CALIFORNIA BUILDING STANDARDS COMMISSION

MONOGRAPH

OF

COMMISSION ACTION

2004 ANNUAL CODE ADOPTION CYCLE

Note: The Commission will meet on May 17, 2006 at 10:00 AM to ratify their actions of the March 22 and 23, 2006 meeting. The meeting will be held at the Department of Consumer Affairs, 1625 North Market Blvd., Suite 120, Sacramento, CA 95834

VOLUME II OF IV

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March 2006

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Preface

California Building Standards Law (Health and Safety Code §18929.1) requires state agencies that propose building standards for adoption in, amendment to, or repeal from the California Building Standards Code (Title 24, California Code of Regulations) to submit the proposed building standards for consideration in an annual code adoption cycle. Building standards law also requires proposed building standards to undergo a technical review by the Code Advisory Committees appointed by the Commission, and to be noticed in accordance with administrative requirements of the California Building Standards Law and the Administrative Procedures Act prior to the Commission taking action.

This document shows the action of the California Building Standards Commission on proposed code changes submitted for the 2004 Annual Code Adoption Cycle.

Code changes originally proposed by the state agencies were published in the "Monograph of Code Change Submittals for 2004", May 2005, which made available to the public for comments. In January and February 2005, the Code Advisory Committees reviewed the proposed code changes, considered public comments, and suggested recommendations to the proposed code changes. The recommendations of the Code Advisory Committees and the proposed code changes were made available to the public in the "Monograph of Code Change Submittals for 2004 Annual Code Adoption Cycle," May 2005, in accordance with the Administrative Procedures Act. In October 2005, the "Monograph of Public Comments" was made available to the public prior to the Commission taking action on each proposed code change.

This monograph represents the final actions of the Commission at the March 22, & 23, 2006 meeting for each proposed code change submitted for the 2004 Annual Code Adoption Cycle.

The Commission regarding any item as printed herein this monograph will hear no new comments or challenges at the March 22 &23, 2006 meeting.

NOTE: The meeting facilities and restrooms are accessible to persons with disabilities. Requests for the following accommodations will be provided by the California Building Standards Commission by calling Michael Nearman at (916) 263-0916:

- Assistive Listening Devices
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Requests are to be made no later than 10 working days prior to the day of the meeting. If Paratransit services are needed, they may be contacted at (916) 363-0661.

Metered parking is available on the street and at various off street parking lots around the Department of Health Services, 1500 Capitol Avenue, Sacramento, CA. 95814. The closest parking is located at 15th and L Streets.

For more information regarding the cycle process please visit the California Building Standards Commission web site at; www.bsc.ca.gov.

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California Building Standards Commission

MARCH 2006

Commission Action Monograph
California Code of Regulations
Title 24
(Submittals for 2004 Annual Cycle)

NOTE: In order to follow the proposed revisions through the code change cycle, it is important to retain parts 1, 2, 3, 4, 5, 9, & 12 of the California Building Standards Code.

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State of California
California Building Standards Commission

2525 Natomas Park Drive, Suite 130, Sacramento, CA 95833 – 2936

Suggested Revisions to the California Building Standards Code
Part 1 – California Administrative Code
Part 2 – California Building Code
Part 3 – California Electrical Code
Part 4 – California Mechanical Code
Part 5 – California Plumbing Code
Part 9 – California Fire Code
Part 12 – California Referenced Standards Code

Submittals for 2004 Annual Code Adoption Cycle

OPEN MEETING – WHERE AND WHEN

The "COMMISSION ACTIONS" contained within this monograph will be ratified by the California Building Standards Commission at a public meeting to be held as indicated below:

California Building Standards Commission

When	Where
Wednesday – May 17, 2006 **10:00 AM**	**Department of Consumer Affairs** **1625 North Market Blvd., Suite 120** **Sacramento, CA 95834**

PRESENTATION FORMAT OF CODE CHANGES

Each proposed code change is identified by **"ITEM #."** Each proposed code change retains the same item number until the end of the annual cycle (Approval CBSC Meeting). The item number assist persons in following this process from the beginning to the end. The format of each item is as follows:

STATE AGENCY CODE CHANGE SUBMITTAL:
This monograph contains the final adopted code change for each item number. New or amended regulations are shown as underlined. Repealed regulations are shown in strikeout.

Legend of Proposing or Adopting State Agencies

CBSC - California Building Standards Commission --
Thomas L. Morrison.....(916) 263-0916

HCD - Department of Housing and Community Development --
Chris Anderson.....(916) 445-9471

DSA/AC - Division of the State Architect --
Access Compliance
Michael Mankin.....(916) 445-5827

DSA/SS - Division of the State Architect --
Structural Safety
Richard Conrad .....(916) 445-8100

OSHPD - Office of Statewide Health Planning & Development --
Sue Botelho.....(916) 654-2012

SFM - State Fire Marshal --
Kevin Reinertson……..(916) 445-8200

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2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 4: HCD 3/04 Part 2, 2001 CBC, Chapters 16, 19, 22, 22B, and 23	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 4-1	HCD 3/04 Matrix Adoption Tables, Chapters 16 through 23	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-2	HCD 3/04 Chapter 16, Sections 1612.3.2*, 1612.3.2.1 and 1612.3.2.2 Alternate Basic Load Combinations*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-3	HCD 3/04 Chapter 16, Sections 1629.4.2*, 1629.4.2.1 and 1629.4.2.2 Seismic Zone 4 Near Source Factor*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-4	HCD 3/04 Chapter 16, Section 1630.2.3.4 Horizontal Distribution	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-5	HCD 3/04 Chapter 16, Sections 1630.4.2*, 1630.4.2.1 and 1630.4.2.2 Vertical Combinations*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-6	HCD 3/04 Chapter 16, Sections 1630.8.2.1*, 1630.8.2.1.1 and 1630.8.2.1.2 General*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-7	HCD 3/04 Chapter 16, Sections 1630.8.2.2*, 1630.8.2.2.1and 1630.8.2.2.2 Detailing Requirements*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-8	HCD 3/04 Chapter 16, Reference Sections and TABLE 16-N.1—STRUCTURAL SYSTEMS	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 4: HCD 3/04 Part 2, 2001 CBC, Chapters 16, 19, 22, 22B, and 23	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 4-9	HCD 3/04 Chapter 19, Sections 1915.2.2, *1915.2.2.1 and 1915.2.2.2 Base area of footing*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-10	HCD 3/04 Chapter 19, Sections 1928.1.2.3, *1928.1.2.3.1 and 1928.1.2.3.2 Basic Combinations*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-11	HCD 3/04 Chapter 22, Sections 2204.1, *2204.1.1 and 2204.1.2 Load and Resistance Factor Design*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-12	HCD 3/04 Chapter 22, Sections 2204.2, *2204.2,1 and 2204.2.2 Allowable Stress Design*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-13	HCD 3/04 Chapter 22, Divisions IV and V—SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-14	HCD 3/04 Chapter 22B STEEL, Divisions I through XI	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 4-15	HCD 3/04 Chapter 23, Division III, Part I—ALLOWABLE STRESS DESIGN OF WOOD	X				**PUBLIC COMMENTS RECEIVED AS FOLLOWS:**					**APPROVE**	X								
						COMMENT #1 Shelia Lee CALBO Requests: Approve as Amended		X												

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

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		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
						COMMENT #2 **David Tyree, P.E.** **C.B.O.** American Forest & Paper Association **Requests:** **Approve as Amended**		X												

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 5: BSC 1/04 Part 2, 2001 CBC, Chapters 16, 19, 22, and 23	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 5-1	BSC 1/04 Chapter 16, Sections 1612.3.2, 1629.4.2, 1630.4.2, 1630.8.2.1 and 1630.8.2.2 and Matrix Table	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 5-2	BSC 1/04 Chapter 16, Referenced Sections, TABLES *16-N.1* and Table 16-O, & Appendix Ch. 16	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 5-3	BSC 1/04 Chapter 19, Sections 1915.2.2 and 1928.1.2.3 and Matrix Table	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 5-4	BSC 1/04 Chapter 22, Section 2204.1 and 2204.2 and Matrix Table	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 5: BSC 1/04 Part 2, 2001 CBC, Chapters 16, 19, 22, and 23	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 5-5	BSC 1/04 Chapter 23, Division III, Part I—ALLOWABLE STRESS DESIGN OF WOOD and Matrix Table	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 6: DSA SS 1/04 Part 2, 2001 CBC, Chapters 16A, 18A, 19A, 21A, 22A, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 6-1	DSA/SS 1/04 Chapter 16A, Sections 1605A.2.2 and 1611A.7	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-2	DSA/SS 1/04 Chapter 16A, Section 1629A.1 Basis for Design	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-3	DSA/SS 1/04 Chapter 16A, Section 1629A.9.2 Undefined structural systems	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-4	DSA/SS 1/04 Chapter 16A, Section 1629A.10.2 Seismic isolation	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-5	DSA/SS 1/04 Chapter 16A, Section 1630A.1.1 Earthquake loads.	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-6	DSA/SS 1/04 Chapter 16A, Section 1630A.8.3 At foundation	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 6: DSA SS 1/04 Part 2, 2001 CBC, Chapters 16A, 18A, 19A, 21A, 22A, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 6-7	DSA/SS 1/04 Chapter 16A, Section 1631A.2 Ground Motion, Items 5 and 6; and sections 1631A.2.1 and 1631A.2.2	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-8	DSA/SS 1/04 Chapter 16A, Section 1632A.1 General	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-9	DSA/SS 1/04 Chapter 16A, Section 1632A.2 Design for Total Lateral Force	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-10	DSA/SS 1/04 Chapter 16A, Section 1632A.6 HVAC Ductwork, Plumbing/Piping and Conduit Systems	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-11	DSA/SS 1/04 Chapter 16A, Section 1633A.2.6 Collector Elements	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-12	DSA/SS 1/04 Chapter 16A, Section 1633A.2.12 Foundations and super-structure-to-foundation connections	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-13	DSA/SS 1/04 Chapter 16A, Table 16A-M—PLAN STRUCTURAL IRREGULARITIES	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-14	DSA/SS 1/04 Chapter 16A, Table 16A-O—HORIZONTAL FORCE FACTORS	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-15	DSA/SS 1/04 Chapter 16A, Section 1637A	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 6: DSA SS 1/04 Part 2, 2001 CBC, Chapters 16A, 18A, 19A, 21A, 22A, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 6-17	DSA/SS 1/04 Chapter 16A, SECTION 1641A--DEFINITIONS	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-18	DSA/SS 1/04 Chapter 16A, Section 1642A.1 The following symbols	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-19	DSA/SS 1/04 Chapter 16A, Sections 1644A.9.2.3.3 and 1644A.9.13.1.2.1	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-20	DSA/SS 1/04 Chapter 16A, Section 1648A.2.4 & 1648A.2.4.1.1	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-21	DSA/SS 1/04 Chapter 16A, Section 1649A.5.1 Reports	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-22	DSA/SS 1/04 Appendix Chapter 16A, Section 1657A.3 Occupancy Categories	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-23	DSA/SS 1/04 Appendix Chapter 16A, Section 1665A.2.3 Sequence and cycles	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-24	DSA/SS 1/04 Appendix Chapter 16A, Section 1665A.4 System adequacy	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-25	DSA/SS 1/04 Chapter 18A, Sections 1804A.1, 1806A.2 and 1809A.5.1	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-26	DSA/SS 1/04 Chapter 19A, Sections 1903A.3.2.1 and 1903A.11	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-27	DSA/SS 1/04 Chapter 19A, Section 1905A.2.3 Concrete	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 6: DSA SS 1/04 Part 2, 2001 CBC, Chapters 16A, 18A, 19A, 21A, 22A, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
	specified																			
SUB-ITEM 6-28	DSA/SS 1/04 Chapter 19A, Sections 1905A.5.1 and 1905A.5.2 As data becomes . . .	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-29	DSA/SS 1/04 Chapter 19A, Section 1921A.0 Notations	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-30	DSA/SS 1/04 Chapter 19A, Sections 1921A.3.2.1 and 1921A.5.3.1	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-31	DSA/SS 1/04 Chapter 21A, Section 2108A.2.2.6 Development	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-32	DSA/SS 1/04 Chapter 21A, Section 2108A.2.6.2.6 Members subjected to axial force and flexure	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-33	DSA/SS 1/04 Chapter 22A, Sections 2213A.7.3 and 2213A.9.1	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-34	DSA/SS 1/04 Chapter 22A, SECTION 2219A—GENERAL and section 2219A.3 Design	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-35	DSA/SS 1/04 Chapter 22A, Section 2220A.2 Boundary Members and Anchorage	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-36	DSA/SS 1/04 Chapter 23A, Division III, Part I—ALLOWABLE STRESS DESIGN OF WOOD	X				**COMMENT #1 David Tyree, P.E. C.B.O.** American Forest & Paper Association **Requests: Approve as Amended**		X			**APPROVE AS RESUBMITTED**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 6: DSA SS 1/04 Part 2, 2001 CBC, Chapters 16A, 18A, 19A, 21A, 22A, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 6-37	DSA/SS 1/04 Chapter 23A, Sections 2318A.3.3 and *2318A.3.4*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 6-38	DSA/SS 1/04 Chapter 23A, Sections 2320A.8.3, *2320A.8.7 and* 2320A.12.8	X				**COMMENT #1 David Tyree, P.E. C.B.O.** American Forest & Paper Association **Requests: Approve as Amended**		X			**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 7: OSHPD 2/04 Part 2, 2001 CBC, Chapters 1 and 4A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				HEALTH FACILITIES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 7-1	OSHPD 2/04 Chapter 1, section *101.17.13 OSHPD 1 & OSHPD 2*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-2	OSHPD 2/04 Chapter *4A*, Section *420A.1 Scope*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-3	OSHPD 2/04 Chapter *4A*, Sections *420A.7.1* and *420A.7.2*	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 7: OSHPD 2/04 Part 2, 2001 CBC, Chapters 1 and 4A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				HEALTH FACILITIES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 7-4	OSHPD 2/04 Chapter *4A,* Sections *420A.37, 420A.49, 421A.1* and *421A.4*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-5	OSHPD 2/04 Chapter *4A,* Section *422A General Construction*	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 7: OSHPD 2/04 Part 2, 2001 CBC, Chapters 16, 16A, 18A, 19, 19A, 22, 22A, 23, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 7-6	OSHPD 2/04 Chapter 16, Section 1605.2.2 Stability against overturning	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-7	OSHPD 2/04 Chapter 16, Section 1633.2.6 Collector elements	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-8	OSHPD 2/04 Chapter 16A, Sections 1605A.2.2 and 1611A.7	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-9	OSHPD 2/04 Chapter 16A, Section 1629A.9.1 Basis for Design	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 7: OSHPD 2/04 Part 2, 2001 CBC, Chapters 16, 16A, 18A, 19, 19A, 22, 22A, 23, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 7-10	OSHPD 2/04 Chapter 16A, Section 1629A.9.2 Undefined structural systems	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-11	OSHPD 2/04 Chapter 16A, Section 1630A.1.1 Earthquake loads	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-12	OSHPD 2/04 Chapter 16A, Section 1630A.8.3 At foundation	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-13	OSHPD 2/04 Chapter 16 A, Section 1631A.2 Ground Motion, Items 5 and 6, & Sections 1631A.2.1 & 1631A.2.2	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-14	OSHPD 2/04 Chapter 16A, Section 1632A.1 General	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-15	OSHPD 2/04 Chapter 16A, Section 1632A.2 Design for Total Lateral Force	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-16	OSHPD 2/04 Chapter 16A, Section 1632A.6 HVAC Ductwork, Plumbing/ Piping and Conduit Systems	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-17	OSHPD 2/04 Chapter 16A, Section 1633A.2.6 Collector Elements	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-18	OSHPD 2/04 Chapter 16A, Section 1633A.2.12 Foundations and superstructure-to-foundation connections	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 7: OSHPD 2/04 Part 2, 2001 CBC, Chapters 16, 16A, 18A, 19, 19A, 22, 22A, 23, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 7-19	OSHPD 2/04 Chapter 16A, Table 16A-M—PLAN STRUCTUR-AL IRREGULARITIES	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-20	OSHPD 2/04 Chapter 16A, Table 16A-O—HORIZON-TAL FORCE FACTORS	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-21	SUB-ITEM 7-21 OSHPD 2/04 Chapter 16A, SECTION 1641A—DEFINITIONS	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-22	OSHPD 2/04 Chapter 16A, Section 1642A.1 The following symbols . . .	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-23	OSHPD 2/04 Chapter 16A, Section 1643A.1 Basis for Evaluation and Design	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-24	OSHPD 2/04 Chapter 16A, Section 1644A.9.2.3.2 In order to qualify . . .	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-25	OSHPD 2/04 Chapter 16A, Section 1644A.13.1.2 Critical nonstructural . . .	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-26	OSHPD 2/04 Appendix Chapter 16A, Section 1648A.2.3.1 If load . . .	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-27	OSHPD 2/04 Appendix Chapter 16A, Section 1648A.2.4 The ground motion . . .	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 7: OSHPD 2/04 Part 2, 2001 CBC, Chapters 16, 16A, 18A, 19, 19A, 22, 22A, 23, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 7-28	OSHPD 2/04 Appendix Chapter 16A, Section 1665A.2.3 Sequence and cycles	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-29	OSHPD 2/04 Appendix Chapter 16A, Section 1665A.4 System adequacy	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-30	OSHPD 2/04 Chapter 18A, Sections 1804A.1 and 1809A.5.1	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-31	OSHPD 2/04 Chapter 19, Section 1921.0 Notations	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-32	OSHPD 2/04 Chapter 19A, Section 1903A.11 Glass Fiber Reinforced Concrete	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-33	OSHPD 2/04 Chapter 19A, Section 1905A.2.3 Concrete specified	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-34	OSHPD 2/04 Chapter 19A, Section 1921A.0 Notations	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-35	OSHPD 2/04 Chapter 19A, Sections 1921A.3.2.1 and 1921A.5.3.1	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-36	OSHPD 2/04 Chapter 21A, Section 2108A.2.2.6 Development	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-37	OSHPD 2/04 Chapter 21A, Section 2108A.2.6.2.6 Members subjected to axial force and flexure	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 7: OSHPD 2/04 Part 2, 2001 CBC, Chapters 16, 16A, 18A, 19, 19A, 22, 22A, 23, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 7-38	OSHPD 2/04 Chapter 22, Section 2210—AMEND-MENTS, 3.1 Loads and Load Combinations	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-39	OSHPD 2/04 Chapter 22A, Sections 2213A.7.3 and 2213A.9	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-40	OSHPD 2/04 Chapter 22A, SECTION 2219A—GENERAL and section 2219A.3 Design	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-41	OSHPD 2/04 Chapter 22A, Section 2220A.2 Boundary Members and Anchorage	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-42	OSHPD 2/04 Chapter 23, Division III, Part I—ALLOW-ABLE STRESS DESIGN OF WOOD	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-43	OSHPD 2/04 Chapter 23A, Division III, Part I—ALLOWABLE STRESS DESIGN OF WOOD	X				**COMMENT #1 David P. Tyree, P.E., C.B.O.** American Forest and Paper Assoc. **Requests: Approve as Amended**		X			**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 7-44	OSHPD 2/04 Chapter 23A, Sections 2318A.3.3 and *2318A.3.4*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 7-45	OSHPD 2/04 Chapter 23A, Sections 2320A.8.3, *2320A.8.7 and* 2320A.12.8	X				**COMMENT #1 David P. Tyree, P.E., C.B.O.** American Forest and Paper Assoc. **Requests: Approve as Amended**		X			**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 7: OSHPD 2/04 Part 2, 2001 CBC, Chapters 16, 16A, 18A, 19, 19A, 22, 22A, 23, and 23A	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				STRUCTURAL DESIGN & LATERAL FORCES CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 7-46	OSHPD 2/04 MATRIX ADOPTION TABLES, Chapters 20, 21, 22, Appendix Chapter 16, Appendix Chapter 16A	X				**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 8: SFM 5/04 Part 2, 2001 CBC, Chapters 1, 2, 3, 5, 9, 10, 11A, and 35	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				BUILDING, FIRE, & OTHER CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 8-1	SFM 5/04 Chapter 1, section *101.17.14 SFM - Office of the State Fire Marshal*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 8-2	Chapter 2, Definitions and Abbreviations, Sections 202 and 215										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-3	Chapter 3, Section 305.1, Group E Occupancies Defined, Division 3										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-4	Chapter 3, Section *305.1.1 Special provisions for nonambulatory persons in Adult Day Programs*										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-5	Chapter 3, Section *305.9.1 Fire Alarm Systems*										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 8: SFM 5/04 Part 2, 2001 CBC, Chapters 1, 2, 3, 5, 9, 10, 11A, and 35	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				BUILDING, FIRE, & OTHER CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 8-6	SFM 5/04 Chapter 3, section *305.11.3 Exempted Portable Buildings*	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 8-7	Chapter 3, Sections 308.1 and *308.1.1.1* Group I Occupancies										**DISAPPROVE**					**WITHDRAWN BY SFM**				
SUB-ITEM 8-8	Chapter 3, Sections 308.2 and 308.2.1.1 Construction Height and Allowable Area **WITHDRAWN BY SFM**																			
SUB-ITEM 8-9	Chapter 3, Table 3-A – Description of Occupancies by Group and Division										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-10	Chapter 3, Section 310.1 Group R Occupancies Defined; Relocate Division 6 Occupancies into Chapter 3										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-11	Appendix Chapter 3A, Division II, Sections *323A* and *324A.2* **WITHDRAWN BY SFM**																			
SUB-ITEM 8-12	Chapter 5, Section 506 – MAXIMUM HEIGHT OF BUILDINGS AND INCREASES, Items 5 & 6 **WITHDRAWN BY SFM**																			
SUB-ITEM 8-13	Chapter 5, Table 5-B, BASIC ALLOWABLE BUILDING HEIGHTS . . . **WITHDRAWN BY SFM**																			

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 8: SFM 5/04 Part 2, 2001 CBC, Chapters 1, 2, 3, 5, 9, 10, 11A, and 35	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				BUILDING, FIRE, & OTHER CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 8-14	SFM 5/04 Chapter 9, sections 904.1.1 through *904.1.2.1* Installation Requirements	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 8-15	SFM 5/04 Chapter 9, section 904.2.1 Where required	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 8-16	Chapter 9, Section *904.2.4.1.1 Nonambulatory persons in Adult Day Programs*										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-17	Chapter 9, Section *904.2.7.1 Group I, Division 1.2.1* **WITHDRAWN BY SFM**																			
SUB-ITEM 8-18	Chapter 10, Section 1003.3.1.10 Special egress-control devices										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-19	Chapter 10, Section *1007.3.11.1 Fences and gates used for Adult Day Programs*										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-20	SFM 5/04 Chapter 10, section 1007.5.4 Corridors	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								
SUB-ITEM 8-21	Chapter 10, Table 10-A, MINIMUM EGRESS REQUIREMENTS										**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-22	SFM 5/04 Chapter 11A, Repeal section *1108A* and adopt new section *1118A EGRESS AND AREAS FOR EVACUATION ASSISTANCE*			X		**NO COMMENT**					**APPROVE**	X								

2004 ANNUAL CODE CYCLE
SUMMARY OF CALIFORNIA BUILDING STANDARDS COMMISSION ACTION

ITEM NUMBER 8: SFM 5/04 Part 2, 2001 CBC, Chapters 1, 2, 3, 5, 9, 10, 11A, and 35	ITEM DESCRIPTION	CBSC FINAL ACTION TO ITEM				CHALLENGE(S) TO PROPOSED CODE CHANGE AS NOTICED DURING 45 DAY COMMENT PERIOD	CBSC ACTION TO 45 DAY CHALL'G				BUILDING, FIRE, & OTHER CAC RECOMMENDATION TO ITEM	CBSC ACTION ON CAC RECOM'D				CHALLENGE TO THE CAC RECOMMEN-DATION	CBSC ACTION ON CAC CHALL'G			
		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS		A	D	AA	FS
SUB-ITEM 8-23	SFM 5/04 Chapter 35, SECTION 3504, PART II—UBC STAND-ARDS, CHAPTER 9	X				**NO COMMENT**					**APPROVE**	X								
SUB-ITEM 8-24	SFM 5/04 Chapter 35, SECTION 3504, PART IV, sections *3504.1.2 and 3504.1.3 Standards*	X				**NO COMMENT**					**FURTHER STUDY**					**SFM CONCURS WITH FURTHER STUDY**				
SUB-ITEM 8-25	SFM 5/04 Chapter 35, SECTION 3505, sections 3505.1 through 3505.10	X				**NO COMMENT**					**APPROVE AS RESUBMITTED**	X								

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Part 2
California Building Code

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ITEM 4
HCD 03/04
Part 2, Volume 2,
Sub-Items 4-1 through 4-15
Matrix Adoption Tables, Chapters 16, 19, 22, 22B and 23: Various Sections

ITEM 4-1 **APPROVED**

MATRIX ADOPTION TABLES

Department of Housing and Community Development
Division of Codes and Standards
Amended 2001 California Building Code Matrix-Chapter 16– Structural Forces
Adopt entire Chapter as amended, amended sections listed below.

		2001 CBC Amendment Number	Amended 2001 CBC Amendment Number	HCD 1/AC Adoption	HCD 1 Adoption	HCD 2 Adoption	Comments
Chapter 16							
1612.3.2 CA			1612.3.2		X	X	
1612.3.2.1 UBC					+	+	
1612.3.2.2 CA			1612.3.2.2		X	X	
1629.4.2 CA			1629.4.2		X	X	
1629.4.2.1 UBC					+	+	
1629.4.2.2 CA			1629.4.2.2		X	X	
1630.2.3.4 CA			1630.2.3.4		X	X	
1630.4.2 CA			1630.4.2		X	X	
1630.4.2.1 UBC					+	+	
1630.4.2.2 CA			1630.4.2.2		X	X	
1630.8.2.1 CA			1630.8.2.1		X	X	

The **+** designation indicates that the section marked is not adopted by this agency for HCD 1 and/or HCD 2

1630.8.2.1.1 UBC					+	+	
1630.8.2.1.2 CA			1630.8.2.1.2		X	X	
1630.8.2.2 CA			1630.8.2.2		X	X	
1630.8.2.2.1 UBC					+	+	
1630.8.2.2.2 CA			1630.8.2.2.2		X	X	
Table 16 – N UBC					X	X	

Department of Housing and Community Development
Division of Codes and Standards
Amended 2001 California Building Code Matrix-Chapter 19– Concrete
Adopt entire Chapter as amended, amended sections listed below.

1997 UBC		1998 CBC Amendment Number	2001 CBC Amendment Number	HCD 1/AC Adoption	HCD 1 Adoption	HCD 2 Adoption	Comments
Chapter 19							
1915.2.2 CA			1915.2.2		X	X	
1915.2.2.1 UBC					+	+	
1915.2.2.2 CA			1915.2.2.2		X	X	
1928.1.2.3 CA			1928.1.2.3		X	X	
1928.1.2.3.1 UBC					+	+	

The **+** designation indicates that the section marked is not adopted by this agency for HCD 1 and/or HCD 2

Department of Housing and Community Development
Division of Codes and Standards
Amended 2001 California Building Code Matrix-Chapter 22– Steel
Adopt entire Chapter as amended, amended sections listed below.

1997 UBC		1998 CBC Amendment Number	2001 CBC Amendment Number	HCD 1/AC Adoption	HCD 1 Adoption	HCD 2 Adoption	Comments
Chapter 22							
2204.1 CA			2204.1		X	X	
2204.1.1 UBC					+	+	
2204.1.2 CA			2204.1.2		X	X	
2204.2 CA			2204.2		X	X	
2204.2.1 UBC					+	+	
2204.2.2 CA			2204.2.2		X	X	
Division IV UBC					+	+	
Division V UBC					+	+	

The **+** designation indicates that the section marked is not adopted by this agency for HCD 1 and/or HCD 2

Department of Housing and Community Development
Division of Codes and Standards
Amended 2001 California Building Code Matrix-Chapter 22B– Steel
Adopt entire California Chapter.

1997 UBC		1998 CBC Amendment Number	2001 CBC Amendment Number	HCD 1/AC Adoption	HCD 1 Adoption	HCD 2 Adoption	Comments
Chapter 22B					X	X	

Department of Housing and Community Development
Division of Codes and Standards
Amended 2001 California Building Code Matrix-Chapter 23 – Wood
Adopt entire Chapter as amended, amended sections listed below.

1997 UBC		1998 CBC Amendment Number	2001 CBC Amendment Number	HCD 1/AC Adoption	HCD 1 Adoption	HCD 2 Adoption	Comments
Chapter 23							
Part 1 CA			Part 1 CA		X	X	
2316 UBC			2316		X	X	
2316.1 UBC			2316.1		X	X	
2316.1.1 UBC					+	+	
2316.1.2 CA			2316.1.2 CA		X	X	
2316.2 UBC			2316.2		+	+	
2316.3 CA			2316.3 CA		X	X	

The **+** designation indicates that the section marked is not adopted by this agency for HCD 1 and/or HCD 2

* * *

(END OF ITEM)

ITEM 4-2
HCD 03/04
Part 2, Volume 2, **APPROVED**

EXPRESS TERMS

~~**1612.3.2 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*.~~

~~D + L + (L_r 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.~~

1612.3.2 Alternate basic load combinations.

1612.3.2.1 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*.

D + L + (L_r 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.

1612.3.2.2 [For HCD 1 & HCD 2] 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_r 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/m ^{2}) or less need not be combined with seismic loads. Where design snow loads exceed 30 psf (1.44 kN/m ^{2}), 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.

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

* * *

(END OF ITEM)

ITEM 4-3
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~~**1629.4.2 Seismic Zone 4 near-source factor.** In Seismic Zone 4, each site shall be assigned a near-source factor in accordance with Table 16-S and the Seismic Source Type set forth in Table 16-U. The value of *Na* used to determine *Ca* need not exceed 1.1 for structures complying with all the following conditions:~~

~~1. The soil profile type is *SA, SB, SC* or *SD.*~~

~~2. ρ = 1.0.~~

~~3. Except in single-story structures, Group R, Division 3 and Group U, Division 1 Occupancies, moment frame systems designated as part of the lateral-force-resisting system shall be special moment-resisting frames.~~

~~4. The exceptions to Section 2213.7.5 shall not apply, except for columns in one-story buildings or columns at the top story of multistory buildings.~~

~~5. None of the following structural irregularities is present:~~
~~Type 1, 4 or 5 of Table 16-L, and Type 1 or 4 of Table 16-M.~~

1629.4.2 Seismic Zone 4 near-source factor.

1629.4.2.1 In Seismic Zone 4, each site shall be assigned a near-source factor in accordance with Table 16-S and the Seismic Source Type set forth in Table 16-U. The value of *Na* used to determine *Ca* need not exceed 1.1 for structures complying with all the following conditions:

1. The soil profile type is *SA, SB, SC* or *SD.*

2. ρ = 1.0.

3. Except in single-story structures, Group R, Division 3 and Group U, Division 1 Occupancies, moment frame systems designated as part of the lateral-force-resisting system shall be special moment-resisting frames.

4. The exceptions to Section 2213.7.5 shall not apply, except for columns in one-story buildings or columns at the top story of multistory buildings.

5. None of the following structural irregularities is present:
Type 1, 4 or 5 of Table 16-L, and Type 1 or 4 of Table 16-M.

1629.4.2.2 [For HCD 1 & HCD 2] In Seismic Zone 4, each site shall be assigned a near-source factor in accordance with Table 16-S and the Seismic Source Type set forth in Table 16-U. The value of N_a used in determining C_a need not exceed 1.1 for structures complying with all the following conditions:

1. The soil profile type is S_A, S_B, S_C or S_D.

2. $\rho = 1.0$.

3. Except in single-story structures, Group R, Division 3 and Group U, Division 1 Occupancies, moment frame systems designated as part of the lateral-force-resisting system shall be special moment-resisting frames.

*4. * * * The provisions in Sections 9.6a and 9.6b of AISC - Seismic Part 1 shall not apply, except for columns in one-story buildings or columns at the top story of multistory buildings.*

5. None of the following structural irregularities is present: Type 1, 4 or 5 of Table 16-L, and Type 1 or 4 of Table 16-M.

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

* * *

(END OF ITEM)

ITEM 4-4
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1630.2.3.3 *Distribution*

~~**1630.2.3.3**~~ ***1630.2.3.3.1*** **Vertical Distribution.** The forces at each level shall be calculated using the following formula:

$$F_x = \frac{3.0\,C_a}{R} W_i \qquad (30\text{-}12)$$

where the value of C_a shall be determined in Section 1630.2.3.2.

1630.2.3.3.2 [For HCD 1 & HCD 2] Horizontal Distribution. *Diaphragms constructed of untopped steel decking or wood structural panels or similar light-frame construction are permitted to be considered as flexible.*

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

* * *

(END OF ITEM)

ITEM 4-5
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~~**1630.4.2 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 amplified by the ratio of the *(R/*ρ) of the upper portion over *(R/*ρ) of the lower portion.~~

1630.4.2 Vertical combinations.

1630.4.2.1 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 amplified by the ratio of the *(R/*ρ) of the upper portion over *(R/*ρ) of the lower portion.

~~***1630.4.2.1***~~ ***1630.4.2.2 [For HCD 1 & HCD 2]*** 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.*

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

* * *

(END OF ITEM)

ITEM 4-6
HCD 03/04
Part 2, Volume 2, **APPROVED**

~~**1630.8.2.1 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 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.~~

~~**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 a resistance factor, Φ, of 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.~~

1630.8.2.1 General.

1630.8.2.1.1 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 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.

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 a resistance factor, Φ, of 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.

~~***1630.8.2.1.1***~~ ***1630.8.2.1.2*** **[For HCD 1 & HCD 2]** 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 a resistance factor, Φ, of 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.

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

* * *

(END OF ITEM)

ITEM 4-7
HCD 03/04
Part 2, Volume 2, **APPROVED**

~~**1630.8.2.2 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 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 axial-load members shall comply with Sections 2213.5.2 and 2213.5.3.~~

~~6. 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 Section 2213.7.1.3.~~

~~7. Wood elements designed primarily as flexural members shall be provided with lateral bracing or solid blocking at each end of the element and at the connection location(s) of the discontinuous system.~~

1630.8.2.2 Detailing requirements in Seismic Zones 3 and 4.

1630.8.2.2.1 In Seismic Zones 3 and 4, elements supporting discontinuous systems shall meet the following detailing or member limitations:

1. Reinforced concrete 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 axial-load members shall comply with Sections 2213.5.2 and 2213.5.3.

6. 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 Section 2213.7.1.3.

7. Wood elements designed primarily as flexural members shall be provided with lateral bracing or solid blocking at each end of the element and at the connection location(s) of the discontinuous system.

~~***1630.2.2.1***~~ ***1630.8.2.2.2 [For HCD 1 & HCD 2]*** 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. * * *

~~5~~ 6. 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 I, Section 9.4b.*

~~6~~ 7. Wood elements designed primarily as flexural members shall be provided with lateral bracing or solid blocking at each end of the element and at the connection location(s) of the discontinuous systems.

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

* * *

(END OF ITEM)

ITEM 4-8
HCD 03/04
Part 2, Volume 2, APPROVED

Section 1628 – Symbols and Notations

R = numerical coefficient representative of the inherent overstrength and global ductility capacity of lateral-force-resisting systems, as set forth in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1* or 16-P.

Ω = Seismic Force Amplification Factor, which is required to account for structural overstrength and set forth in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*.

1629.6.1 General. Structural systems shall be classified as one of the types listed in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1* and defined in this section.

1629.6.7 Undefined structural system. A structural system not listed in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*

1629.7 Height Limits. Height limits for the various structural systems in Seismic Zones 3 and 4 are given in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*.

EXCEPTION: Regular structures may exceed these limits by not more than 50 percent for unoccupied structures, which are not accessible to the general public.

1629.8.3 Static. The static lateral force procedure of Section 1630 may be used for the following structures:

1. All structures, regular or irregular, in Seismic Zone 1 and in Occupancy Categories 4 and 5 in Seismic Zone 2.

2. Regular structures under 240 feet (73 152 mm) in height with lateral force resistance provided by systems listed in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*, except where Section 1629.8.4, Item 4, applies.

3. Irregular structures not more than five stories or 65 feet (19 812 mm) in height.

4. Structures having a flexible upper portion supported on a rigid lower portion where both portions of the structure considered separately can be classified as being regular, the average story stiffness of the lower portion is at least 10 times the average story stiffness of the upper portion and the period of the entire structure is not greater than 1.1 times the period of the upper portion considered as a separate structure fixed at the base.

1629.9.2 Undefined structural systems. For undefined structural systems not listed in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*, the coefficient R shall be substantiated by approve cyclic test data and analysis. ….

~~*1630.2.3.5*~~ **1630.2.3.4 Applicability.** Sections 1630.1.2, 1630.1.3, 1630.2.1, 1630.2.2, 1630.5, 1630.9, 1630.10 and 1631 shall not apply when using the simplified procedure.

EXCEPTION: For buildings with relatively flexible structural systems, the building official may require consideration of $P\Delta$ effects and drift in accordance with Sections 1630.1.3, 1630.9 and 1630.10.Δs shall be prepared using design seismic forces from Section 1630.2.3.2.

Where used, ΔM shall be taken equal to 0.01 times the story height of all stories. In Section 1633.2.9, Formula (33-1) shall read F_{px} =3.0 $C_a R_{wpx}$ and need not exceed 1.0 $C_a w_{px}$, but shall not be less than 0.5 $C_a w_{px}$. R and Ω_o shall be taken from Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*.

1630.3.1 Determination of Ω_o. For specific elements of the structure, as specifically identified in this code, the minimum design strength shall be the product of the seismic force overstrength factor Ω_o and the design seismic forces set forth in Section 1630. For both Allowable Stress Design and StrengthDesign, the Seismic Force Overstrength Factor, Ω_o, shall be taken from Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*.

1630.3.2 Determination of *R*. The notation *R* shall be taken from Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*.

1633.2.1 General. Four types of general building framing systems defined in Section 1629.6 are recognized in these provisions and shown in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*. Each type is subdivided by the types of vertical elements used to resist lateral seismic forces. Special framing requirements are given in this section and in Chapters 19 through 23.

1634.2 Lateral Force. Lateral-force procedures for nonbuilding structures with structural systems similar to buildings (those with structural systems which are listed in Table 16-N *[For HCD 1 & HCD 2] Table 16-N.1*) shall be selected in accordance with the provisions of Section 1629.

> **EXCEPTION:** Intermediate moment-resisting frames (IMRF) may be used in Seismic Zones 3 and 4 for nonbuilding structures in Occupancy Categories 3 and 4 if (1) the structure is less than 50 feet (15 240 mm) in height and (2) the value *R* used in reducing calculated member forces and moments does not exceed 2.8.

TABLE 16-N — STRUCTURAL SYSTEMS

Repeal adoption of Chapter 16, Table 16-N in its entirety and adopt the proposed Chapter 16, Table 16-N.1.

TABLE 16-N.1 — [For HCD 1 & HCD 2] STRUCTURAL SYSTEMS [1]

BASIC STRUCTURAL SYSTEM[2]	LATERAL-FORCE-RESISTING SYSTEM DESCRIPTION	*R*	*Ωo*	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 walls			
	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]	5.6	2.2	=
	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*	-
	b. Concrete[7]	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]	4.2	2.8	=
	g. Masonry with masonry MMRWF	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)*			
	a. Steel with steel SMRF	=	=	=
	b. Steel with steel OMRF	=	=	=
	c. Concrete with concrete SMRF[3]	=	=	=
	d. Concrete with concrete IMRF[3]	=	=	=
	4. Special concentrically braced frames			
	a. Steel with steel SMRF	7.5	2.8	N.L.
	b. Steel with steel OMRF *(Not Permitted)*	=	=	=
	5. Steel IMRF (Not permitted)	=	=	=
5. Cantilevered column building systems	1. Cantilevered column elements	2.2	2.0	35[7]
6. Shear wall-frame interaction systems	1. Concrete[8]	5.5	2.8	160
7. Undefined systems	See Section 1629.6.7 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] * * * *Unless otherwise approved by the enforcement agency, in Seismic Zone 4 :*
[6.1] *Steel IMRF are permitted for buildings 35 ft. or less in height and the dead load of the roof, walls or floors not exceeding 35 psf each; or for single-story buildings 60 ft. or less in height with dead load of the roof or walls not exceeding 15 psf each where the moment joints of field connections are constructed of bolted end plates; or single-family dwellings using light frame construction with R = 3.0 and Ω_o = 2.2.*
[6.2] *Steel OMRF are permitted for buildings 35 ft or less in height with the dead load of the roof, walls or floors not exceeding 15 psf each; or single-story buildings 60 ft or less in height with the dead load of the roof or walls not exceeding 15 psf each and where the moment joints of field connections are constructed of bolted end plates.*
[6.3] *Steel Ordinary Braced Frames are permitted for buildings 35 ft or less in height; or penthouse structures; or single-story buildings 60 ft or less in height with the dead load of the roof or walls not exceeding 15 psf. each.*
[7] Total height of the building including cantilevered columns.
[8] Prohibited in Seismic Zones 2A, 2B, 3 and 4. See Section 1633.2.7.

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

* * *

(END OF ITEM)

ITEM 4-9
HCD 03/04
Part 2, Volume 2, APPROVED

CHAPTER 19 – CONCRETE

~~**1915.2.2 Base area of footing or number and arrangement of piles.** 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 un-factored loads (D, L, W and E) specified in Chapter 16.*~~

1915.2.2 Base area of footing or number and arrangement of piles.

1915.2.2.1 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 un-factored loads (D, L, W and E) specified in Chapter 16.*

~~***1915.2.2.1***~~ ***1915.2.2.2 [For HCD 1 & HCD 2]*** 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.*

1921.2.1.7 *In structures having precast gravity systems, the lateral-force-resisting system shall be one of the systems listed in Table 16-N [For HCD 1 & HCD 2] Table 16-N.1 and shall be well distributed using one of the following methods:*

1. The lateral-force-resisting systems shall be spaced such that the span of the diaphragm or diaphragm segment between lateral-force-resisting systems shall be no more than three times the width of the diaphragm or diaphragm segment.

Where the lateral-force-resisting system consists of moment-resisting frames, at least [(Nb/4) + 1] of the bays (rounded up to the nearest integer) along any frame line at any story shall be part of the lateral-force-resisting system, where Nb is the total number of bays along that line at that story. This requirement applies to only the lower two thirds of the stories of buildings three stories or taller.

2. All beam-to-column connections that are not part of the lateral-force-resisting system shall be designed in accordance with the following:

Connection design force. *The connection shall be designed to develop strength M. M is the moment developed at the connection when the frame is displaced by Δs assuming fixity at the connection and a beam flexural stiffness of*

no less than one-half of the gross section stiffness. M shall be sustained through a deformation of Δm [for OSHPD 2] ΔM.

Connection characteristics. *The connection shall be permitted to resist moment in one direction only, positive or negative. The connection at the opposite end of the member shall resist moment with same positive or negative sign. The connection shall be permitted to have zero flexural stiffness up to a frame displacement of Δs.*

In addition, complete calculations for the deformation compatibility of the gravity load carrying system shall be made in accordance with Section 1633.2.4 using cracked section stiffnesses in the lateral-force-resisting system and the diaphragm.

Where gravity columns are not provided with lateral support on all sides, a positive connection shall be provided along each unsupported direction parallel to a principal plan axis of the structure. The connection shall be designed for a horizontal force equal to 4 percent of the axial load strength (P0) of the column. The bearing length shall be 2 inches (51 mm) more than that required for bearing strength.

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

*** * ***

(END OF ITEM)

ITEM 4-10
HCD 03/04
Part 2, Volume 2, **APPROVED**
1928.1.2.3 Basic Combinations.

~~***1928.1.2.3 Basic Combinations.*** When permitted by Section 1928.1, structures, components 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 + 0.5(L_r or S or R)~~
~~3. 1.2D + 1.6(L_r or S or R) + (0.5L or 0.8W)~~
~~4. 1.2D + 1.3W + 0.5L + 0.5(L_r or S or R)~~
~~5. 1.2D ± 1.5E + (0.5L or 0.2S)~~
~~6. 0.9D ± (1.3W or 1.5E)~~

~~**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.~~

1928.1.2.3.1 When permitted by Section 1928.1, structures, components 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 + 0.5(L_r or S or R)
3. 1.2D + 1.6(L_r or S or R) + (0.5L or 0.8W)
4. 1.2D + 1.3W + 0.5L + 0.5(L_r or S or R)
5. 1.2D ± 1.5E + (0.5L or 0.2S)
6. 0.9D ± (1.3W or 1.5E)

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.

~~*1928.1.2.3.1*~~ ***1928.1.2.3.2 [For HCD 1 & HCD 2]*** When permitted by Section 1928.1, structures, components 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 + 0.5(L_r or S or R)
3. 1.2D + 1.6(L_r or S or R) + (0.5L or 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 ± (1.3W 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.

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

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(END OF ITEM)

ITEM 4-11
HCD 03/04
Part 2, Volume 2, APPROVED

CHAPTER 22 – STEEL

~~**2204.1 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. Seismic design of structures, where required, shall comply with Division IV for structures designed in accordance with Division II (LRFD).~~

2204.1 Load and Resistance Factor Design.

2204.1.1 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. Seismic design of structures, where required, shall comply with Division IV for structures designed in accordance with Division II (LRFD).

~~*2204.1.1*~~ ***2204.1.2 [For HCD 1 & HCD 2]*** 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. * * *

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(END OF ITEM)

ITEM 4-12
HCD 03/04
Part 2, Volume 2, APPROVED

~~**2204.2 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. Seismic design of structures, where required, shall comply with Division V for structures designed in accordance with Division III (ASD).~~

2204.2 Allowable Stress Design.

2204.2.1 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. Seismic design of structures, where required, shall comply with Division V for structures designed in accordance with Division III (ASD).

~~2204.2.1~~ ***2204.2.2 [For HCD 1 & HCD 2]*** *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.* * * *

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

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(END OF ITEM)

ITEM 4-13
HCD 03/04
Part 2, Volume 2, **APPROVED**

Division IV – SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS

NOTE: This Division shall not apply to applications regulated by the Department of Housing and Community Development as referenced in Sections 101.17.9 and 101.17.10. See Chapter 22B, Division IV.

Repeal the adoption of Chapter 22, Division IV, Sections 2210 and 2211 in their entirety and adopt the proposed Chapter 22B, Division IV, Sections 2210B, 2211B and 2212B.

Division V – SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS FOR USE WITH ALLOWABLE STRESS DESIGN

NOTE: This Division shall not apply to applications regulated by the Department of Housing and Community Development as referenced in Sections 101.17.9 and 101.17.10. See Chapter 22B, Division V

Repeal the adoption of Chapter 22, Division V, Sections 2212, 2213 and 2214 in their entirety and adopt the proposed Chapter 22B, Division V, Sections 2213B, 2214B and 2215B.

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

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(END OF ITEM)

ITEM 4-14
HCD 03/04
Part 2, Volume 2, APPROVED

CHAPTER 22B [For HCD 1 & HCD 2]

STEEL

DIVISION I – GENERAL

See Chapter 22, STEEL, Division I for content of this division.

DIVISION II – DESIGN STANDARDS 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 Buildings, of the American Institute of Steel Construction.

(Part III, 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 for 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 Buildings 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 Eqs. (4-1) and (4-2) *LRFD Specification Section Eqs. (A4-1) through (A4-6)*	*Chapter 16 Eqs. (12-17) and (12-18) respectively* *Chapter 16 Eqs. (12-1) through (12-6) respectively*
$\Omega_o Q_E$	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 buildings 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:

$1.2\,D + 0.5\,L + 0.2S + \Omega_o E_h$ (4-1)

$0.9\,D + \Omega_o E_h$ (4-2)

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 for 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 Buildings in this Division, hereinafter referred to as AISC-Seismic, shall include Parts III (ASD) 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.

2214B – 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 III 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 Eqs. (4-1) and (4-2)	Chapter 16 Eqs. (12-17) and (12-18) respectively
$\Omega_o Q_E$	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 buildings 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:

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

$$0.9\,D + \Omega_o E_h \qquad (4\text{-}2)$$

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

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

* * *

(END OF ITEM)

ITEM 4-15
HCD 03/04
Part 2, Volume 2, APPROVED

CHAPTER 23 – WOOD

Division III – DESIGN SPECIFICATIONS FOR ALLOWABLE STRESS DESIGN OF WOOD BUILDINGS

Part I – ALLOWABLE STRESS DESIGN OF WOOD

This standard, with certain exceptions, is the ANSI/NFoPA NDS-91 National Design Specification for Wood Construction of the American Forest and Paper Association, Revised 1991 Edition, and the Supplement to the 1991 Edition, National Design Specification, adopted by reference.

The National Design Specification for Wood Construction, Revised 1991 Edition, and supplement are available from the American Forest and Paper Association, 1111 19th Street, NW, Eighth Floor, Washington, DC, 20036.

[For HCD 1 & HCD 2] *For applications regulated by the Department of Housing and Community Development as referenced in Sections 101.17.9 and 101.17.10, this standard, with certain exceptions, is the ANSI/AF&PA NDS-01 National Design Specification for Wood Construction of the American Forest and Paper Association, 2001 Edition, and the Supplement to the 2001 Edition, National Design Specification, adopted by reference.*

SECTION 2316 DESIGN SPECIFICATIONS

~~**2316.1 Adoption and Scope.** The National Design Specification for Wood Construction, Revised *1991* Edition (NDS), which is hereby adopted as a part of this code, shall apply to the design and construction of wood structures using visually graded lumber, mechanically graded lumber, structural glued laminated 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 1991 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.~~

~~Other codes, standards or specifications referred to in this standard 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, except where such other codes, standards or specifications are specifically adopted by this code as primary standards.~~

2316.1 Adoption and Scope.

2316.1.1 The National Design Specification for Wood Construction, Revised 1991 Edition (NDS), which is hereby adopted as a part of this code, shall apply to the design and construction of wood structures using visually graded lumber, mechanically graded lumber, structural glued laminated 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 1991 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.

Other codes, standards or specifications referred to in this standard 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, except where such other codes, standards or specifications are specifically adopted by this code as primary standards.

2316.1.2 [For HCD 1 & HCD 2] *The National Design Specification for Wood Construction, 2001 Edition (NDS), as amended by Section 2316.3, which is hereby adopted as a part of this code, shall apply to the allowable stress design and construction of wood structures. The Supplement to the 2001 Edition National Design Specification, is specifically adopted and made a part of this standard.*

Where a code, standard or specification referred to in this code conflict with a code, standard or specification referenced in the NDS-01 for allowable stress design of wood building, the NDS-01 shall prevail.

2316.2 Amendments.

Repeal adoption of Chapter 23, Division III, Section 2316.2 in its entirety and adopt the proposed Chapter 23, Division III, Section 2316.3.

> ***Note: The provisions of this section shall not apply to applications regulated by the Department of Housing and Community Development as referenced in Sections 101.17.9 and 101.17.10.***

2316.3 [For HCD 1 & HCD 2] Amendments.

1. [For HCD 1 & HCD 2] Sec. 2.2. Add a forth sentence as follows:

Values for species and grades not tabulated shall be submitted to the enforcing agency for approval.

2. [For HCD 1 & HCD 2] Sec. 2.3.2.1. In fourth sentence, delete "or Figure B1 (see Appendix B)."

3. [For HCD 1 & HCD 2] Sec. 2.3.2.3. Delete and substitute the following:

2.3.2.3 *When using Section 1612.3.1 basic load combinations, the Load Duration Factor, C_D, noted in Table 2.3.2 shall be permitted to be used. When using Section 1612.3.2 alternate load combinations, the one-third increase shall not be used concurrently with the Load Duration Factor, C_D.*

4. [For HCD 1 & HCD 2] Table 2.3.2. Delete and substitute as follows:

TABLE 2.3.2 LOAD DURATION FACTORS, C_D

DESIGN LOAD	LOAD DURATION	C_D
Dead Load	Permanent	0.9
Floor, Occupancy Live Load	Ten Years	1.0
Snow Load	Two Months	1.15
Roof Live Load	Seven Days	1.25
Earthquake Load[1]	—	1.33
Wind Load[2]	—	1.33
Impact	—	2.0

[1] 1.60 may be used for nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for earthquake are not combined with the increase allowed in Section 1612.3. The 60-percent increase for nailed and bolted connections exhibiting Mode III or IV behavior for earthquake shall not be applicable to joist hangers, framing anchors, and other mechanical fastenings, including straps and hold-down anchors. The 60-percent increase shall not apply to the allowable shear values in Tables 23-II-H, 23-II-I-1, 23-II-I-2, 23-II-J or in Section 2315.3.
[2] 1.60 may be used for members and nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for wind are not combined with the increase allowed in Section 1612.3. The 60-percent increase shall not apply to the allowable shear values in Tables 23-II-H, 23-II-I-1, 23-II-I-2, 23-II-J or in Section 2315.3.

5. [For HCD 1 & HCD 2] Sec. 2.3.3. Add a second paragraph following Table 2.3.3:

The allowable unit stresses for fire-retardant-treated solid-sawn lumber and plywood, including fastener values, subject to prolonged elevated temperatures from manufacturing or equipment processes, but not exceeding 150_F (66_C), shall be developed from approved test methods that properly consider potential strength-reduction characteristics, including effects of heat and moisture.

6. [For HCD 1 & HCD 2] Sec. 2.3.4. Add second, third and fourth paragraphs as follows:

The values for lumber and plywood impregnated with approved fire-retardant chemicals, including fastener values, shall be submitted to the building official for approval. Submittal to the building official shall include all substantiating data. Such values shall be developed from approved test methods and procedures that consider potential strength-reduction characteristics, including the effects of elevated temperatures and moisture. Other adjustments are applicable, except that the impact load-duration factor shall not apply.
Values for glued-laminated timber, including fastener design values, shall be recommended by the treater and submitted to the building official for approval. Submittal to the building official shall include all substantiating data.

In addition to the requirements specified in Section 207, fire retardant lumber having structural applications shall be tested and identified by an approved inspection agency in accordance with UBC Standard 23-5.

7. [For HCD 1 & HCD 2} Sec. 5.4. Add a section as follows:

5.4.5 Ponding. *Roof-framing members shall be designed for the deflection and drainage or ponding requirements specified in Section 1506 and Chapter 16. In glued-laminated timbers, the minimum slope for roof drainage required by Section 1506 shall be in addition to a camber of one and one-half times the calculated dead load deflection. The calculation of the required slope shall not include any vertical displacement created by short taper cuts. In no case shall the deflection of glued-laminated timber roof members exceed 1/2-inch (13 mm) for a 5 pound-per-square-foot (239 Pa) uniform load.*

8. [For HCD 1 & HCD 2] Sec. 5.4. Add a new section as follows:

5.4.6 Tapered Faces. *Sawn tapered cuts shall not be permitted on the tension face of any beam. Pitched or curved beams shall be so fabricated that the laminations are parallel to the tension face. Straight, pitched or curved beams may have sawn tapered cuts on the compression face.*

For other members subject to bending, the slope of tapered faces, measured from the tangent to the lamination of the section under consideration, shall not be steeper than 1 unit vertical in 24 units horizontal (4% slope) on the tension side.

EXCEPTION: *1.This requirement does not apply to arches.*

2. Taper may be steeper at sections increased in size beyond design requirements for architectural projections.

9. [For HCD 1 & HCD 2] Sec.* 11.1.5.6. *Delete and substitute as follows:

11.1.5.6 *For wood-to-wood joints, the spacing center to center of nails in the direction of stress shall not be less than the required penetration. Edge or end distances in the direction of stress shall not be less than one-half of the required penetration. All spacing and edge and end distances shall be such as to avoid splitting of the wood.*

Note:
Authority: Health and Safety Code Sections 17040, 17921, 17922, 18300, 18865, 18865.3, and 19990
Reference: Health and Safety Code Sections 17000 through 17060, 17910 through 17990, 18000 – 18700, 18860 – 18874, and 19960 through 19997

*** * ***

(END OF ITEM)

EXPRESS TERMS

ITEM 5-1
BSC 01/04
Part 2, Volume 2, Chapter 16 **APPROVED**

CHAPTER 16 – STRUCTURAL DESIGN REQUIREMENTS

SECTION 1611 - OTHER MINIMUM LOADS

1611.7 Water Accumulation.

1611.7.1 All roofs shall be designed with sufficient slope or camber to ensure adequate drainage after the long-term deflection from dead load or shall be designed to resist ponding load, *P,* combined in accordance with Section 1612.2 or 1612.3. Ponding load shall include water accumulation from any source, including snow, due to deflection. See Section 1506 and Table 16-C, Footnote 3, for drainage slope. See Section 1615 for deflection criteria.

1611.7.2 [For BSC] All roofs shall be designed with sufficient slope or camber to ensure adequate drainage after the long-term deflection from dead load or shall be designed to resist ponding load, P, combined in accordance with Section 1612.2 or 1612.3. Ponding load shall include water accumulation from any source, including snow, due to deflection. See Section 1506 and Table 16-C, Footnote 3, for drainage slope. See Section *1613* for deflection criteria.

1612.3.2 Alternate basic load combinations.

1612.3.2.1 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*.

$D + L + (L_r \text{ or } S)$	(12-12)
$D + L + (W \text{ or } E/1.4)$	(12-13)
$D + L + W + S/2$	(12-14)
$D + L + S + W/2$	(12-15)
$D + L + S + E/1.4$	(12-16)
$0.9D \pm E/1.4$	(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.

~~***1612.3.2.1***~~ ***1612.3.2.2 [For BSC]*** 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.*

$D + L + (L_r \text{ or } S)$	(12-12)
$D + L + (W \text{ or } E/1.4)$	(12-13)
$D + L + W + S/2$	(12-14)
$D + L + S + W/2$	(12-15)
$D + L + S + E/1.4$	(12-16)
$0.9D \pm E/1.4$	(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/m ^{2}) or less need not be combined with seismic loads. Where design snow loads exceed 30 psf (1.44 kN/m ^{2}), 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.

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

1629.4.2 Seismic Zone 4 near-source factor.

1629.4.2.1 In Seismic Zone 4, each site shall be assigned a near-source factor in accordance with Table 16-S and the Seismic Source Type set forth in Table 16-U. The value of *Na* used to determine *Ca* need not exceed 1.1 for structures complying with all the following conditions:

1. The soil profile type is *SA, SB, SC* or *SD.*

2. ρ = 1.0.

3. Except in single-story structures, Group R, Division 3 and Group U, Division 1 Occupancies, moment frame systems designated as part of the lateral-force-resisting system shall be special moment-resisting frames.

4. The exceptions to Section 2213.7.5 shall not apply, except for columns in one-story buildings or columns at the top story of multistory buildings.

5. None of the following structural irregularities is present:
Type 1, 4 or 5 of Table 16-L, and Type 1 or 4 of Table 16-M.

~~1629.2.1~~ 1629.4.2.2 [For BSC] In Seismic Zone 4, each site shall be assigned a near-source factor in accordance with Table 16-S and the Seismic Source Type set forth in Table 16-U. The value of N_a used in determining C_a need not exceed 1.1 for structures complying with all the following conditions:

1. The soil profile type is S_A, S_B, S_C or S_D.

2. ρ = 1.0.

3. Except in single-story structures, Group R, Division 3 and Group U, Division 1 Occupancies, moment frame systems designated as part of the lateral-force-resisting system shall be special moment-resisting frames.

*4. * * * The provisions in Sections 9.6a and 9.6b of AISC - Seismic Part 1 shall not apply, except for columns in one-story buildings or columns at the top story of multistory buildings.*

5. None of the following structural irregularities is present: Type 1, 4 or 5 of Table 16-L, and Type 1 or 4 of Table 16-M.

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

1630 – MINIMUM DESIGN LATERAL FORCES AND RELATED EFFECTS
1630.1 Earthquake Loads and Modeling Requirements. …
1630.2 Static Force Procedure.
…
1630.2.3 Simplified design base shear.
1630.2.3.1 General …
1630.2.3.2 Base Shear …

1630.2.3.3 *[For BSC] Distribution*

~~1630.2.3.3~~ ***1630.2.3.3.1*** **Vertical Distribution.** The forces at each level shall be calculated using the following formula:

$F_x =$	$\frac{3.0\ C_a}{R}$	W_i	(30-12)

where the value of C_a shall be determined in Section 1630.2.3.2.

1630.2.3.3.2 [For BSC] Horizontal Distribution. *Diaphragms constructed of untopped steel decking or wood structural panels or similar light-frame construction are permitted to be considered as flexible.*

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

1630.4.2 Vertical combinations.

1630.4.2.1 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 amplified by the ratio of the *(R/*ρ) of the upper portion over *(R/*ρ) of the lower portion.

~~*1630.4.2.1*~~ ***1630.4.2.2 [For BSC]*** 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.*

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

1630.8.2.1 General.

1630.8.2.1.1 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 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.

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 a resistance factor, Φ, of 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.

~~***1630.8.2.1.1***~~ ***1630.8.2.1.2 [For BSC]*** 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 a resistance factor, Φ, of 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.

1630.8.2.2 Detailing requirements in Seismic Zones 3 and 4.

1630.8.2.2.1 In Seismic Zones 3 and 4, elements supporting discontinuous systems shall meet the following detailing or member limitations:

1. Reinforced concrete 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 axial-load members shall comply with Sections 2213.5.2 and 2213.5.3.

6. 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 Section 2213.7.1.3.

7. Wood elements designed primarily as flexural members shall be provided with lateral bracing or solid blocking at each end of the element and at the connection location(s) of the discontinuous system.

~~***1630.2.2.1***~~ ***1630.8.2.2.2 [For BSC]*** 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. * * *

~~5~~ 6. 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 I, Section 9.4b.*

~~6~~ 7. Wood elements designed primarily as flexural members shall be provided with lateral bracing or solid blocking at each end of the element and at the connection location(s) of the discontinuous systems.

Notation
Authority: Health and Safety Code Sections 18934.5
Reference: Health and Safety Code, Division 13, Part 2.5, commencing with section 18901

*** * ***

(END OF ITEM)

ITEM 5-2
BSC 01/04
Part 2, Volume 2, Chapter 16 **APPROVED**

Section 1628 – Symbols and Notations

…

R = numerical coefficient representative of the inherent overstrength and global ductility capacity of lateral-force-resisting systems, as set forth in Table 16-N *[For BSC] Table 16-N.1* or 16-P.
…

Ω = Seismic Force Amplification Factor, which is required to account for structural overstrength and set forth in Table 16-N *[For BSC] Table 16-N.1*.

1629.6 Structural Systems.
1629.6.1 General. Structural systems shall be classified as one of the types listed in Table 16-N *[For BSC] Table 16-N.1* and defined in this section.

1629.6.2 …
1629.6.3 …
1629.6.4 …
1629.6.5 …
1629.6.6 …

1629.6.7 Undefined structural system. A structural system not listed in Table 16-N *[For BSC] Table 16-N.1*
1629.6.8 …

1629.7 Height Limits. Height limits for the various structural systems in Seismic Zones 3 and 4 are given in Table 16-N *[For BSC] Table 16-N.1*.

EXCEPTION: Regular structures may exceed these limits by not more than 50 percent for unoccupied structures, which are not accessible to the general public.

1629.8 Selection of Lateral Force Procedure
1629.8.1 …
1629.8. 2 …
1629.8.3 Static. The static lateral force procedure of Section 1630 may be used for the following structures:

1. All structures, regular or irregular, in Seismic Zone 1 and in Occupancy Categories 4 and 5 in Seismic Zone 2.

2. Regular structures under 240 feet (73 152 mm) in height with lateral force resistance provided by systems listed in Table 16-N *[For BSC] Table 16-N.1*, except where Section 1629.8.4, Item 4, applies.

3. Irregular structures not more than five stories or 65 feet (19 812 mm) in height.

4. Structures having a flexible upper portion supported on a rigid lower portion where both portions of the structure considered separately can be classified as being regular, the average story stiffness of the lower portion is at least 10 times the average story stiffness of the upper portion and the period of the entire structure is not greater than 1.1 times the period of the upper portion considered as a separate structure fixed at the base.

1629.9 System Limitations.
1629.9.1 Discontinuity. …
1629.9.2 Undefined structural systems. For undefined structural systems not listed in Table 16-N *[For BSC] Table 16-N.1*, the coefficient R shall be substantiated by approve cyclic test data and analysis. ….

~~*1630.2.3.5*~~ **1630.2.3.4 Applicability.** Sections 1630.1.2, 1630.1.3, 1630.2.1, 1630.2.2, 1630.5, 1630.9, 1630.10 and 1631 shall not apply when using the simplified procedure.

EXCEPTION: For buildings with relatively flexible structural systems, the building official may require consideration of $P\Delta$ effects and drift in accordance with Sections 1630.1.3, 1630.9 and 1630.10.Δs shall be prepared using design seismic forces from Section 1630.2.3.2.

Where used, ΔM shall be taken equal to 0.01 times the story height of all stories. In Section 1633.2.9, Formula (33-1) shall read F_{px} =3.0 $C_a R_{wpx}$ and need not exceed 1.0 $C_a w_{px}$, but shall not be less than 0.5 $C_a w_{px}$. R and Ω_o shall be taken from Table 16-N *[For BSC] Table 16-N.1*.

1630.3 Determination of Seismic Factors.
1630.3.1 Determination of Ω_o. For specific elements of the structure, as specifically identified in this code, the minimum design strength shall be the product of the seismic force overstrength factor Ω_o and the design seismic forces set forth in Section 1630. For both Allowable Stress Design and StrengthDesign, the Seismic Force Overstrength Factor, Ω_o, shall be taken from Table 16-N *[For BSC] Table 16-N.1*.
1630.3.2 Determination of *R*. The notation R shall be taken from Table 16-N *[For BSC] Table 16-N.1*.

SECTION 1633 – DETAILED SYSTEMS DESIGN REQUIREMENTS
1633.1 General …
1633.2 Structural Framing Systmes.
1633.2.1 General. Four types of general building framing systems defined in Section 1629.6 are recognized in these provisions and shown in Table 16-N *[For BSC] Table 16-N.1*. Each type is subdivided by the types of vertical elements used to resist lateral seismic forces. Special framing requirements are given in this section and in Chapters 19 through 23.

SECTION 1634 – NONBUILDING STRUCTURES
1634.1 General. …
1634.2 Lateral Force. Lateral-force procedures for nonbuilding structures with structural systems similar to buildings (those with structural systems which are listed in Table 16-N *[For BSC] Table 16-N.1*) shall be selected in accordance with the provisions of Section 1629.

> **EXCEPTION:** Intermediate moment-resisting frames (IMRF) may be used in Seismic Zones 3 and 4 for nonbuilding structures in Occupancy Categories 3 and 4 if (1) the structure is less than 50 feet (15 240 mm) in height and (2) the value R used in reducing calculated member forces and moments does not exceed 2.8.

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

TABLE ~~16-N~~ 16.1-N — [For BSC] STRUCTURAL SYSTEMS [1]

BASIC STRUCTURAL SYSTEM[2]	LATERAL-FORCE-RESISTING SYSTEM DESCRIPTION	*R*	Ω*o*	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 walls			
	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]	5.6	2.2	—
	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~~	-
	b. Concrete[7]	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)*	4.2	2.8	160
	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)*	4.2	2.8	160
	f. Masonry with concrete IMRF [3]	4.2	2.8	—
	g. Masonry with masonry MMRWF	6.0	2.8	160
	2. Steel EBF			
	a. With steel SMRF	8.5	2.8	N.L.
	b. With steel OMRF *(Not Permitted)*	4.2	2.8	160
	3. Ordinary braced frames *(Not Permitted)*			
	a. Steel with steel SMRF	~~6.5~~ * * *	~~2.8~~ * * *	N.L.
	b. Steel with steel OMRF	~~4.2~~ * * *	~~2.8~~ * * *	160
	c. Concrete with concrete SMRF[3]	~~6.5~~ * * *	~~2.8~~ * * *	—
	d. Concrete with concrete IMRF[3]	~~4.2~~ * * *	~~2.8~~ * * *	—
	4. Special concentrically braced frames			
	a. Steel with steel SMRF	7.5	2.8	N.L.
	b. Steel with steel OMRF *(Not Permitted)*	~~4.2~~ * * *	~~2.8~~ * * *	160
	5. Steel IMRF (Not permitted)	—	—	—
5. Cantilevered column building systems	1. Cantilevered column elements	2.2	2.0	35[7]
6. Shear wall-frame interaction systems	1. Concrete[8]	5.5	2.8	160
7. Undefined systems	See Section 1629.6.7 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] * * * *Unless otherwise approved by the enforcement agency, in Seismic Zone 4 :*
[6.1] Steel IMRF are permitted for buildings 35 ft. or less in height and the dead load of the roof, walls or floors not exceeding 35 psf each; or for single-story buildings 60 ft. or less in height with dead load of the roof or walls not exceeding 15 psf each where the moment joints of field connections are constructed of bolted end plates; or single-family dwellings using light frame construction with R = 3.0 and Ω_o = 2.2.
[6.2] Steel OMRF are permitted for buildings 35 ft or less in height with the dead load of the roof, walls or floors not exceeding 15 psf each; or single-story buildings 60 ft or less in height with the dead load of the roof or walls not exceeding 15 psf each and where the moment joints of field connections are constructed of bolted end plates.
[6.3] Steel Ordinary Braced Frames are permitted for buildings 35 ft or less in height; or penthouse structures; or single-story buildings 60 ft or less in height with the dead load of the roof or walls not exceeding 15 psf. each.
[7] Total height of the building including cantilevered columns.
[8] Prohibited in Seismic Zones 2A, 2B, 3 and 4. See Section 1633.2.7.

TABLE 16-O

Amend Table 16-O as follows:

TABLE 16-O—HORIZONTAL FORCE FACTORS, a_P AND R_p

ELEMENTS OF STRUCTURES AND NONSTRUCTURAL COMPONENTS AND EQUIPMENT[1]	a_p	R_p	FOOTNOTE
1. Elements of Structures A. Walls including the following: (1) Unbraced (cantilevered) parapets.	2.5	3.0	
(2) Exterior walls at or above the ground floor and parapets braced above their centers of gravity.	1.0	3.0	2
(3) All interior-bearing and nonbearing walls.	1.0	3.0	2
B. Penthouse (except when framed by an extension of the structural frame).	2.5	4.0	
C. Connections for prefabricated structural elements other than walls. See also Section 1632.2.	1.0	3.0	3
2. Nonstructural Components A. Exterior and interior ornamentations and appendages.	2.5	3.0	
B. Chimneys, stacks and trussed towers supported on or projecting above the roof: (1) Laterally braced or anchored to the structural frame at a point below their centers of mass.	2.5	3.0	
(2) Laterally braced or anchored to the structural frame at or above their centers of mass.	1.0	3.0	
C. Signs and billboards.	2.5	3.0	
D. Storage racks (include contents) *with upper storage level more than 5 feet (1524 mm) in height* ***[For BSC]***	2.5	4.0	~~4~~ * * * *4.1*
E. Permanent floor-supported cabinets and book stacks more than 6 feet (1829 mm) in height (include contents).	1.0	3.0	5
F. Anchorage and lateral bracing for suspended ceilings and light fixtures.	1.0	3.0	3, 6, 7, 8
G. Access floor systems. ***[For BSC]***	1.0	3.0	~~4, 5, 9~~ * * * *4.1, 5, 9*
H. Masonry or concrete fences over 6 feet (1829 mm) high.	1.0	3.0	
I. Partitions.	1.0	3.0	
3. Equipment A. Tanks and vessels (include contents), including support systems.	1.0	3.0	
B. Electrical, mechanical and plumbing equipment and associated conduit and ductwork and piping.	1.0	3.0	5, 10, 11, 12, 13, 14, 15, 16
C. Any flexible equipment laterally braced or anchored to the structural frame at a point below their center of mass.	2.5	3.0	5, 10, 14, 15, 16
D. Anchorage of emergency power supply systems and essential communications equipment. Anchorage and support systems for battery racks and fuel tanks necessary for operation of emergency equipment. See also Section 1632.2.	1.0	3.0	17, 18
E. Temporary containers with flammable or hazardous materials.	1.0	3.0	19
4. Other Components A. Rigid components with ductile material and attachments.	1.0	3.0	1
B. Rigid components with nonductile material or	1.0	1.5	1

attachments.			
C. Flexible components with ductile material and attachments.	2.5	3.0	1
D. Flexible components with nonductile material or attachments.	2.5	1.5	1

[1]See Section 1627 for definitions of flexible components and rigid components.

[2]See Sections 1633.2.4 and 1633.2.8 for concrete and masonry walls and Section 1632.2 for connections for panel connectors for panels.

[3]Applies to Seismic Zones 2, 3 and 4 only.

[4]Ground supported steel storage racks may be designed using the provisions of Section 1634. Chapter 22, Division VI, may be used for design, provided seismic design forces are equal to or greater than those specified in Section 1632.2 or 1634.2, as appropriate.

[4.1]***[For BSC]*** Ground supported steel storage racks may be designed using the provisions of Section 1634. Chapter 22A, Division *X*, may be used for design, provided seismic design forces are equal to or greater than those specified in Section 1632.2 or 1634.2, as appropriate.

[5]Only attachments, anchorage or restraints need be designed.

[6]Ceiling weight shall include all light fixtures and other equipment or partitions that are laterally supported by the ceiling. For purposes of determining the seismic force, a ceiling weight of not less than 4 psf (0.19 kN/m2) shall be used.

[7]Ceilings constructed of lath and plaster or gypsum board screw or nail attached to suspended members that support a ceiling at one level extending from wall to wall need not be analyzed, provided the walls are not over 50 feet (15 240 mm) apart.

[8]Light fixtures and mechanical services installed in metal suspension systems for acoustical tile and lay-in panel ceilings shall be independently supported from the structure above as specified in UBC Standard 25-2, Part III.

[9]*Wp* for access floor systems shall be the dead load of the access floor system plus 25 percent of the floor live load plus a 10-psf (0.48 kN/m2) partition load allowance.

[10]Equipment includes, but is not limited to, boilers, chillers, heat exchangers, pumps, air-handling units, cooling towers, control panels, motors, switchgear, transformers and life-safety equipment. It shall include major conduit, ducting and piping, which services such machinery and equipment and fire sprinkler systems. See Section 1632.2 for additional requirements for determining *ap* for nonrigid or flexibly mounted equipment.

[11]Seismic restraints may be omitted from piping and supports if all the following conditions are satisfied:

[11.1]Lateral motion of the piping or duct will not cause damaging impact with other systems.
[11.2]The piping or duct is made of ductile material with ductile connections.
[11.3]Lateral motion of the piping or duct does not cause impact with fragile appurtenances (e.g. sprinkler heads) with any other equipment, piping, or structural member.
[11.4]Lateral motion of the piping or duct does not cause loss of system vertical support.
[11.5]Rod-hung supports of less than 12 inches (305 mm) in length have top connections that cannot develop moments.
[11.6]Support members cantilevered up from the floor are checked for stability.

[12]Seismic restraints may be omitted from electrical raceways, such as cable trays, conduit and bus ducts, if all the following conditions are satisfied:

[12.1] Lateral motion of the raceway will not cause damaging impact with other systems.

[12.2] Lateral motion of the raceway does not cause loss of system vertical support.

[12.3] Rod-hung supports of less than 12 inches (305 mm) in length have top connections that cannot develop moments

[12.4] Support members cantilevered up from the floor are checked for stability.

[13]Piping, ducts and electrical raceways, which must be functional following an earthquake, spanning between different buildings or structural systems shall be sufficiently flexible to withstand relative motion of support points assuming out-of-phase motions.

[14]Vibration isolators supporting equipment shall be designed for lateral loads or restrained from displacing laterally by other means. Restraint shall also be provided, which limits vertical displacement, such that lateral restraints do not become disengaged. a_p and R_p for equipment supported on vibration isolators shall be taken as 2.5 and 1.5, respectively, except that if the isolation mounting frame is supported by shallow or expansion anchors, the design forces for the anchors calculated by Formula (32-1), (32-2) or (32-3) shall be additionally multiplied by a factor of 2.0.

[15]Equipment anchorage shall not be designed such that lateral loads are resisted by gravity friction (e.g., friction clips).

[16]Expansion anchors, which are required to resist seismic loads in tension, shall not be used where operational vibrating loads are present.

[17]Movement of components within electrical cabinets, rack- and skid-mounted equipment and portions of skid-mounted electromechanical equipment that may cause damage to other components by displacing, shall be restricted by attachment to anchored equipment or support frames.

[18]Batteries on racks shall be restrained against movement in all directions due to earthquake forces.

[19]Seismic restraints may include straps, chains, bolts, barriers or other mechanisms that prevent sliding, falling and breach of containment of flammable and toxic materials. Friction forces may not be used to resist lateral loads in these restraints unless positive uplift restraint is provided which ensures that the friction forces act continuously.

Note:
Authority: Health and Safety Code Sections 18934.5
Reference: Health and Safety Code, Division 13, Part 2.5, commencing with section 18901
Appendix Chapter 16

DIVISION IV - EARTHQUAKE REGULATIONS FOR SEISMIC-ISOLATED STRUCTURES

SECTION 1665 - REQUIRED TESTS OF ISOLATION SYSTEM

1665.2.3 Sequence and cycles.

1665.2.3.1 The following sequence of tests shall be performed for the prescribed number of cycles at a vertical load equal to the average D+ 0.5L on all isolator units of a common type and size:

1. Twenty fully reversed cycles of loading at a lateral force corresponding to the wind design force.

2. Three fully reversed cycles of loading at each of the following increments of displacement: 0.2 D_D, 0.5 D_D and 1.0 D_D, 1.0D_M.

3. Three fully reversed cycles at the total maximum displacement, 1.0D_{TM}.

4. (15$C_{VD}/C_{VA}B_D$), but not less than 10, fully reversed cycles of loading at 1.0 times the total design displacement, 1.0D_{TD}.

1665.2.3.2 [For BSC] The following sequence of tests shall be performed for the prescribed number of cycles at a vertical load equal to the average D+ 0.5L on all isolator units of a common type and size:

1. Twenty fully reversed cycles of loading at a lateral force corresponding to the wind design force.

2. Three fully reversed cycles of loading at each of the following increments of displacement: 0.2 D_D, 0.5 D_D and 1.0 D_D, 1.0D_M.

3. Three fully reversed cycles at the total maximum displacement, 1.0D_{TM}.

4. *(15$C_{VD}/C_{AD}B_D$)*, but not less than 10, fully reversed cycles of loading at 1.0 times the total design displacement, 1.0D_{TD}.

1665.4 System Adequacy.

1665.4.1 The performance of the test specimens shall be assessed as adequate if the following conditions are satisfied:

1. The force-deflection plots of all tests specified in Section 1665.2 have a positive incremental force-carrying capacity.

2. For each increment of test displacement specified in Section 1665.2.3, Item 2, and for each vertical load case specified in Section 1665.2.3:

2.1 There is no greater than a plus or minus 10 percent difference between the effective stiffness at each of the three cycles of test and the average value of effective stiffness for each test specimen.

2.2 There is no greater than a 10 percent difference in the average value of effective stiffness of the two test specimens of a common type and size of the isolator unit over the required three cycles of test.

3. For each specimen there is no greater than a plus or minus 20 percent change in the initial effective stiffness of each test specimen over the ($15C_{VD}/C_{VA}B_D$), but not less than 10, cycles of the test specified in Section 1665.2.3, Item 4.

4. For each specimen there is no greater than a 20 percent decrease in the initial effective damping over for the ($15C_{VD}/C_{VA}B_D$), but not less than 10, cycles of the test specified in Section 1665.2.3, Item 4.

5. All specimens of vertical load-carrying elements of the isolation system remain stable at the total maximum displacement for static load as prescribed in Section 1665.2.6.

1665.4.2 [For BSC] The performance of the test specimens shall be assessed as adequate if the following conditions are satisfied:

1. The force-deflection plots of all tests specified in Section 1665.2 have a positive incremental force-carrying capacity.

2. For each increment of test displacement specified in Section 1665.2.3, Item 2, and for each vertical load case specified in Section 1665.2.3:

2.1 There is no greater than a plus or minus 10 percent difference between the effective stiffness at each of the three cycles of test and the average value of effective stiffness for each test specimen.

2.2 There is no greater than a 10 percent difference in the average value of effective stiffness of the two test specimens of a common type and size of the isolator unit over the required three cycles of test.

3. For each specimen there is no greater than a plus or minus 20 percent change in the initial effective stiffness of each test specimen over the *($15C_{VD}/C_{AD}B_D$)*, but not less than 10, cycles of the test specified in Section 1665.2.3, Item 4.

4. For each specimen there is no greater than a 20 percent decrease in the initial effective damping over for the *($15C_{VD}/C_{AD}B_D$)*, but not less than 10, cycles of the test specified in Section 1665.2.3, Item 4.

5. All specimens of vertical load-carrying elements of the isolation system remain stable at the total maximum displacement for static load as prescribed in Section 1665.2.6.

…(Section unchanged except as noted above)

* * *

(END OF ITEM)

ITEM 5-3
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Part 2, Volume 2, Chapter 18 & 19 **APPROVED**

CHAPTER 18 – FOUNDATIONS AND RETAINING WALLS

SECTION 1809 - FOUNDATION CONSTRUCTION - SEISMIC ZONES 3 AND 4

1809.5 Special Requirements for Piles and Caissons.

1809.5.1 General.

1809.5.1.1 Piles, caissons and caps shall be designed according to the provisions of Section 1603, including the effects of lateral displacements. Special detailing requirements as described in Section 1809.5.2 shall apply for a length of piles equal to 120 percent of the flexural length. Flexural length shall be considered as a length of pile from the first point of zero lateral deflection to the underside of the pile cap or grade beam.

1809.5.1.2 [For BSC] Piles, caissons and caps shall be designed according to the provisions of Section *1605*, including the effects of lateral displacements. Special detailing requirements as described in Section 1809.5.2 shall apply for a length of piles equal to 120 percent of the flexural length. Flexural length shall be considered as a length of pile from the first point of zero lateral deflection to the underside of the pile cap or grade beam.

CHAPTER 19 – CONCRETE

DIVISION II

1903.11 Glass Fiber Reinforced Concrete.

1903.11.1 Recommended Practice for Glass Fiber Reinforced Concrete Panels, Manual 128.

1903.11.2 [For BSC} Recommended Practice for Glass Fiber Reinforced Concrete Panels, *PCI* Manual 128.

1915.2.2 Base area of footing or number and arrangement of piles.

1915.2.2.1 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 un-factored loads (D, L, W and E) specified in Chapter 16.*

~~*1915.2.2.1*~~ ***1915.2.2.2 [For BSC]*** 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.*

SECTION 1921 – REINFORCED CONCRETE STRUCTURES RESISTING FORCES INDUCED BY EARTHQUAKE MOTION
1921.0 Notations. …
1921.1 Definitions. …
1921.2 General.
1921.2.1 Scope.
…
1921.2.1.7 *In structures having precast gravity systems, the lateral-force-resisting system shall be one of the systems listed in Table 16-N [For BSC] Table 16-N.1 and shall be well distributed using one of the following methods:*

1. The lateral-force-resisting systems shall be spaced such that the span of the diaphragm or diaphragm segment between lateral-force-resisting systems shall be no more than three times the width of the diaphragm or diaphragm segment.

Where the lateral-force-resisting system consists of moment-resisting frames, at least [(Nb/4) + 1] of the bays (rounded up to the nearest integer) along any frame line at any story shall be part of the lateral-force-resisting system, where Nb is the total number of bays along that line at that story. This requirement applies to only the lower two thirds of the stories of buildings three stories or taller.

2. All beam-to-column connections that are not part of the lateral-force-resisting system shall be designed in accordance with the following:

Connection design force. *The connection shall be designed to develop strength M. M is the moment developed at the connection when the frame is displaced by Δs assuming fixity at the connection and a beam flexural stiffness of no less than one-half of the gross section stiffness. M shall be sustained through a deformation of Δm [for OSHPD 2] ΔM.*

Connection characteristics. *The connection shall be permitted to resist moment in one direction only, positive or negative. The connection at the opposite end of the member shall resist moment with same positive or negative sign. The connection shall be permitted to have zero flexural stiffness up to a frame displacement of Δs.*

In addition, complete calculations for the deformation compatibility of the gravity load carrying system shall be made in accordance with Section 1633.2.4 using cracked section stiffnesses in the lateral-force-resisting system and the diaphragm.

Where gravity columns are not provided with lateral support on all sides, a positive connection shall be provided along each unsupported direction parallel to a principal plan axis of the structure. The connection shall be designed for a horizontal force equal to 4 percent of the axial load strength (P0) of the column. The bearing length shall be 2 inches (51 mm) more than that required for bearing strength

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

1928.1.2.3 Basic combinations.

1928.1.2.3.1 When permitted by Section 1928.1, structures, components 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 + 0.5(L_r or S or R)
3. 1.2D + 1.6(L_r or S or R) + (0.5L or 0.8W)
4. 1.2D + 1.3W + 0.5L + 0.5(L_r or S or R)
5. 1.2D ± 1.5E + (0.5L or 0.2S)
6. 0.9D ± (1.3W or 1.5E)

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.

~~*1928.1.2.3.2*~~ ***1928.1.2.3.2*** ***[For BSC]*** When permitted by Section 1928.1, structures, components 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 + 0.5(L_r or S or R)
3. 1.2D + 1.6(L_r or S or R) + (0.5L or 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 ± (1.3W 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.

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

* * *

(END OF ITEM)

ITEM 5-4
BSC 01/04
Part 2, Volume 2, Chapter 21 & 22 **APPROVED**

CHAPTER 21 – MASONRY

2108.2.6.2.6 Members subjected to axial force and flexure.

2108.2.6.2.6.1 The requirements set forth in this subsection apply to piers proportioned to resist flexure in conjunction with axial loads.

1. **Longitudinal reinforcement.** A minimum of four longitudinal bars shall be provided at all sections of every pier.

Flexural reinforcement shall be distributed across the member depth. Variation in reinforcement area between reinforced cells shall not exceed 50 percent.

Minimum reinforcement ratio calculated over the gross cross section shall be 0.002.

Maximum reinforcement ratio calculated over the gross cross section shall be 0.15*f.m / fy*.

Maximum bar diameter shall be one eighth nominal width of the pier.

2. **Transverse reinforcement.** Transverse reinforcement shall be hooked around the extreme longitudinal bars with standard 180-degree hook as defined in Section 2108A.2.2.4.

Within an end region extending one pier depth from the end of the beam, and at any region at which flexural yielding may occur during seismic or wind loading, the maximum spacing of transverse reinforcement shall not exceed one fourth the nominal depth of the pier.

The maximum spacing of transverse reinforcement shall not exceed one half the nominal depth of the pier. The minimum transverse reinforcement ratio shall be 0.0015.

3. **Lateral reinforcement.** Lateral reinforcement shall be provided to confine the grouted core when compressive strains due to axial and bending forces exceed 0.0015, corresponding to factored forces with R_W equal to 1.5. The unconfined portion of the cross section with strain exceeding 0.0015 shall be neglected in computing the nominal strength of the section.

2108.2.6.2.6.2 [For BSC] The requirements set forth in this subsection apply to piers proportioned to resist flexure in conjunction with axial loads.

1. **Longitudinal reinforcement.** A minimum of four longitudinal bars shall be provided at all sections of every pier.

Flexural reinforcement shall be distributed across the member depth. Variation in reinforcement area between reinforced cells shall not exceed 50 percent.

Minimum reinforcement ratio calculated over the gross cross section shall be 0.002.

Maximum reinforcement ratio calculated over the gross cross section shall be 0.15*f.m / fy*.

Maximum bar diameter shall be one eighth nominal width of the pier.

2. **Transverse reinforcement.** Transverse reinforcement shall be hooked around the extreme longitudinal bars with standard 180-degree hook as defined in Section 2108A.2.2.4.

Within an end region extending one pier depth from the end of the beam, and at any region at which flexural yielding may occur during seismic or wind loading, the maximum spacing of transverse reinforcement shall not exceed one fourth the nominal depth of the pier.

The maximum spacing of transverse reinforcement shall not exceed one half the nominal depth of the pier. The minimum transverse reinforcement ratio shall be 0.0015.

3. **Lateral reinforcement.** Lateral reinforcement shall be provided to confine the grouted core when compressive strains due to axial and bending forces exceed 0.0015, corresponding to factored forces with *R* equal to *1.0*. The unconfined portion of the cross section with strain exceeding 0.0015 shall be neglected in computing the nominal strength of the section.

…(Section unchanged except as noted above)

CHAPTER 22 – STEEL

2204.1 Load and Resistance Factor Design.

2204.1.1 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. Seismic design of structures, where required, shall comply with Division IV for structures designed in accordance with Division II (LRFD).

~~2204.1.1~~ 2204.1.2 [For BSC] 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. * * *

2204.2 Allowable Stress Design.

2204.2.1 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. Seismic design of structures, where required, shall comply with Division V for structures designed in accordance with Division III (ASD).

~~2204.2.1~~ 2204.2.2 [For BSC] *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.* * * *

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

Division IV – SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS

NOTE: This division shall not apply to applications regulated by the Building Standards Commission as referenced in Section 101.17.3. See Chapter 22B, Division IV.

Division V – SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS FOR USE WITH ALLOWABLE STRESS DESIGN

NOTE: This division shall not apply to applications regulated by the Building Standards Commission as referenced in Section 101.17.3 See Chapter 22, Division V

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

* * *

(END OF ITEM)

ITEM 5-5
BSC 01/04
Part 2, Volume 2, Chapter 23 **APPROVED**

CHAPTER 23 – WOOD

Division III – DESIGN SPECIFICATIONS FOR ALLOWABLE STRESS DESIGN OF WOOD BUILDINGS

Part I – ALLOWABLE STRESS DESIGN OF WOOD

This standard, with certain exceptions, is the ANSI/NFoPA NDS-91 ~~[For BSC]~~ *~~NDS-97~~* National Design Specification for Wood Construction of the American Forest and Paper Association, Revised 1991 ~~[For BSC]~~ *~~1997~~* Edition, and the Supplement to the 1991 ~~[For BSC]~~ *~~1997~~* Edition, National Design Specification, adopted by reference.

The National Design Specification for Wood Construction, Revised 1991 ~~[For BSC]~~ *~~1997~~* Edition, and supplement are available from the American Forest and Paper Association, 1111 19th Street, NW, Eighth Floor, Washington, DC, 20036.

[For BSC] *For applications regulated by the Building Standards Commission as referenced in section 101.17.3 this standard, with certain exceptions, is the ANSI/AF&PA NDS-01 National Design Specification for Wood Construction of the American Forest and Paper Association, 2001 Edition, and the Supplement to the 2001 Edition, National Design Specification, adopted by reference.*

SECTION 2316 DESIGN SPECIFICATIONS

2316.1 Adoption and Scope.

2316.1.1 The National Design Specification for Wood Construction, Revised 1991 ~~[For BSC]~~ *~~1997~~* Edition (NDS), which is hereby adopted as a part of this code, shall apply to the design and construction of wood structures using visually graded lumber, mechanically graded lumber, structural glued laminated 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 1991 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.

Other codes, standards or specifications referred to in this standard 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, except where such other codes, standards or specifications are specifically adopted by this code as primary standards.

2316.1.2 [For BSC] *The National Design Specification for Wood Construction, 2001 Edition (NDS), as amended by Section 2316.3, which is hereby adopted as a part of this code, shall apply to the allowable stress design and construction of wood structures. The Supplement to the 2001 Edition National Design Specification, is specifically adopted and made a part of this standard.*

Where a code, standard or specification referred to in this code conflict with a code, standard or specification referenced in the NDS-01 for allowable stress design of wood building, the NDS-01 shall prevail.

2316.2 Amendments.

Note: The provisions of this section shall not apply to applications regulated by the Building Standards Commission as referenced in section 101.17.3.

~~1. Sec. 1.1 Delete and substitute the following: …~~

~~2. Secs. 1.2 through 1.5. Delete.~~

~~3. Sec. 2.2 Delete first sentence and …~~

~~4. Sec. 2.3.2.1. In fourth sentence …~~

~~5. Sec. 2.3.2.3. Delete and substitute …~~

~~6. Table 2.3.2. Delete and substitute …~~

~~7. Sec. 2.3.4. Add paragraph …~~

~~8. Sec. 2.3.6. Add second …~~

~~9. Sec. 2.3.8. Add new second …~~

~~10. Sec. 2.3.10. Add a paragraph …~~

~~11. Sec. 3.2.1. Add a second …~~

~~12. Sec.~~ 3.2.3.2 ~~[For BSC]~~ ~~*3.2.3.3.*~~ ~~Add to the end …~~

~~13. Sec. 3.3.2. Add a last …~~

~~14. Sec. 3. 4. 4.~~ Add a section as follows; ~~*Not adopted by the State of California*~~

3.4.4.5 When girders, beams or joists are notched at points of support on the compression side, they shall meet design requirements for the net section in bending and in shear. The actual shear stress as such point shall be calculated as follows:

$f_v = 3V / 2b\ [d – ((d – d') / d')\ e]$

where

d = total depth.
d' = actual depth of beam at notch.
e = distance notch extends inside the inner edge of support.
V = shear force.

Where e exceeds d', the actual shear stress for the notch on the compression side shall be calculated as follows:

$F_v = 3V / 2bd'$

~~15. Sec. 3.7.1. 4. Delete and substitute …~~

~~16. Sec. 3.8. 2. Delete and substitute …~~

~~17. Sec. 4.2. 5.5. Delete.~~

~~18. Sec. 4.4.1.1. Delete and substitute …~~

~~19. Sec. 4.4. 1.2. Delete first …~~

~~20. Sec. 5.4.1. Delete second …~~

~~21. Sec. 5.4.1. 2 Add a second …~~

~~22. Sec. 5.5.5. Add a section …~~

~~23. Sec. 5.4.5. Add a new section …~~

~~24. Sec. 8.3. Add a section …~~

~~25. Sec. 12.4.1 Delete and substitute …~~

2316.3 [For BSC] Amendments.

1. [For BSC] Sec. 2.2. Add a fourth sentence as follows:

Values for species and grades not tabulated shall be submitted to the enforcing agency for approval.

2. [For BSC] Sec. 2.3.2.1. In fourth sentence, delete "or Figure B1 (see Appendix B)."

3. [For BSC] Sec. 2.3.2.3. Delete and substitute the following:

2.3.2.3 *When using Section 1612.3.1 basic load combinations, the Load Duration Factor, C_D, noted in Table 2.3.2 shall be permitted to be used. When using Section 1612.3.2 alternate load combinations, the one-third increase shall not be used concurrently with the Load Duration Factor, C_D.*

4. [For BSC] Table 2.3.2. Delete and substitute as follows:

TABLE 2.3.2 LOAD DURATION FACTORS, C_D

DESIGN LOAD	LOAD DURATION	C_D
Dead Load	Permanent	0.9
Floor, Occupancy Live Load	Ten Years	1.0
Snow Load	Two Months	1.15
Roof Live Load	Seven Days	1.25
Earthquake Load[1]	—	1.33
Wind Load[2]	—	1.33
Impact	—	2.0

[1] 1.60 may be used for nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for earthquake are not combined with the increase allowed in Section 1612.3. The 60-percent increase for nailed and bolted connections exhibiting Mode III or IV behavior for earthquake shall not be applicable to joist hangers, framing anchors, and other mechanical fastenings, including straps and hold-down anchors. The 60-percent increase shall not apply to the allowable shear values in Tables 23-II-H, 23-II-I-1, 23-II-I-2, 23-II-J or in Section 2315.3.

[2] 1.60 may be used for members and nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for wind are not combined with the increase allowed in Section 1612.3. The 60-percent increase shall not apply to the allowable shear values in Tables 23-II-H, 23-II-I-1, 23-II-I-2, 23-II-J or in Section 2315.3.

5. [For BSC] Sec. 2.3.3. Add a second paragraph following Table 2.3.3:

The allowable unit stresses for fire-retardant-treated solid-sawn lumber and plywood, including fastener values, subject to prolonged elevated temperatures from manufacturing or equipment processes, but not exceeding 150_F (66_C), shall be developed from approved test methods that properly consider potential strength-reduction characteristics, including effects of heat and moisture.

6. [For BSC] Sec. 2.3.4. Add second, third and fourth paragraphs as follows:

The values for lumber and plywood impregnated with approved fire-retardant chemicals, including fastener values, shall be submitted to the building official for approval. Submittal to the building official shall include all substantiating data. Such values shall be developed from approved test methods and procedures that consider potential strength-reduction characteristics, including the effects of elevated temperatures and moisture. Other adjustments are applicable, except that the impact load-duration factor shall not apply.
Values for glued-laminated timber, including fastener design values, shall be recommended by the treater and submitted to the building official for approval. Submittal to the building official shall include all substantiating data.

In addition to the requirements specified in Section 207, fire retardant lumber having structural applications shall be tested and identified by an approved inspection agency in accordance with UBC Standard 23-5.

7. [For BSC} Sec. 5.4. Add a section as follows:

5.4.5 Ponding. *Roof-framing members shall be designed for the deflection and drainage or ponding requirements specified in Section 1506 and Chapter 16. In glued-laminated timbers, the minimum slope for roof drainage required by Section 1506 shall be in addition to a camber of one and one-half times the calculated dead load deflection. The calculation of the required slope shall not include any vertical displacement created by short taper cuts. In no case shall the deflection of glued-laminated timber roof members exceed 1/2-inch (13 mm) for a 5 pound-per-square-foot (239 Pa) uniform load.*

8. [For BSC] Sec. 5.4. Add a new section as follows:

5.4.6 Tapered Faces. *Sawn tapered cuts shall not be permitted on the tension face of any beam. Pitched or curved beams shall be so fabricated that the laminations are parallel to the tension face. Straight, pitched or curved beams may have sawn tapered cuts on the compression face.*

For other members subject to bending, the slope of tapered faces, measured from the tangent to the lamination of the section under consideration, shall not be steeper than 1 unit vertical in 24 units horizontal (4% slope) on the tension side.

EXCEPTION: *1.This requirement does not apply to arches.*

2. Taper may be steeper at sections increased in size beyond design requirements for architectural projections.

9. [For BSC] Sec. 11.1.5.6. Delete and substitute as follows:

11.1.5.6 *For wood-to-wood joints, the spacing center to center of nails in the direction of stress shall not be less than the required penetration. Edge or end distances in the direction of stress shall not be less than one-half of the required penetration. All spacing and edge and end distances shall be such as to avoid splitting of the wood.*

Notation
Authority: Health & Safety Code Section 18934.5
Reference(s): Health & Safety Code, Division 13, Part 2.5, commencing with section 18901.

*** * ***

(END OF ITEM)

ITEM 6-1
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Chapter 16*A [For DSA-SS, OSHPD 1 & 4]*
STRUCTURAL DESIGN REQUIREMENTS

SECTION 1605A – DESIGN

1605A.2.2 Stability against overturning. Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1611A.6 for retaining walls, Section ~~1615A~~ 1621A for wind and Section ~~1626A~~ 1630A.8 for seismic.

SECTION 1611A - OTHER MINIMUM LOADS

1611A.7 Water Accumulation. All roofs shall be designed with sufficient slope or camber to ensure adequate drainage after the long-term deflection from dead load or shall be designed to resist ponding load, *P*, combined in accordance with Section 1612A.2 or 1612A.3. Ponding load shall include water accumulation from any source, including snow, due to deflection. See Section 1506 and Table 16A-C, Footnote 3, for drainage slope. See Section ~~1615A~~ 1613A for deflection criteria.

Notation
Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022
Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-2
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1629A - CRITERIA SELECTION (EARTHQUAKE DESIGN)

1629A.1 Basis for Design. The procedures and the limitations for the design of structures shall be determined considering seismic zoning, site characteristics, occupancy, configuration, structural system and height in accordance with this section. Structures shall be designed with adequate strength to withstand the lateral displacements induced by the Design Basis Ground Motion, considering the inelastic response of the structure and the inherent redundancy, overstrength and ductility of the lateral-force-resisting system. The minimum design strength shall be based on the Design Seismic Forces determined in accordance with the static lateral force procedure of Section 1630A, except as modified by Section 1631A.5.4. Where strength design is used, the load combinations of Section 1612A.2 shall apply. Where Allowable Stress Design is used, the load combinations of Section 1612A.3 shall apply. Allowable Stress Design may be used to evaluate sliding or overturning at the soil-structure interface regardless of the design approach used in the design of the structure, provided load combinations of Section 1612A.3 are utilized *and the foundation conforms with the requirements of Section 1633A.2.12*. ~~One- and two-family dwellings in Seismic Zone 1 need not conform to the provisions of this section.~~

Notation
Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022
Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-3
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

1629A.9 System Limitations.

1629A.9.2 Undefined structural systems. For undefined structural systems not listed in Table 16A-N, the coefficient R shall be substantiated by approved cyclic test data and analyses. The following items shall be addressed when establishing R:
1. Dynamic response characteristics,
2. Lateral force resistance,
3. Overstrength and strain hardening or softening,
4. Strength and stiffness degradation,
5. Energy dissipation characteristics,
6. System ductility, and
7. Redundancy.

Undefined systems shall comply with Section 1631A.2.2.

Notation
Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022
Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-4
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

1629A.10 Alternative Procedures

1629A.10.2 Seismic isolation. Seismic isolation, energy dissipation and damping systems may be used in the design of structures when approved by the *enforcement agency* and when special detailing is used to provide results equivalent to those obtained by the use of conventional structural systems.

[For OSHPD 1 & 4] [For DSA/SS] *For alternate design procedures on seismic isolation systems, refer to Appendix Chapter 16A, Division ~~IV~~ VII, Earthquake Regulations for Seismic-Isolated Structures.*

~~***[For DSA/SS]*** *For alternative design procedures on seismic isolation systems, refer to Chapter 16B, Division IV, Earthquake Regulations for Seismic-Isolated Structures, 1998, California Building Code, Volume 2B.*~~

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-5
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1630A - MINIMUM DESIGN LATERAL FORCES AND RELATED EFFECTS

1630A.1 Earthquake Loads and Modeling Requirements.

1630A.1.1 Earthquake loads. *Any structure which does not have a highly irregular shape, large differences in lateral resistance or stiffness between adjacent stories, or other unusual structural features which could significantly affect the dynamic response, may be designed and constructed to resist the minimum lateral seismic forces set forth in the provisions of this section. The equivalent static lateral seismic forces assumed to act on parts or portions of structures and their anchorage shall be as set forth in Section 1632A. The equivalent static lateral seismic forces assumed to act on nonstructural components and their anchorage shall be as set forth in Section 1632A.* Structures shall be

designed for ground motion producing structural response and seismic forces in any horizontal direction. The following earthquake loads shall be used in the load combinations set forth in Section 1612A:

$$E = \rho E_h \pm E_v \qquad (30A\text{-}1)$$

$$E_m = \Omega_0 E_h \qquad (30A\text{-}2)$$

WHERE:

E = the earthquake load on an element of the structure resulting from the combination of the horizontal component, E_h, and the vertical component, E_v.

E_h = the earthquake load due to the base shear, *V,* as set forth in Section 1630A.2 or the design lateral force, *Fp,* as set forth in Section 1632A.

E_m = the estimated maximum earthquake force that can be developed in the structure as set forth in Section 1630A.1.1.

E_v = the load effect resulting from the vertical component of the earthquake ground motion and is equal to * * * $0.5C_aID$ *applied* to the dead load effect, *D,* for Strength Design, and may be taken as zero for Allowable Stress Design.
Exception: See Section 1632A.2 for the definition of E_v for nonstructural components.

…(Section unchanged except as noted above)

Notation
Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022
Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-6
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

1630A.8 Overturning

1630A.8.3 At foundation. See Sections 1629A.1, 1633A.2.12 and 1809A.4 for overturning moments to be resisted at the foundation soil interface.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-7
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1631A - DYNAMIC ANALYSIS PROCEDURES

1631A.2 Ground Motion. *The dynamic analysis shall be based on the maximum probable ground motions prescribed in the Supplemental Ground-response Reports described in Section 1637A.2. The maximum probable* ground motion representation shall, as a minimum, be one having a 10-percent probability of being exceeded in 50 years, shall not be reduced by the quantity R and may be one of the following:

1. An elastic design response spectrum constructed in accordance with Figure 16A-3, using the values of C_a and C_v consistent with the specific site. The design acceleration ordinates shall be multiplied by the acceleration of gravity, 386.4 in./sec.2 (9.815 m/sec.2). *This spectrum may be used for regular structures only.*
2. A site-specific elastic design response spectrum based on the geologic, tectonic, seismologic and soil characteristics associated with the specific site. The spectrum shall be developed for a damping ratio of

0.05, unless a different value is shown to be consistent with the anticipated structural behavior at the intensity of shaking established for the site. *The site-specific response spectra shall be used for irregular structures and for all structures located on Soil Profile Type S_F.*

3. Ground motion time histories developed for the specific site shall be representative of actual earthquake motions. Response spectra from time histories, either individually or in combination, shall approximate the site design spectrum conforming to Section 1631A.2, Item 2.

4. For structures on Soil Profile Type S_F, the following requirements shall apply when required by Section 1629A.8.4, Item 4:

   4.1 The ground motion representation shall be developed in accordance with Items 2 and 3.

   4.2 Possible amplification of building response due to the effects of soil-structure interaction and lengthening of building period caused by inelastic behavior shall be considered.

1631A.2.1 Vertical Ground Motion ~~5.~~ The vertical component of ground motion may be defined by scaling corresponding horizontal accelerations by a factor of two-thirds. Alternative factors may be used when substantiated by site-specific data. Where the Near Source Factor, N_a, is greater than 1.0, site-specific vertical response spectra shall be used in lieu of the factor of two-thirds.

1631A.2.2 Upper Bound Earthquake ~~6.~~ *The "upper bound earthquake" ground motion is defined as the motion having a 10 percent probability of being exceeded in a 100-year period or maximum level of motion which may ever be expected at the building site within the known geological framework. Where required by other sections of this code, structures shall be designed to sustain the upper bound earthquake motion, including the P∆ effects, without forming a story collapse mechanism along any frameline. Such structures shall have sufficient ductility and strength to undergo the displacement caused by the upper bound earthquake motion without collapse. For irregular or unusual structures located in an area having large site-specific ground motion, criteria as determined by the project architect or structural engineer and approved by the enforcement agency will be required to demonstrate safety against collapse from the upper bound earthquake motion.*

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-8
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1632A - LATERAL FORCE ON ELEMENTS OF STRUCTURES, NONSTRUCTURAL COMPONENTS AND EQUIPMENT SUPPORTED BY STRUCTURES

1632A.1 General. Elements of structures and their attachments, permanent nonstructural components and their attachments, and the attachments for permanent equipment supported by a structure shall be designed to resist the total design seismic forces prescribed in Section 1632A.2.

Attachments shall include anchorages and required bracing *of components, including legs, platforms, frames, skids, or other elements providing gravity or lateral support to the equipment or component. Welded, bolted or other intermittent connections, such as inserts for anchorage of nonstructural components, shall not be allowed the one-third increase in allowable stresses permitted in Section 1612A.3.2.* Friction resulting from gravity loads shall not be considered to provide resistance to seismic forces.

When the structural failure of the lateral-force-resisting systems of nonrigid equipment would cause a life hazard, such systems shall be designed to resist the seismic forces prescribed in Section 1632A.2.

When permissible design strengths and other acceptance criteria are not contained in or referenced by this code, such criteria shall be obtained from approved national standards subject to the approval of the *enforcement agency.*

* * *

(END OF ITEM)

1632*A*.2 Design for Total Lateral Force. The total design lateral seismic force, F_p, shall be determined from the following formula:

$$F_p = 4.0 C_a I_p W_p \qquad (32A\text{-}1)$$

Alternatively, F_p may be calculated using the following formula:

$$\cancel{F_p = \frac{a_p C_a I_p}{R_p}\left(1 + 2\frac{h_x}{h_r}\right)W_p} \qquad F_p = \frac{a_p C_a I_p}{R_p}\left(1 + 2\frac{h_x}{h_r}\right)W_p$$

(32*A*-2)

Except that: F_p shall not be less than $0.7 C_a I_p W_p$ and need not be more than $4 C_a I_p W_p$ (32*A*-3)

WHERE:

h_x is the element or component attachment elevation with respect to grade. h_x shall not be taken less than 0.0. *The value of h_x/h_r need not exceed 1.0.*
h_r is the structure roof elevation with respect to grade.
a_p is the in-structure Component Amplification Factor that varies from 1.0 to 2.5.

A value for a_p shall be selected from Table 16*A*-O. Alternatively, this factor may be determined based on the dynamic properties or empirical data of the component and the structure that supports it. The value shall not be taken less than 1.0. *For elevator-related equipment, see Part 7, Title 24, California Code of Regulations in addition to Table 16A-O.*

R_p is the Component Response Modification Factor that shall be taken from Table 16*A*-O, except that R_p for anchorages shall equal 1.5 for shallow expansion anchor bolts, shallow chemical anchors or shallow cast-in-place anchors. Shallow anchors are those with an embedment length-to-diameter ratio of less than 8. When anchorage is constructed of nonductile materials, or by use of adhesive, R_p shall equal 1.0.

The design lateral forces determined using Formula (32*A*-1) or (32*A*-2) shall be distributed in proportion to the mass distribution of the element or component. *To determine the out-of-plane loading for elements such as walls or wall panels that have points of attachment at two or more different elevations, the following procedure may be used. For the vertical span of the element having a unit weight w_p between two successive attachment elevations h_x and h_{x+i} evaluate the force coefficients F_p and W_p at each of the two points, observing the minimum and maximum limits, and compute the average of the two values. The resulting average coefficient times the unit weight w_p provides the distributed seismic load for the span between the attachment points, and this load may be extended to the top of any wall parapet above the roof attachment point at h_r.*

Forces determined using Formulas (32*A*-1) or (32*A*-2) shall be used to design members and connections that transfer these forces to the seismic-resisting systems. Members and connection design shall use the load combinations and factors specified in Section 1612*A*.2 or 1612*A*.3. *The vertical earthquake effect E_v, shall be applied simultaneously with the horizontal earthquake effect E_h. E_v shall be taken as $0.5C_aIW_p$ for Strength Design and $0.35C_aIW_p$ for Allowable Stress Design. E_v shall be applied to the dead load effect D, in a manner that produces the most severe member and connection demands* The Reliability/Redundancy Factor, ρ, may be taken equal to 1.0 *A continuous load path of sufficient strength and stiffness between the component and the supporting structure shall be verified. Local elements of the supporting structure shall be verified for the component loads where they control the design of the elements or their connections. The component loads shall be those determined using Formula (32A-1) or (32A-2), except that modifications to R_p due to anchorage conditions need not be considered.*

…(Section unchanged except as noted above)

Notation
Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022
Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

1632A.6 HVAC Ductwork, Plumbing/Piping and Conduit Systems. *All pipes, ducts and conduit shall be braced to resist the forces prescribed in Section 1632A.2. Ductwork shall be constructed in accordance with provisions contained in Part 4, Title 24, California Mechanical Code. Pipes and their connections constructed of ductile materials (copper, ductile iron, steel or aluminum with brazed or welded connections) shall have brace spacing not exceeding that specified in Section 1632A.5 or other standards approved by the enforcement agency. Pipes and their connections, constructed of nonductile materials (e.g., cast iron, no-hub pipe and plastic), or with screwed connections shall have the brace spacing reduced to one-half of the spacing allowed for ductile material in accordance with Section 1632A.5 or other standards approved by the enforcement agency.*

Seismic restraints may be omitted for the following conditions, where flexible connections are provided between components or equipment and the associated ductwork, piping and conduit:

1. Fuel, medical gas, and vacuum piping less than 1 inch (25 mm) inside diameter, or

2. All other piping less than 2.5 inches (64 mm) diameter, or

3. All piping suspended by individual hangers 12 inches (305 mm) or less in length from the top of the pipe to the bottom of the structural support for the hanger, where the hangers are detailed to avoid bending of the hangers and their connections, or

4. All electrical conduit less than 2.5 inches (64 mm) trade size~~.~~, or

~~3.~~5. All rectangular air-handling ducts less than 6 square feet (0.56 m^2) in cross-sectional area, or

6. All round air-handling ducts less than 28 inches (711 mm) in diameter, or

7. All ducts suspended by hangers 12 inches (305 mm) or less in length from the top of the duct to the bottom of the structural support for the hanger, where the hangers are detailed to avoid bending of the hangers and their connections.

Where lateral restraints are omitted, the piping, ducts or conduit shall be installed such that lateral motion of the piping or duct will not cause damaging impact with other systems or structural members, or loss of vertical support.

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

SECTION 1633A - DETAILED SYSTEMS DESIGN REQUIREMENTS

1633A.2 Structural Framing Systems.

1633A.2.6 Collector elements. Collector elements shall be provided that are capable of transferring the seismic forces originating in other portions of the structure to the element providing the resistance to those forces.

Collector elements, splices and their connections to resisting elements shall resist the forces determined in accordance with Formula (33A-1). In addition, collector elements, splices, and their connections to resisting elements shall have the design strength to resist the combined loads resulting from the special seismic load of Section 1612A.4.

> **EXCEPTION:** In structures, or portions thereof, braced entirely by light-frame wood shear walls or light-frame steel and wood structural panel shear wall systems, collector elements, splices and connections to resisting elements need only be designed to resist forces in accordance with Formula (33A-1).

The quantity $\cancel{E_M}$ $\underline{E_m}$ need not exceed the maximum force that can be transferred to the collector by the diaphragm and other elements of the lateral-force-resisting system. For Allowable Stress Design, the design strength may be determined using an allowable stress increase of 1.7 and *for LRFD* a resistance factor, ϕ, of 1.0. This increase shall

not be combined with the one-third stress increase permitted by Section 1612A.3, but may be combined with the duration of load increase permitted in Division III of Chapter 23A.

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(END OF ITEM)

ITEM 6-12
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

1633A.2.12 Foundations and superstructure-to-foundation connections. *The foundation shall be capable of transmitting the design base shear and the overturning forces from the structure into the supporting soil.*

~~The~~ In addition, the foundation and the connection of the superstructure elements to the foundation shall have the strength to resist, in addition to gravity loads, the lesser of the following seismic loads:

1. The strength of the superstructure elements.

2. The maximum forces that would occur in the fully yielded structural system.

3. Ω_o times the forces in the superstructure elements due to the seismic forces as prescribed in this chapter.

> ***EXCEPTIONS:*** *1. Where structures are designed using $R \leq 2.2$ such as for inverted pendulum-type structures.*
> *2. When it can be demonstrated that inelastic deformation of the foundation and superstructure-to-foundation connection will not result in a weak story or cause collapse of the structure.*
> *3. Where the basic structural system as described in Table 16A-N consists of light-framed walls with shear panels.*

Where moment resistance is assumed at the base of the superstructure elements, the rotation and flexural deformation of the foundation as well as deformation of the superstructure-to-foundation connection shall be considered in the drift and deformation compatibility analyses.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-13
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

TABLE 16A-M

Amend Table 16A-M as follows:

TABLE 16*A*-M—PLAN STRUCTURAL IRREGULARITIES

IRREGULARITY TYPE AND DEFINITION	REFERENCE SECTION
1a. **Torsional irregularity-to be considered when diaphragms are not flexible** Torsional irregularity shall be considered to exist when the maximum story drift, computed including accidental torsion, at one end of the structure transverse to an axis is more than 1.2 times the average of the story drifts of the two ends of the structure.	1633A.1 1633A.2.9, Item 6
1b. ***Severe Torsional irregularity-to be considered when diaphragms are not flexible*** *Severe torsional irregularity shall be considered to exist when the maximum story drift, computed including accidental torsion, at one end of the structure transverse to an axis is more than 1.4 times the average of the story drifts of the two ends of the structure.*	*1629A.9.5* *~~1631B.2.9~~ 1633A.2.9, Item 6*

2. **Reentrant corners** Plan configurations of a structure and its lateral force-resisting system contain reentrant corners, where both projections of the structure beyond a reentrant corner are greater than 15 percent of the plan dimension of the structure in the given direction.	1633A.2.9, Items 6 and 7
3. **Diaphragm discontinuity** Diaphragms with abrupt discontinuities or variations in stiffness, including those having cutout or open areas greater than 50 percent of the gross enclosed area of the diaphragm, or changes in effective diaphragm stiffness of more than 50 percent from one story to the next.	1633A.2.9, Item 6
4. **Out-of-plane offsets** Discontinuities in a lateral force path, such as out-of-plane offsets of the vertical elements.	1630A.8.2; 1633A.2.9, Item 6; 2213A.9.1
5. **Nonparallel systems** The vertical lateral load-resisting elements are not parallel to or symmetric about the major orthogonal axes of the lateral force-resisting system.	1633A.1

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-14
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

TABLE 16A-O

Amend Table 16A-O as follows:

TABLE 16A-O—HORIZONTAL FORCE FACTORS, a_P AND R_p

ELEMENTS OF STRUCTURES AND NONSTRUCTURAL COMPONENTS AND EQUIPMENT[1]	a_p	R_p	FOOTNOTE
1. Elements of Structures A. Walls including the following: (1) Unbraced (cantilevered) parapets.	2.5	3.0	
(2) Exterior walls at or above the ground floor and parapets braced above their centers of gravity.	1.0	3.0	2
(3) All interior-bearing and nonbearing walls.	1.0	3.0	2, *11* ~~8~~
B. Penthouse (except when framed by an extension of the structural frame).	2.5	4.0	
C. Connections for prefabricated structural elements other than walls. See also Section 1632*A*.2.	1.0	3.0	3~~, *20*~~
2. Nonstructural Components A. Exterior and interior ornamentations and appendages.	2.5	3.0	~~*20*~~
B. Chimneys, stacks and trussed towers supported on or projecting above the roof: (1) Laterally braced or anchored to the structural frame at a point below their centers of mass.	2.5	3.0	
(2) Laterally braced or anchored to the structural frame at or above their centers of mass.	1.0	3.0	
C. Signs and billboards.	2.5	3.0	
D. Storage racks (include contents) *with upper storage level more than 5 feet (1524 mm) in height*	2.5	4.0	4, *23*
E. Permanent floor-supported cabinets and book stacks more than 6 feet (1829 mm) in height (include contents).	1.0	3.0	5, ~~*20,*~~ *23, 24*
F. Anchorage and lateral bracing for suspended ceilings and light	1.0	3.0	3, 6, 7, 8, *25,*

fixtures.			*26*
G. Access floor systems.	1.0	3.0	9,*14* ~~20~~
H. Masonry or concrete fences over 6 feet (1829 mm) high.	1.0	3.0	
I. Partitions.	1.0	3.0	~~8~~ *11*
J. Wall hung cabinets and storage shelving (plus contents)	*1.0*	*3.0*	
3. Equipment A. Tanks and vessels (include contents), including support systems.	1.0	3.0	~~20~~
B. Electrical, mechanical and plumbing equipment and associated conduit and ductwork and piping*, and machinery. In hospitals and essential services buildings, this includes all piping, electrical conduits, cable trays and air-handling ducting necessary to the continuing operation of the facility.*	1.0	3.0	5, 10, ~~11~~, 12, 13, 14, 15, 16, ~~20~~
C. Any flexible equipment laterally braced or anchored to the structural frame at a point below their center of mass.	2.5	3.0	5, 10, 14, 15, 16, ~~20~~
D. Anchorage of emergency power supply systems and essential communications equipment. Anchorage and support systems for battery racks and fuel tanks necessary for operation of emergency equipment. See also Section 1632*A*.2.	~~1.3~~ *1.0*	~~3.0~~ *2.5*	*14,* 17, 18, ~~20,~~ *21*
E. Temporary containers with flammable or hazardous materials.	1.0	3.0	19
F. Power cable-driven elevators or hydraulic elevators with lifts over 5 feet (1524 mm): *(1) Hoistway structural framing providing the support for guide rail brackets*			~~25~~ *27*
(2) Guide rails and guide rail brackets			
(3) Car and counterweight auxiliary guiding members or retainer plates			
(4) Driving machinery, pump unit tanks operating devices and control equipment cabinets			
4. Other Components A. Rigid components with ductile material and attachments.	1.0	3.0	1*, 14,* ~~20~~
B. Rigid components with nonductile material or attachments.	1.0	1.5	1*, 14,* ~~20~~
C. Flexible components with ductile material and attachments.	2.5	3.0	1*, 14,* ~~20~~
D. Flexible components with nonductile material or attachments.	2.5	1.5	1*, 14,* ~~20~~

[1]See Section 1627A for definitions of flexible components and rigid components. *See Section 1632A for formula using a_p. Horizontal forces are to be applied in any horizontal direction. The value of a_p shall not be reduced for all walls. Welded, bolted or other intermittent connections such as inserts for anchorage of nonstructural components shall not be allowed the one-third increase in allowable stress permitted in Section 1612A.3.2.*

[2]See Sections 1633A.2.4 and 1633A.2.8 for concrete and masonry walls and Section 1632A.2 for connections for ~~panel connectors for~~ *wall* panels.

[3]Applies to Seismic Zones 2, 3 and 4 only.

[4]Ground supported steel storage racks may be designed using the provisions of Section 1634A. Chapter 22A, Division ~~VI~~ X, may be used for design, provided seismic design forces are equal to or greater than those specified in Section 1632A.5 or 1634A.5, as appropriate.

[5]Only attachments, anchorage or restraints need be designed. *See Section 1632A.1.*

[6]Ceiling weight shall include all light fixtures and other equipment or partitions that are laterally supported by the ceiling. For purposes of determining the seismic force, a ceiling weight of not less than 4 psf (0.19 kN/m2) shall be used.

[7]Ceilings constructed of lath and plaster or gypsum board screw or nail attached to suspended members that support a ceiling at one level extending from wall to wall need not be analyzed, provided the walls are not over 50 feet (15 240 mm) apart.

[8]Light fixtures and mechanical services installed in metal suspension systems for acoustical tile and lay-in panel ceilings shall be independently supported from the structure above as specified in UBC Standard 25-2, Part III. ~~*See also Section 1611A.5 for minimum load and deflection criteria for interior partitions.*~~

[9]*Wp* for access floor systems shall be the dead load of the access floor system plus 25 percent of the floor live load plus a 10-psf (0.48 kN/m2) partition load allowance.

[10]Equipment includes, but is not limited to, boilers, chillers, heat exchangers, pumps, air-handling units, cooling towers, control panels, motors, switchgear, transformers and life-safety equipment. It shall include major conduit,

ducting and piping, which services such machinery and equipment and fire sprinkler systems. See Section 1632A.2 for additional requirements for determining a_p for nonrigid or flexibly mounted equipment.

[11]~~*Deleted*~~ *See also Section 1611A.5 for minimum load and deflection criteria for interior partitions.*

[12]Seismic restraints may be omitted from electrical raceways, such as cable trays, conduit and bus ducts, if all the following conditions are satisfied:

[12.1] Lateral motion of the raceway will not cause damaging impact with other systems.

[12.2] Lateral motion of the raceway does not cause loss of system vertical support.

[12.3] Rod-hung supports of less than 12 inches (305 mm) in length ~~have top connections that cannot develop moments~~ *where the hangers are detailed to avoid bending of the hangers and their connections.*

[12.4] Support members cantilevered up from the floor are checked for stability.

[13]Piping, ducts and electrical raceways, which must be functional following an earthquake, spanning between different buildings or structural systems shall be sufficiently flexible to withstand relative motion of support points assuming out-of-phase motions.

[14]Vibration isolators supporting *nonstructural components and* equipment shall be designed for lateral loads or restrained from displacing laterally by other means. Restraint shall also be provided, which limits vertical displacement, such that lateral restraints do not become disengaged. a_p and R_p for equipment supported on vibration isolators shall be taken as 2.5 and 1.5, respectively~~;~~. ~~except that if~~ *If* the isolation mounting frame is supported by shallow or expansion anchors, the design forces for the anchors calculated by Formula (32A-1), (32A-2) or (32A-3) shall be ~~additionally~~ multiplied by a factor of *1.3*.

[15]Equipment anchorage shall not be designed such that lateral loads are resisted by ~~gravity~~ friction induced solely by the effects of gravity (e.g., friction clips).

[16]Expansion anchors, which are required to resist seismic loads in tension, shall not be used where operational vibrating loads are present.

[17]Movement of components within electrical cabinets, rack- and skid-mounted equipment and portions of skid-mounted electromechanical equipment that may cause damage to other components by displacing, shall be restricted by attachment to anchored equipment or support frames.

[18]Batteries on racks shall be restrained against movement in all directions due to earthquake forces.

[19]Seismic restraints may include straps, chains, bolts, barriers or other mechanisms that prevent sliding, falling and breach of containment of flammable and toxic materials. Friction forces may not be used to resist lateral loads in these restraints unless positive uplift restraint is provided which ensures that the friction forces act continuously.

[20] *Not used.* ~~*The component anchorage shall be designed for the horizontal force, Fp, acting simultaneously with a vertical seismic force equal to one third of the horizontal force, Fp.*~~

[21]Emergency equipment should be located where there is the least likelihood of damage due to earthquake. Such equipment should be located at ground level, and where it can be easily maintained to assure its operation during an emergency.

[22]Not used.

[23]Floor-supported storage racks, cabinets or book stacks not more than 5 feet (1524 mm) in height need not be anchored if the width of the supporting base or width between the exterior legs is equal to or greater than two thirds the height. In addition to gravity loads, storage racks or cabinets shall be designed and constructed to resist the horizontal force, F_p, with the base assumed to be anchored.

[24]Mobile storage racks or cabinets mounted on wheels and not restrained by fixed tracks are not subject to approval by the enforcement agency when the rack or cabinet is not more than 5 feet (1524 mm) in height and the width of the supporting base or width between the exterior legs/wheels is equal to or greater than two thirds the height. All such racks or cabinets shall be restrained to prevent movement when not in use. Movable storage racks or cabinets mounted on wheels or glides restrained by fixed tracks shall be designed and constructed to resist the horizontal force, Fp, with the base of the rack or cabinet assumed to be anchored. Provisions shall be made to resist translation perpendicular to the track and overturning both perpendicular and parallel to the track.

[25]Suspension systems for light fixtures which have passed shaking table tests approved by the enforcement agency, or which, as installed, are free to swing a minimum of 45 degrees from the vertical in all directions without contacting obstructions, shall be assumed to comply with the lateral-force requirements of Section 1632A.2. Unless the cable-type, free-swinging suspension systems shall have a safety wire or cable attached to the fixture and structure at each support capable of supporting four times the supported load.

[26]For suspended and surface-mounted light fixtures, the product of I a_p need not exceed 1.5 for any value of I.

[27]*See Section 1633A.2.13.*

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 6-15
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1637A – SITE DATA FOR HOSPITALS, PUBLIC ELEMENTARY AND SECONDARY SCHOOLS, AND STATE-OWNED OR STATE-LEASED ESSENTIAL SERVICES BUILDINGS

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 6-16 **WITHDRAWN**
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A

ITEM 6-17
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Division VI-R - EARTHQUAKE EVALUATION AND DESIGN FOR RETROFIT OF [FOR BSC, DSA] EXISTING STATE-OWNED BUILDINGS [FOR OSHPD] EXISTING HOSPITALS [FOR DSA-SS] EARTHQUAKE EVALUATION AND DESIGN FOR REHABILITATION OF EXISTING BUILDINGS FOR USE AS PUBLIC SCHOOL BUILDINGS

SECTION 1641A - DEFINITIONS

…

LATERAL LOAD CAPACITY *is the capacity as determined either by Method A or Method B of the subject element. ~~A [For DSA-SS]: The capacity of]~~ The capacity of a system is the sum of all element capacities acting individually reduced by the* β *factor for the element and meeting the requirements of Section 1646A.2.4. All forms of loading are to consider both displacements in orthogonal directions and torsion.*

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-18
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1642A - SYMBOLS AND NOTATIONS

1642A.1 *The following symbols and notations apply to this division in addition to those of Section 1628A:*

~~*[For DSA-SS] Cn represents the nominal strength of a material for a given state of stress.*~~

ϕC_n = Usable strength or capacity of an element as determined in the materials chapters where ϕ is the strength reduction factor and C_n is the nominal strength.

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-19
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1644A - METHOD A

1644A.9.2.3.3 [For DSA/SS] *In order to qualify for a β value equal to 1.0, such columns shall meet the following detailing and member limitations:*

1. Chapter 19A, Section 1921A.4, for concrete, and Chapter 22A, Section 2210A, ~~2211.4,~~ 2211A and 2213A.5, for steel in structures in Seismic Zones 3 and 4, except for welded steel moment connections where the current SAC Interim Guidelines for the evaluation, repair, modification, and design of welded steel moment frame buildings, FEMA 350, 351, 352, July 2000, provisions for columns apply.

1644A.13.1.2.1 [For DSA/SS] *Nonstructural components and systems shall meet the requirements for new buildings, Section 1632A, or comply with provisions of Section 1645A.8 and this section.*

The total design lateral force, F_p, shall be determined from the following formula:

$$\cancel{F_p = \beta H C_a I_p W_p} \qquad \underline{F_p = 4.0 H C_a I_p W_p} \qquad (44A\text{-}14)$$

Alternatively, Fp may be calculated using the following formula:

$$\cancel{F_p = \beta \frac{a_p H C_a I_p}{R_p}\left(1 + 3\frac{h_x}{h_r}\right) w_p} \qquad \underline{F_p = \frac{a_p H C_a I_p}{R_p}\left(1 + 2\frac{h_x}{h_r}\right) W_p} \qquad (44A\text{-}15)$$

Except that:

F_p shall not be less than ~~$0.7\beta H C_a I_p W_p$~~ $\underline{0.7 H C_a I_p W_p}$ and need not be more than ~~$4\beta H C_a I_p W_p$~~ $\underline{4 H C_a I_p W_p}$. *(44A-16)*

Where:

~~β = *is the value for the connection, not the element to which it is attached. The values of β for connections, bracing and materials shall be as prescribed in Section 1645A.7.2.*~~

I_p = the value used for the structure selected from Table 16A-K.

h_x = the element or component attachment elevation with respect to grade. h_x shall not be taken less than 0.0.

h_r = the structure roof elevation with respect to grade. The value of h_x/h_r need not exceed 1.0.

a_p = the in-structure Component Amplification Factor that varies from 1.0 to 2.5. A value for a_p shall be selected from Table 16A-O.

R_p = the Component Response Modification Factor that shall be taken from Table 16A-0, except that R_p for anchorages shall equal 1.5 for shallow expansion bolts, shallow chemical anchors or shallow cast-in-place anchors. Shallow anchors are those with an embedment length-to-diameter ratio of less than 8. Where anchorage is constructed of nonductile materials, or has nonductile behavior, or the component is attached with an adhesive surface joint, R_p shall equal 1.0.

The design lateral forces determined using Formula (44A-14) or (44A-15) shall be distributed in proportion to the mass distribution of the element or component.

Forces determined using Formula (44A-14) or (44A-15) shall be used to design members and connections that transfer these forces to the seismic-resisting systems. Members and connections shall use the load combinations and factors specified in Section 1644A.4.1.1 or 1644A.4.1.2. The member or connection actions due to F_p are the earthquake load E to be used in the load combinations. <u>The vertical earthquake effect E_v, shall be applied simultaneously with the horizontal earthquake effect E_h. E_v shall be taken as $0.5HC_aIW_p$ for Strength Design and $0.35HC_aIW_p$ for Allowable Stress Design. E_v shall be applied to the dead load effect D, in a manner that produces the most severe member and connection demands.</u>

To determine the out-of-plane loading for elements such as walls or wall panels that have points of attachment at two or more different elevations, the following procedure may be used. For the vertical span of the element having a unit weight w_p between two successive attachment elevations h_x and h_{x+i} evaluate the force coefficients F_p/W_p at each of the two points, observing the minimum and maximum limits, and compute the average of the two values. The resulting average coefficient times the unit weight w_p provides the distributed seismic load for the span between the attachment points, and this load may be extended to the top of any wall parapet above the roof attachment point at h_r.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

*** * ***

(END OF ITEM)

ITEM 6-20
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1648A - METHOD B

1648A.2.4 *The ground motion characterization used for Method B shall be consistent with <u>this</u> ~~those required by~~ Section ~~1643A.8~~.*

1648A.2.4.1.1 [For DSA/SS] *The ground motion characterization used for Method B shall be based on ground shaking having a 10 percent probability of exceedance in 50 years at a performance level for the protection of life and property and the maximum considered earthquake at the performance level for collapse prevention.*

Ground shaking having a 10 percent probability of exceedance in 50 years need not exceed 2/3 of the maximum considered earthquake. Ground shaking response spectra for use in Method B shall be determined in accordance with either the General Procedure of Section ~~1648A.2.2.2.1~~ <u>1648A.2.4.2.1</u> or the Site-Specific Procedure of Section ~~1648A.2.2.3.1~~ <u>1648A.2.4.3.1.</u>

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-21
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1649A - PEER REVIEW REQUIREMENTS

1649A.5.1 [For DSA/SS] Reports. *The reviewer(s) shall prepare a written report to the owner and ~~responsible~~ DSA that covers all aspects of the review performed, including conclusions reached by the reviewer, in accordance with Section 1640A.8.3. Such reports shall address the following.*

1. Scope of engineering design peer review performed during phase of work

.

2. The status of the project documents and/or analyses at each review stage.

3. Ability of structural and nonstructural materials and framing systems to meet the performance objective.

4. Basic constructability of the retrofit or repair system.

5. Recommendations that would be appropriate to the specific project.

6. Presentation of the conclusions of the reviewer identifying any areas that need further review, investigation and/or clarification.

7. Compliance with the evaluation and retrofit report criteria per Section 1640A.8.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-22
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Appendix Chapter 16A

DIVISION *VII* - EARTHQUAKE REGULATIONS FOR SEISMIC-ISOLATED STRUCTURES

SECTION 1657A - CRITERIA SELECTION

1657A.3 Occupancy Categories. The importance factor, *I*, for a seismic-isolated building shall be taken as 1.0 regardless of occupancy category. *[For OSHPD 1] [For DSA-SS] The importance factor, Ip, for parts and portions of a seismic-isolated building shall be the same as that required for a fixed-base building of the same occupancy category.*

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-23
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1665A - REQUIRED TESTS OF ISOLATION SYSTEM

1665A.2.3 Sequence and cycles. The following sequence of tests shall be performed for the prescribed number of cycles at a vertical load equal to the average D+ 0.5L on all isolator units of a common type and size:

1. Twenty fully reversed cycles of loading at a lateral force corresponding to the wind design force.

2. Three fully reversed cycles of loading at each of the following increments of displacement: 0.2 D_D, 0.5 D_D and 1.0 D_D, 1.0D_M.

3. Three fully reversed cycles at the total maximum displacement, 1.0D_{TM}.

4. ~~(15C_{VD}/$C_{VA}$$B_D$)~~ (15$C_{VD}$/$C_{AD}$$B_D$), but not less than 10, fully reversed cycles of loading at 1.0 times the total design displacement, 1.0D_{TD}.

…(Section unchanged except as noted above)

* * *

(END OF ITEM)

ITEM 6-24
DSA/SS 01/04
Part 2, Volume 2, Chapter 16A **APPROVED**

1665A.4 System Adequacy. The performance of the test specimens shall be assessed as adequate if the following conditions are satisfied:

1. The force-deflection plots of all tests specified in Section 1665A.2 have a positive incremental force-carrying capacity.

2. For each increment of test displacement specified in Section 1665A.2.3, Item 2, and for each vertical load case specified in Section 1665A.2.3:

2.1 There is no greater than a plus or minus 10 percent difference between the effective stiffness at each of the three cycles of test and the average value of effective stiffness for each test specimen.

2.2 There is no greater than a 10 percent difference in the average value of effective stiffness of the two test specimens of a common type and size of the isolator unit over the required three cycles of test.

3. For each specimen there is no greater than a plus or minus 20 percent change in the initial effective stiffness of each test specimen over the ~~(15C_{VD}/$C_{VA}$$B_D$)~~ (15$C_{VD}$/$C_{AD}$$B_D$), but not less than 10, cycles of the test specified in Section 1665A.2.3, Item 4.

4. For each specimen there is no greater than a 20 percent decrease in the initial effective damping over for the ~~(15C_{VD}/$C_{VA}$$B_D$)~~ (15$C_{VD}$/$C_{AD}$$B_D$), but not less than 10, cycles of the test specified in Section 1665A.2.3, Item 4.

5. All specimens of vertical load-carrying elements of the isolation system remain stable at the total maximum displacement for static load as prescribed in Section 1665A.2.6.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-25
DSA/SS 01/04
Part 2, Volume 2, Chapter 18A **APPROVED**

Chapter 18*A [For DSA-SS]*
FOUNDATIONS AND RETAINING WALLS

SECTION 1804A - FOUNDATION INVESTIGATION

1804A.1 General. *Soil investigation reports which include foundation or pile capacity recommendations, recommendations regarding installation, and, in the case of engineered fills, directions as to materials and construction procedures shall be prepared by a geotechnical engineer qualified to undertake investigations for foundation and earthwork design. Investigations involving test borings, exploration shafts or load tests shall be made under the engineering control of such a geotechnical engineer.*

Site investigations and reports pertaining to geologic hazards shall be made where required by Sections 17212 and 17212.5 of the Education Code for public school buildings, Sections ~~15044~~ 129775 and ~~15045~~ 129780 of the Health and Safety Code for hospital buildings, and Section 16014 of the Health and Safety Code for essential services buildings. See also Sections 1629A.3 and 1637A.

… Remainder unchanged of section unchanged

SECTION 1806A - FOOTINGS

1806A.2 Footing Design. (2nd paragraph)

The enforcing agency may require… drift values in Chapter 16A.

SECTION 1809A - FOUNDATION CONSTRUCTION - SEISMIC ZONES 3 AND 4

1809A.5 Special Requirements for Piles and Caissons.

1809A.5.1 General. Piles, caissons and caps shall be designed according to the provisions of Section ~~1603A~~ 1605A, including the effects of lateral displacements. *Whenever such members are founded in Type S_D, S_E, or S_F soils,* special detailing requirements as described in Section 1809A.5.2 shall apply for a length of *such members* equal to 120 percent of the flexural length. Flexural length shall be considered as a length of pile from the first point of zero lateral deflection to the underside of the pile cap or grade beam.

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-26
DSA/SS 01/04
Part 2, Volume 2, Chapter 19A **APPROVED**

Chapter 19*A [For DSA/SS & OSHPD 1 & 4*]
CONCRETE

SECTION 1903A - SPECIFICATIONS FOR TESTS AND MATERIALS

1903A.3.2.1 [For DSA/SS] The nominal maximum size of coarse aggregate shall not be larger than:

1. One fifth the narrowest dimension between sides of forms, or 2. One third the depth of slabs, or

3. Three fourths the minimum clear spacing between individual reinforcing bars or wires, bundles of bars, or prestressing tendons or ducts.

These limitations may be waived if, in the judgment of the *structural engineer and the enforcement agency,* workability and methods of consolidation are such that concrete can be placed without honeycomb or voids *and the mixes are designed and tested in accordance with Method B or C of Section 1905A.*

Evidence that the aggregate used is not reactive in the presence of cement alkalies may be required by the enforcement agency. If new aggregate sources are to be used or if past experience indicates problems with existing aggregate sources, test the aggregate for potential reactivity according to ASTM C 289. If a result other than innocuous is obtained, test the cement-aggregate combination according to ASTM C 227 using the cement corresponding to that on which the selection of concrete proportions was based (see Section 1905A.2). If the results of this test indicate an expansion greater than 0.10 percent at six months, the aggregate shall be deemed to contain reactive substances in amounts deleterious to concrete, and shall be used with a cementitious material system suitable for preventing alkali-aggregate reaction as follows:

1. Low-alkali portland cement containing not more than 0.6 percent total alkali when calculated as sodium oxide, as determined by the method given in Methods of Chemical Analysis of Hydraulic Cement, ASTM ~~C 144~~ C 114.

2. Blended hydraulic cement, Type 1S or 1P, conforming to UBC Standard 19-1, Part III, except that Type 1S cement shall not contain less than 40 percent slag constituent.

3. Replacement of not less than 15 percent by weight of the portland cement used by a mineral admixture conforming to ASTM C 618.

4. Replacement of not less than 40 percent by weight of the portland cement used by a ground granulated blast-furnace slag conforming to ASTM C 989.

1903A.11 Glass Fiber Reinforced Concrete. Recommended Practice for Glass Fiber Reinforced Concrete Panels, PCI Manual 128.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-27
DSA/SS 01/04
Part 2, Volume 2, Chapter 19A **APPROVED**

SECTION 1905A - CONCRETE QUALITY, MIXING AND PLACING

1905A.2.3 *Concrete specified by compressive strength shall be proportioned by one of the following methods:*

Method A. *As an alternate to Methods B and C, below, the compressive strength of 2,500 psi (17.2 MPa) and 3,000 psi (20.7 MPa) concrete shall be permitted to be used for structural concrete in accordance with Table ~~19A-A-7~~ 19A-A-8.*

…(Section unchanged except as noted above)

Notation
Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022
Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-28
DSA/SS 01/04
Part 2, Volume 2, Chapter 19A **APPROVED**

~~**1905A.5.1 [For DSA/SS]** Average Strength Reduction. As data become available during construction, *** the amount by which f.cr must exceed the specified value of f.c, provided:~~
~~1. Thirty or more test results are available and average of test results exceeds that required by Section 1905A.3.2.1, using a standard deviation calculated in accordance with Section 1905A.3.1.1, or~~
~~2. Fifteen to 29 test results are available and average of test results exceeds that required by Section 1905A.3.2.1, using a standard deviation calculated in accordance with Section~~

~~1905A.3.1.2, and~~
~~3. Special exposure requirements of Section 1904A are met.~~

~~**1905A.5.2**~~ **1905A.5.1** ***[For OSHPD 1&4 and DSA/SS]*** As data becomes available during construction, *it shall be permitted to reduce* the amount by which f'_{cr} must exceed the specified value of f'_c, provided:

1. Thirty or more test results are available and average of test results exceeds that required by Section 1905A.3.2.1, using a standard deviation calculated in accordance with Section 1905A.3.1.1, or

2. Fifteen to 29 test results are available and average of test results exceeds that required by Section 1905A.3.2.1, using a standard deviation calculated in accordance with Section

1905A.3.1.2, and

3. Special exposure requirements of Section 1904A are met.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022
Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-29
DSA/SS 01/04
Part 2, Volume 2, Chapter 19A **APPROVED**

SECTION 1921A - REINFORCED CONCRETE STRUCTURES RESISTING FORCES INDUCED BY EARTHQUAKE MOTIONS

1921A.0 Notations.

…

$\cancel{\Delta_m}$ $\underline{\Delta_M} = 0.7R\Delta_s$.

…

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022
Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

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(END OF ITEM)

ITEM 6-30
DSA/SS 01/04
Part 2, Volume 2, Chapter 19A **APPROVED**

1921A.3.2 Longitudinal reinforcement.

1921A.3.2.1 At any section of a flexural member, except as provided in Section 1910A.5.3, for top as well as for bottom reinforcement, the amount of reinforcement shall not be less than that given by Formula (~~20A-3~~ 10A-3) but not less than 200 $b_w d/f_y$, (For **SI:** 1.38 $b_w d/f_y$) and the reinforcement ratio, ρ, shall not exceed 0.025. At least two bars shall be provided continuously, both top and bottom.

…(Section unchanged except as noted above)

1921A.5.3 Shear strength.

1921A.5.3.1 The nominal shear strength of the joint shall not be taken greater than the forces specified below for normal-weight aggregate concrete.

For joints confined on all four faces 20 $\sqrt{f'_c}A_j$

(For **SI:** 1.66 $\sqrt{f'_c}A_j$)

For joints confined on three faces or on two opposite faces 15 $\sqrt{f'_c}A_j$

(For **SI:** 1.25 $\sqrt{f'_c}A_j$)

For others 12 $\sqrt{f'_c}A_j$

(For **SI:** 1.00 $\sqrt{f'_c}A_j$)

A member that frames into a face is considered to provide confinement to the joint if at least three fourths of the face of the joint is covered by the framing member. A joint is considered to be confined ~~is~~ if such confining members frame into all faces of the joint.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 6-31
DSA/SS 01/04
Part 2, Volume 2, Chapter 21A **APPROVED**

Chapter 21A ***[DSA-SS & OSHPD]***
MASONRY

SECTION 2108A - STRENGTH DESIGN OF MASONRY

2108A.2.2.6 Development. The calculated tension or compression reinforcement shall be developed in accordance with the following provisions:
The embedment length of reinforcement shall be determined by Formula (8A-12).

$$l_d = l_{de} / \phi \qquad \text{(8A-12)}$$

WHERE:

$$l_{de} = \frac{0.15 d_b^2 f_y}{K\sqrt{f'_m}} \underline{\leq 52 d_b} \qquad \text{(8A-13)}$$

For SI:

$$l_{de} = \frac{1.8 d_b^2 f_y}{K\sqrt{f'_m}} \underline{\leq 52 d_b}$$

K shall not exceed $3d_b$.

* * *

(END OF ITEM)

2108A.2.6.2.6 Members subjected to axial force and flexure.
The requirements set forth in this subsection apply to piers proportioned to resist flexure in conjunction with axial loads.

1. **Longitudinal reinforcement.** A minimum of four longitudinal bars shall be provided at all sections of every pier.

Flexural reinforcement shall be distributed across the member depth. Variation in reinforcement area between reinforced cells shall not exceed 50 percent.

Minimum reinforcement ratio calculated over the gross cross section shall be 0.002.

Maximum reinforcement ratio calculated over the gross cross section shall be 0.15*f.m / fy*.

Maximum bar diameter shall be one eighth nominal width of the pier.

2. **Transverse reinforcement.** Transverse reinforcement shall be hooked around the extreme longitudinal bars with standard 180-degree hook as defined in Section 2108A.2.2.4.

Within an end region extending one pier depth from the end of the beam, and at any region at which flexural yielding may occur during seismic or wind loading, the maximum spacing of transverse reinforcement shall not exceed one fourth the nominal depth of the pier.

The maximum spacing of transverse reinforcement shall not exceed one half the nominal depth of the pier. The minimum transverse reinforcement ratio shall be 0.0015.

3. **Lateral reinforcement.** Lateral reinforcement shall be provided to confine the grouted core when compressive strains due to axial and bending forces exceed 0.0015, corresponding to factored forces with ~~R_w~~ $\underline{R}$ equal to ~~1.5~~ *1.1*. The unconfined portion of the cross section with strain exceeding 0.0015 shall be neglected in computing the nominal strength of the section.

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

Chapter 22A ***[DSA/SS & OSHPD]***
STEEL

Division V - SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS FOR USE WITH ALLOWABLE STRESS DESIGN

SECTION 2213A - SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS IN SEISMIC ZONES 3 AND 4

2213A.7 Special Moment-Resisting Frame (SMRF) Requirements.

2213A.7.3 Width-thickness ratio. Girders shall comply with Division III, except that the flange width-thickness ratio, $b_f / 2t_f$, shall not exceed $52 \Big/ \sqrt{F_y}$ (For **SI:** $0.31 \Big/ \sqrt{E/F_y}$). The width-thickness ratio of column sections shall meet the requirements of Division III, Section ~~2251 N7~~ 2208 N7. The outside wall width-thickness ratio of rectangular tubes used for columns shall not exceed $110 \Big/ \sqrt{F_y}$ (For **SI:** $0.65 \Big/ \sqrt{E/F_y}$), unless otherwise stiffened.

…(Section unchanged except as noted above)

2213A.9 Requirements for Special Concentrically Braced Frames.

2213A.9.1 General. The provisions of this section apply to special concentrically braced frame structures as defined in Section ~~1625A~~ 1627A. All members and connections in special braced frames shall be designed and detailed to resist shear and flexure caused by eccentricities in the geometry of the members comprising the frame in accordance with Section 2213A.9. Any member intersected by a brace shall be continuous through the connection. Horizontal bracing that transfers forces between horizontally offset bracing in the vertical plane shall be subject to the requirements of Section 2213A.9, except Sections 2213A.9.2.3; 2213A.9.4.1, Item 3; and 2213A.9.4.2. Horizontal bracing other than the above is not subjected to the requirements of Section 2213A.9.

…(Section unchanged except as noted above)

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 6-34
DSA/SS 01/04
Part 2, Volume 2, Chapter 22A **APPROVED**

Division VIII - LATERAL RESISTANCE FOR STEEL STUD WALL SYSTEMS

SECTION 2219A - GENERAL

Steel stud wall systems in which shear panels are used to resist lateral loads produced by wind or earthquake shall comply with the requirements of this section. The nominal shear value used to establish the allowable shear value or design shear value shall not exceed the values set forth in Table 22A-VIII-A * * * for wind loads or Table 22A-VIII-C for seismic loads. The allowable shear value (ASD) or design *shear* value (LRFD) shall be determined using the ~~*f*~~ *Φ* or ~~*W*~~ *Ω* factors as set forth in Section 2219A.3.

…(Section unchanged except as noted above)

2219A.3 Design. Where allowable stress design is used, the allowable shear value shall be determined by dividing the nominal shear value, shown in Table 22A-VIII-A, * * * by a factor of safety (~~*W*~~ *Ω*) which shall be taken as 3.0. The factor of safety (~~*W*~~ *Ω*) for the nominal loads shown in Table 22A-VIII-C shall be taken as *3.0*.

Where Load and Resistance Factor Design is used, the design shear value shall be determined by multiplying the nominal shear value, shown in Tabl~~es~~ 22A-VIII-A ~~and 22A-VIIIB~~, by a resistance factor *(~~f~~ Φ)* which shall be taken as 0.45. The resistance factor *(~~f~~ Φ)* for the nominal loads shown in Table 22A-VIII-C shall be taken as 0.55.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 6-35
DSA/SS 01/04
Part 2, Volume 2, Chapter 22A **APPROVED**

SECTION 2220A - SPECIAL REQUIREMENTS IN SEISMIC ZONES 3 AND 4

2220A.2 Boundary Members and Anchorage. Boundary members and the uplift anchorage thereto shall have the strength to resist the forces determined by the *following* load ~~*modifications*~~ *combinations*:

1. Axial compression $1.0P_{DL} + 0.7P_{LL} + \underline{\Omega_O P_E}$

2. Axial tension $0.85P_{DL} \cancel{+} \underline{-} \underline{\Omega_O P_E}$

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 6-36
DSA/SS 01/04
Part 2, Volume 2, Chapter 23A **APPROVED**

Chapter 23A *[For DSA/SS and OSHPD]*
WOOD

Division III - DESIGN SPECIFICATIONS FOR ALLOWABLE STRESS DESIGN OF WOOD BUILDINGS

Part I - ALLOWABLE STRESS DESIGN OF WOOD

This standard, with certain exceptions, is the ~~ANSI/NfoPA NDS-91~~ ANSI/AF&PA NDS-2001 National Design Specification for Wood Construction of the American Forest and Paper Association, ~~Revised 1991 Edition,~~ and the Supplement to the ~~1991~~ 2001 Edition, National Design Specification, adopted by reference.

The National Design Specification for Wood Construction, ~~Revised 1991~~ 2001 Edition, and 2001 Supplement are available from the American Forest and Paper Association, 1111 19th Street, NW, Eighth Floor, Washington, DC, 20036.

SECTION 2316A - DESIGN SPECIFICATIONS

2316A.1 Adoption and Scope. The National Design Specification for Wood Construction, ~~Revised 1991~~ 2001 Edition (NDS), which is hereby adopted as a part of this code, shall apply to the allowable stress design and construction of wood structures using visually graded lumber, mechanically graded lumber, structural glued laminated 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 1991Edition National Design Specification, Tables 2A, 4A except for the Repetitive Member Factor, Cr, 4B except for the Repetitive Member Factor,Cr, 4C except for the Repetitive Member Factor Cr, 4D, 4E except for the Repetitive Member Factor, Cr, 5A, 5B and 5C are specifically adopted and made a part of this standard.~~

~~Other codes, standards or specifications referred to in this standard are to be considered as only an indication of an acceptable method or material that can be used with the approval of the enforcement agency, except where such other codes, standards or specifications are specifically adopted by this code as primary standards.~~ *Where a standard or specification referred to in this code conflicts with a standard or specification referenced in the 2001 NDS for wood construction, the 2001 NDS shall prevail.*

2316A.2 Amendments.

~~**1. Sec. 1.1. Delete and substitute the following:**~~

~~The design of elements of structures using visually graded lumber, mechanically graded lumber, structural glued laminated timber, timber piles, and design of their connections shall be in accordance with Chapter 23A, Division III, Part 1.~~

~~**2. Secs. 1.2 through 1.5. Delete.**~~

~~**3. Sec. 2.2. Delete first sentence and substitute the following:**~~

~~Allowable stress design values for visually graded structural lumber, mechanically graded structural lumber and structural glued laminated timber shall be in accordance with NDS Supplement Tables 2A, 4A except for the Repetitive Member Factor, Cr, 4B except for the Repetitive Member Factor Cr, 4C except for the Repetitive Member Factor, Cr, 4D, 5A, 5B and 5C. The Repetitive Member Factor, Cr, shall not be used to adjust the allowable stresses set forth in Tables 4A, 4B, 4C and 4E. Values for species and grades not tabulated shall be submitted to the enforcement agency for approval.~~

~~4.~~ *1.* Sec. 2.3.2.1. In fourth sentence, delete "or Figure B1 (see Appendix B)."

~~5.~~ *2.* Sec. 2.3.2.3. Delete and substitute the following:

2.3.2.3 When using Section 1612A.3.1 basic load combinations, the Load Duration Factor, C_D *except for dead load,* noted in Table 2.3.2 shall NOT be permitted to be used. When using Section 1612A.3.2 alternate load combinations, the one-third increase shall not be used concurrently with the Load Duration Factor, C_D.

~~6.~~ *3.* Table 2.3.2. Delete and substitute as follows:

TABLE 2.3.2—LOAD DURATION FACTORS, C_D

DESIGN LOAD	LOAD DURATION	C_D
Dead Load	Permanent	0.9
Floor, Occupancy Live Load	Ten Years	1.0
Snow Load	Two Months	1.15
Roof Live Load[3]	Seven Days	1.25
Earthquake Load[1]	—	1.33
Wind Load[2]	—	1.33
Impact	—	2.0

C
A

[1] 1.60 may be used for nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for earthquake are not combined with the increase allowed in Section 1612A.3. The 60-percent increase for nailed and bolted connections exhibiting Mode III or IV behavior for earthquake shall not be applicable to joist hangers, framing anchors, and other mechanical fastenings, including straps and hold-down anchors. The 60-percent increase shall not apply to the allowable shear values in Tables 23A-II-H, 23A-II-I-1, 23A-II-I-2, 23A-II-J or in Section 2315A.3.

[2] 1.60 may be used for members and nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for wind are not combined with the increase allowed in Section 1612A.3. The 60-percent increase shall not apply to the allowable shear values in Tables 23A-II-H, 23A-II-I-1, 23A-II-I-2, 23A-II-J or in Section 2315A.3.

[3] *Provided the dead load includes the weight of at least one reroofing.*

~~7.~~ *4.* Sec. ~~2.3.4.~~ 2.3.3. Add a second paragraph following Table ~~2.3.4~~ 2.3.3 :

The allowable unit stresses for fire-retardant-treated solid-sawn lumber and plywood, including fastener values, subject to prolonged elevated temperatures from manufacturing or equipment processes, but not exceeding 150˚ F (66˚ C), shall be developed from approved test methods that properly consider potential strength-reduction characteristics, including effects of heat and moisture.

~~8.~~ *5.* Sec. ~~2.3.6.~~ 2.3.4. Add second, third and fourth paragraphs as follows:

The values for lumber and plywood impregnatedwith approved fire-retardant chemicals, including fastener values, shall be submitted to the enforcement agency for approval. Submittal to the enforcement agency shall include all substantiating data. Such values shall be developed from approved test methods and procedures that consider potential strength-reduction characteristics, including the effects of elevated temperatures and moisture. Other adjustments are applicable, except that the impact load-duration factor shall not apply.

The values for fasteners specified in Division III shall be reduced to 90 percent, except that values for light metal plate connectors shall be recommended by each truss plate manufacturer and approved by the enforcement agency. Values for glued-laminated timber, including fastener design values, shall be recommended by the treater and submitted to the enforcement agency for approval. Submittal to the enforcement agency shall include all substantiating data.

In addition to the requirements specified in Section 207, fire retardant lumber having structural applications shall be tested and identified by an approved inspection agency in accordance with UBC Standard 23-5.

~~**9. Sec. 2.3.8. Add new second and third paragraphs following Table 2.3.8:**~~

~~For lumber I beams and box beams, the form factor, Cf, shall be calculated as:~~

$$C_f = \left[1 + \left(\frac{d^2 + 143}{d^2 + 88} - 1\right) C_g\right]$$

For **SI:** $$C_f = \left[1 + \left(\frac{\left(\frac{d}{25.4}\right)^2 + 143}{\left(\frac{d}{25.4}\right)^2 + 88} - 1\right) C_g\right]$$

~~**WHERE:**~~
~~*Cf* = form factor.~~
~~*Cg* = support factor = *p*2(6 − 8*p* + 3*p*2)(1 − *q*) + *q*.~~
~~*d* = depth of I or box beam.~~
~~*p* = ratio of depth of compression flange to full depth of beam.~~
~~*q* = ratio of thickness of web or webs to full width of beam.~~

~~**10. Sec. 2.3.10. Add a paragraph at end of section as follows:**~~

~~In joists supported on a ribbon or ledger board and spiked to the studding, the allowable stress in compression perpendicular to grain may be increased 50 percent.~~

~~**11. Sec. 3.2.1. Add a second sentence as follows:**~~

~~For continuous beams, the span shall be taken as the distance between centers of bearings on supports over which the beam is continuous.~~

~~**12. Sec. 3.2.3.2. *Delete and substitute* as follows:**~~

~~*Notches in sawn lumber bending members shall not exceed one tenth the depth of the member and shall not be located in the middle third of the span. Where members are notched at the ends, the notch depth shall not exceed one fourth the beam depth. The*~~
~~*tension side of sawn lumber bending members of 4 inches (102 mm) or greater nominal thickness shall not be notched except at ends of members. Cantilevered portions of beams less than 4 inches (102 mm) 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.*~~

~~***13. Sec. 3.2.3.3. Delete and substitute as follows:***~~

~~*Notched glued laminated members shall be designed as required for sawn lumber using the allowable stress of a combination, with the outer lamination being the grade of laminations*~~
~~*exposed by the notch. Where a notch is located on the tension face of a member, at least one fully threaded lag bolt, or equal, shall be provided on each side of the notch to prevent splitting.*~~

~~**14. Sec. 3.3.2. Add a last paragraph as follows:**~~

~~A beam of circular cross section may be assumed to have the same strength as a square beam having the same cross sectional area. If a circular beam is tapered, it shall be considered a beam of variable cross section.~~

~~**15. Sec. 3.4.4. Add a section as follows:**~~

~~**3.4.4.5** When girders, beams or joists are notched at points of support on the compression side, they shall meet design requirements for the net section in bending and in shear. The actual shear stress at such point shall be calculated as follows:~~

$$f_v = \frac{3V}{2b\left[d - \left(\frac{d - d'}{d'}\right) e\right]}$$

~~**WHERE:**~~
~~*d* = total depth of beam.~~
~~*di* = actual depth of beam at notch.~~
~~*e* = distance notch extends inside the inner edge of support.~~
~~*V* = shear force.~~

~~Where *e* exceeds *d* , the actual shear stress for the notch on the compression side shall be calculated as follows:~~

$$\cancel{f_v = \frac{3V}{2bd'}}$$

~~16. Sec. 3.7.1.4. Delete and substitute as follows:~~

~~The slenderness ratio for solid columns, *le/d* shall not exceed 50.~~

~~17. Sec. 3.8.2. Delete and substitute as follows:~~

~~Where designs that induce tension stresses perpendicular to grain cannot be avoided, mechanical reinforcement sufficient to resist such forces shall be provided.~~

~~18. Sec. 4.2.5.5. Delete.~~

~~19. Sec. 4.3.4. Delete and substitute as follows:~~
~~*The provisions of Item (b) above apply.*~~

~~20. Sec. 4.4.1.1. Delete and substitute as follows:~~

~~Rectangular sawn lumber beams, rafters, joists or other bending members shall be supported laterally to prevent rotation or lateral displacement in accordance with Section 4.4.1.2, or shall be designed in accordance with the lateral stability provisions in Section 3.3.3.~~

~~21. Sec. 4.4.1.2. Delete first sentence.~~

~~*(c) Add: The provisions of Item (b) above apply.*~~

~~*(d) Delete and substitute as follows:*~~

~~*Six to 1; bridging, full depth solid blocking or cross bracing shall be installed at intervals not exceeding 8 feet (2438 mm) and the provisions of Item (b) above shall apply unless:*~~

~~*Both edges of the member are held in line or,*~~

~~*The compression edge of the member is supported throughout its length to prevent lateral displacement, as by adequate sheathing or subflooring, and the ends and all points of bearing have lateral support to prevent rotation.*~~

~~22.~~ 6. Sec. 4.4.1. Add a section as follows:

4.4.1.4 Bridging for Floor Joists and Roof Joists or Rafters.

Roof joists or rafters of more than 8-inch (203 mm) depth and floor joists of more than 4-inch (102 mm) depth which are spaced 32 inches (813 mm) on center or less shall be provided with bridging to distribute superimposed loads. Floor joists shall be bridged every 8 feet (2438 mm) and roof joists or rafters every 10 feet (3048 mm) by solid blocking 2 inches (51 mm) thick and the full depth of the joist or rafter, or by wood cross bridging of not less than 1 inch by 3 inches (25 mm by 76 mm) or nailed metal cross bridging of equal strength. Where cross bridging is used, the lower ends of such cross bridging shall be driven up and nailed after the floor, subfloor or roof has been nailed.

~~23. Sec. 5.2.2. Delete and substitute as follows:~~

~~[For DSA/SS] Reinforcement of radial tension.~~ ~~Where mechanical reinforcement is required to resist radial tension, reinforcement shall be as described in the 3rd Edition (1985) of the Timber ConstructionManual or as otherwise approved. The maximum spacing of mechanical reinforcement shall not exceed one half the effective embedded thread length of the member at the location of the reinforcement. The effective embedded thread length is the embedded thread length in the tension zone from the neutral axis of the member to the end of the reinforcement.~~

~~24. Sec. 5.4.1. Delete second paragraph and substitute as follows:~~

~~For curved bending members having a varying cross section, the maximum actual radial stress induced, *fr,* is given by:~~

$$\cancel{f_r = K_r \frac{6M}{bd^2}}$$

~~WHERE:~~

~~*b* = width of cross section, inches (mm).~~
~~*d* = depth of cross section at the apex in inches (mm).~~
~~*Kr* = radial stress factor determined from the following relationship:~~

$$K_r = A + B\left(\frac{d}{Rm}\right) + C\left(\frac{d}{Rm}\right)^2$$

~~*M* = bending moment at midspan in inch-pounds (N·mm).~~

~~**WHERE:**~~
~~*Rm* = radius of curvature at the center line of the member at midspan in inches (mm).~~
~~*A, B* and *C* = constants as follows:~~

β (1)	A (2)	B (3)	C (4)
(0.0)	(0.0)	(0.2500)	(0.0)
2.5°	0.0079	0.1747	0.1284
5.0°	0.0174	0.1251	0.1939
7.5°	0.0279	0.0937	0.2162
10.0°	0.0391	0.0754	0.2119
15.0°	0.0629	0.0619	0.1722
20.0°	0.0893	0.0608	0.1393
25.0°	0.1214	0.0605	0.1238
30.0°	0.1649	0.0603	0.1115

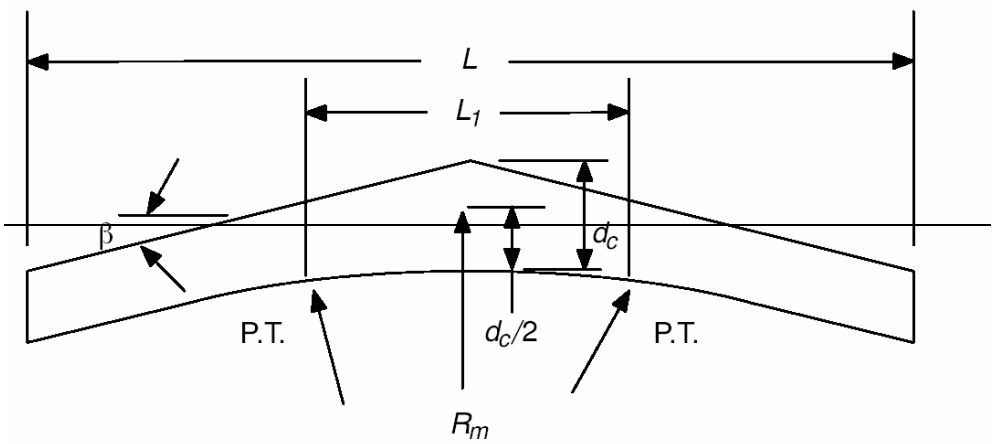
~~and β = angle between the upper edge of the member and the horizontal in degrees.Values of *Kr* for intermediate values of â may be interpolated linearly.~~
~~When the beam is loaded with a uniform load, *Kr* may be modified by multiplying by the reduction factor *Cr* as calculated by the following formula:~~

$$C_r = A + B\left(\frac{L}{L_t}\right) + C\left(\frac{d_c}{R_m}\right) + D\left(\frac{L}{L_t}\right)^2 + E\left(\frac{d_c}{R_m}\right)^2 + F\left(\frac{d_c}{R_m}\right)\left(\frac{L}{L_t}\right) + G\left(\frac{L}{L_t}\right)^3 + H\left(\frac{d_c}{R_m}\right)^3$$

~~**WHERE:**~~
~~*Cr* = reduction factor.~~
~~*L* = span of beam.~~
~~*Lt* = length of beam between tangent points.~~
~~*A, B*~~
~~. . . *H* = constants for a given â as follows:~~

β	A	B	C	D	E	F	G	H
2.3°	-0.142	0.418	-2.358	-0.053	—	—	0.002	—
9.7°	0.143	0.376	-0.541	-0.060	—	—	0.003	—
14.9°	0.406	0.293	-0.927	-0.041	—	—	0.002	—
20.0°	0.423	0.364	-1.022	-0.067	—	0.146	—	—
25.2°	0.540	0.360	-1.061	-0.070	—	0.156	—	—
29.8°	0.502	0.372	—	-0.076	-3.712	0.138	0.004	4.336

~~and β = angle between the upper edge of the member and the horizontal in degrees. Values of *Cr* for intermediate values may be interpolated linearly.~~



~~PITCHED AND TAPERED CURVED BEAM~~

~~**25. Sec. 5.4.1.2.** ***Delete and substitute as follows:***~~

~~*When M is in the direction tending to decrease the curvature (increase the radius), mechanical reinforcing sufficient to resist all radial tension stresses is required, but in no case shall the calculated radial tension stress exceed one third the allowable unit stress in horizontal shear. When mechanical reinforcing is used, the maximum moisture content of the laminations at time of manufacture shall not exceed 12 percent for dry conditions of use.*~~

~~26.~~ *7.* Sec. ~~5.4.4.~~ 5.4. Add a new section as follows:

~~5.4.4~~ 5.4.5 Ponding. Roof-framing members shall be designed for the deflection and drainage or ponding requirements specified in Section 1506 and Chapter 16A. In glued-laminated timbers, the minimum slope for roof drainage required by Section 1506 shall be in addition to a camber of one and one-half times the calculated dead load deflection. The calculation of the required slope shall not include any vertical displacement created by short taper cuts. In no case shall the deflection of glued-laminated timber roof members exceed 1/2-inch (13 mm) for a 5 pound-per-square-foot (239 Pa) uniform load.

~~27.~~ *8.* Sec. ~~5.4.5.~~ 5.4. Add a new section as follows:

~~5.4.5~~ 5.4.6 Tapered Faces. Sawn tapered cuts shall not be permitted on the tension face of any beam. Pitched or curved beams shall be so fabricated that the laminations are parallel to the tension face. Straight, pitched or curved beams may have sawn tapered cuts on the compression face.

For other members subject to bending, the slope of tapered faces, measured from the tangent to the lamination of the section under consideration, shall not be steeper than 1 unit vertical in 24 units horizontal (4% slope) on the tension side.

EXCEPTIONS:
1. This requirement does not apply to arches.
2. Taper may be steeper at sections increased in size beyond design requirements for architectural projections.

~~28.~~ 9. Sec. ~~5.4.6.~~ 5.4. Add a new section as follows:

5.4.7 ***Manufacture and Fabrication.*** *The manufacture and fabrication of structural glued-laminated timber shall be in accordance with ANSI/AITC A 190.1 and the following requirements:*

1. ***Joints.*** *All portions of end joints in adjacent laminations shall be separated in accordance with ANSI/AITC A 190.1 and ASTMD3737. The areas requiring 6-inch (152 mm) spacing shall be shown on the approved drawings or described in the specifications.*

Joints in adjacent laminations of arched members shall be separated as required for bending members.

2. ***Adhesives.*** *Dry-use adhesives shall not be used.*

3. ***Moisture content at the time of gluing.*** *The maximum moisture content of the ~~wood~~ laminating lumber at the time of gluing shall not exceed 16 percent for projects located in coastal areas, 12 percent for projects located in interior valleys or ~~10 percent for projects located in~~ desert areas, with the geographical areas as determined by the enforcement agency. The moisture content of the wood for members that will be exposed to direct sunlight in the finished structure shall not exceed ~~the following limits~~ 12 percent at time of gluing~~:~~ .*

~~1. 12 percent for Alaskan Yellow Cedar~~

~~2. 10 percent for all other species~~

~~The minimum moisture content shall not be less than 7 percent.~~ The range of moisture content of laminations assembled into a single member shall not exceed 5 percent at the time of gluing.

When mechanical reinforcing is used, such as radial tension reinforcement, the maximum moisture content of the laminations at time of manufacture shall not exceed 12 percent for dry conditions of use.

~~3.~~ ***~~Reinforcement for radial tension.~~*** *~~Where mechanical reinforcement is required to resist radial tension, reinforcement shall be as described in 3rd Edition (1985) of the Timber Construction Manual or as otherwise approved. The maximum spacing of mechanical reinforcement shall not exceed one half the effective embedded thread length of the member at the location of reinforcement. The effective embedded thread length is the embedded thread length in the tension zone from the neutral axis of the member to the end of the reinforcement.~~*

4. ***Inspection.*** *See Section 2337A for inspection requirements.*

~~29.~~ 10. Sec. ~~5.4.7.~~ 5.4. Add a new section as follows:

5.4.8 Specifications. *For structural glued-laminated timber, the following shall be shown on the plans and in the specifications:*

Whether for dry or wet conditions of use

Species and applicable standard

Stress requirements and combination symbol

If the temperature of the timber exceeds 150°F (66°C) in service

Tension zones for purposes of determining grades of laminations and location of spaced end joints for all members except simple beams supporting uniform loads.

Those portions of glued-laminated timbers which form the structural supports of a building or other structure and are exposed to weather and not properly protected by a roof, eave over-
hangs or similar covering shall be pressure treated with an approved preservative or be manufactured from wood of natural resistance to decay.

All weather-exposed surfaces of members shall be protected in an approved manner to prevent decay where they are located in a high-humidity environment such as in direct contact with soil or water and where portions extend beyond the walls and roof cover-
age in buildings. When the member is protected with an approved pressure treatment, the treatment process shall not impair the structural integrity of the member. When the member is protected by flashing or is encased, care must be taken to provide ventilation and prevent moisture entrapment on the member.

All members shall have appropriate weather protection during transit, storage and erection.

~~30. Sec. 8.2. Delete and substitute as follows:~~

~~***8.2.3*** Allowable shear values for bolts used to connect a wood member to concrete or masonry are permitted to be determined as one half the tabulated double shear value for a wood member twice the thickness of the member attached to the concrete or~~
~~masonry.~~

~~31.~~ 11. Sec. ~~12.2.3.~~ 11.5.4. Delete.

~~*32. Sec. 12.3.7. Delete.*~~

~~33.~~ *12.* Sec. ~~12.4.1.~~ 11.1.5.6. Delete and substitute as follows:

~~12.4.1~~ 11.1.5.6 For wood-to-wood joints, the spacing center to center of nails in the direction of stress shall not be less than the required penetration. Edge or end distances in the direction of stress shall not be less than one-half of the required penetration. All spacing and edge and end distances shall be such as to avoid splitting of the wood.

~~**34. Sec. 13.2.1. Delete and substitute as follows:**~~

~~**13.2.1 Test for design values.** Tests to determine design values for metal plate connectors in lateral withdrawal, net section shear and net section tension shall be conducted in accordance with the test and evaluation procedures in ANSI/TPI 1-1995. Design values determined in accordance with these test procedures shall be multiplied by all applicable adjustment factors (see Table 7.3.1) to obtain allowable design values.~~

~~**35. NDS Supplement Table 5A. Add combinations and design values as follows:**~~

COMBINATION SYMBOL[4]	SPECIES OUTER LAMINATIONS/CORE LAMINATIONS[5]	DESIGN VALUES IN POUNDS PER SQUARE INCH (psi)													
		BENDING ABOUT X-X AXIS (Loaded Perpendicular to Wide Faces of Laminations)						BENDING ABOUT Y-Y AXIS (Loaded Parallel to Wide Faces of Laminations)					AXIALLY LOADED		
		Bending		Compression Perpendicualr to Grain											
		Tension Zone Stressed in Tension F_{bxx}	Compression Zone Stressed in Tension[6] F_{bxx}	Tension Face[9,10] $F_{c\perp xx}$	Compression Face[9,10] $F_{c\perp xx}$	Shear Parallel to Grain[10] F_{vxx}	Modulus of Elasticity E_{xx}	Bending F_{byy}	Compression Perpendicular to Grain (Side Faces) $F_{c\perp yy}$	Shear Parallel to Grain F_{vyy}	Shear Parallel to Grain (For Members With Mulitple Piece Laminations Which are not Edge glued)[13] F_{vyy}	Modulus of Elasticity E_{yy}	Tension Parallel to Grain F_t	Compression Parallel to Grain F_c	Modulus of Elasticity E
VISUALLY GRADED SOUTHERN PINE															
~~26F-V1~~	~~SP/SP~~	~~2600~~	~~1300~~	~~650~~	~~650~~	~~200~~	~~1,800,000~~	~~1900~~	~~560~~	~~175~~	~~90~~	~~1,600,000~~	~~1150~~	~~1600~~	~~1,600,000~~
26F-V2	SP/SP	2600	1300	650	650	200	1,900,000	2200	650	175	90	1,800,000	1200	1650	1,800,000
26F-V3	SP/SP	2600	1300	650	650	200	1,900,000	2100	560	175	90	1,800,000	1150	1600	1,800,000
26F-V4[8]	SP/SP	2600	2600	650	650	200	1,900,000	2100	560	175	90	1,800,000	1150	1600	1,800,000
E-RATED SOUTHERN PINE															
28F-E1	SP/SP	2800	1400	650	650	200	2,000,000	1600	560	175	90	1,700,000	1300	1850	1,700,000
28F-E2[8]	SP/SP	2800	2800	650	650	200	2,000,000	1600	560	175	90	1,700,000	1300	1850	1,700,000
30F-E1[15]	SP/SP	3000	1500	650	650	200	2,000,000	1750	560	175	90	1,700,000	1250	1750	1,700,000
30F-E2[8,15]	SP/SP	3000	3000	650	650	200	2,000,000	1750	560	175	90	1,700,000	1250	1750	1,700,000

[15]These combinations are only for nominal widths 6 inches and less, in accordance with AITC 117-93.

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 6-37
DSA/SS 01/04
Part 2, Volume 2, Chapter 23A **APPROVED**

SECTION 2318A - TIMBER CONNECTORS AND FASTENERS

2318A.3.3 Spacing and penetration. Common wire nails shall have penetration into the piece receiving the point as set forth in Tables 23A-III-C-1 and 23A-III-C-2.Nails or spikes forwhich the gages or lengths are not set forth in Tables 23A-III-C-1 and 23A-III-C-2 shall have a required penetration of not less than 11 diameters, and allowable loadsmay be interpolated. Allowable loads shall not be increased when the penetration of nails into the member holding the point is larger than required by this section. *Spacing shall be in accordance with Section 2316A.2, Item ~~33~~ 12. Common wire 10d, 12d and 16 d nails may be used to join two members of 2-inch (51 mm) nominal thickness at the tabulated values indicated for these nails.*

Nails in plywood shall not be overdriven such that the nail heads penetrate the face ply by more than the thickness of the nail head or break the face-ply wood fibers.

2318A.3.4 Corrosion resistance. *Nails and spikes used in wet or exterior locations, such as exterior wall coverings of hospitals, public elementary and secondary schools, community college buildings, and state-owned or state-leased essential services buildings, shall be corrosion resistant and shall have a hot-dipped or tumbled galvanized coating of not less than ~~1.5~~ 1.0 ounces of zinc per square foot (458 gm/m^2) or be fabricated of copper, stainless steel or brass.*

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 6-38
DSA/SS 01/04
Part 2, Volume 2, Chapter 23A **APPROVED**

SECTION 2320A - CONVENTIONAL LIGHT-FRAME CONSTRUCTION DESIGN PROVISIONS

2320A.8.3 Framing details. Joists shall be supported laterally at the ends and at each support by solid blocking except where the ends of joists are nailed to a header, band or rim joist or to an adjoining stud or by other approved means. Solid blocking shall not be less than 2 inches (51 mm) in thickness and the full depth of joist.

Notches on the ends of joists shall not exceed one fourth the joist depth. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist, and the diameter of any such hole shall not exceed one third the depth of the joist. Notches in the top or bottom of joists shall not exceed one ~~*tenth*~~ sixth the depth and shall not be located in the middle third of the span. *Notches or holes shall not be placed in joists unless fully detailed in the approved plans.*

Joist framing from opposite sides of a beam, girder or partition shall be lapped at least 3 inches (76 mm) or the opposing joists shall be tied together in an approved manner.

Ledger strips applied to the sides of girders for support of joists shall not be less than 2 inches by 4 inches (51 mm by 102 mm).

2320A.8.7 Bridging. *Floor joists more than 4 inches (102 mm) in depth shall be provided with bridging in accordance with the provisions of Section 2316A.2, Item ~~22~~ 6 ~~, 4.4.1.4~~.*

2320A.12.8 Blocking. Roof rafters and ceiling joists shall be supported laterally to prevent rotation and lateral displacement when required by Division III, Part I, Section 4.4.1.2. *In addition, rafters of more than 8 inches (203 mm) in depth shall be provided with bridging in accordance with the provisions of Section 2316A.2, Item ~~22~~ 6.*

Notation

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 - 16023

* * *

(END OF ITEM)

ITEM 7-1
OSHPD 02/04
Part 2, Volume 1, Chapter 1 **APPROVED**

Chapter 1:

101.17.13 OSHPD – Office of Statewide Health Planning and Development

1. OSHPD 1

Application – General acute-care hospitals and acute psychiatric hospitals, excluding distinct part units or distinct part freestanding buildings providing skilled nursing or intermediate-care services. For Structural Regulations: Skilled nursing facilities and/or intermediate-care facilities except those skilled nursing facilities and intermediate care facilities of single story, Type V, wood or light steel-frame construction.

…

2. OSHPD 2

Application – Skilled nursing facilities and intermediate-care facilities, including distinct part skilled nursing and intermediate-care services on a general acute-care or acute psychiatric hospital license, provided either in a separate unit or a freestanding building. For Structural Regulations: Single-story, Type V skilled nursing facility and/or intermediate-care facilities utilizing wood or light steel-frame construction.

…

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

* * *

(END OF ITEM)

ITEM 7-2
OSHPD 02/04
Part 2, Volume 1, Chapter 4A **APPROVED**

Chapter 4:

420A.1 Scope. *The provisions of this chapter shall apply to general acute-care hospitals, acute psychiatric hospitals, and general acute-care hospitals providing only acute medical rehabilitation center services. The provisions of chapter 421A shall apply to distinct part skilled nursing and intermediate-care services on a general acute-care or acute psychiatric hospital license, provided either in a separate unit or a freestanding building.*

…

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

* * *

(END OF ITEM)

ITEM 7-3
OSHPD 02/04
Part 2, Volume 1, Chapter 4A **APPROVED**

420A.7 Windows and Screens.

420A.7.1 *Rooms approved for the housing of patients shall be provided with natural light by means of exterior glazed openings excluding clerestory windows, obscure glass and skylights, with an area not less than one tenth of the total floor area ~~and natural ventilation by means of an exterior opening, with an area not less than one twentieth of the total floor area.~~*

EXCEPTIONS: *1. Intensive-care newborn nurseries.*

2. Intensive-care units other than intensive-care nurseries shall be provided with exterior glazed openings, excluding obscure glass, sized and located in a manner to provide patients with an awareness of the outdoors.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

420A.7.2.1 *Patient room windows ~~openings shall be operable and~~ shall have sills not more than 36 inches (914 mm) above the floor. ~~Where~~ If operable windows are provided that require the use of tools or keys for operation, the tools or keys shall be located at the nurses' station.*

EXCEPTIONS: *~~1.~~ Window sills in intensive-care units may be 60 inches (1524 mm) above the floor.*
~~2. Windows in buildings which have mechanical smoke-control system complying with Section 905 need not be operable.~~

420A.7.2.2 *~~3.~~ If operable ~~W~~ windows ~~of~~ are provided in isolation rooms, they shall only be operable by the use of tools or keys which shall be located at the nurses' station.*

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

*** * ***

(END OF ITEM)

ITEM 7-4
OSHPD 02/04
Part 2, Volume 1, Chapter 4A **APPROVED**

420A.37 Intermediate-care Service. *An intermediate-care service unit shall be housed in a separate and distinct nursing unit and shall comply with the applicable requirements of Section 421A. ~~provide the following:~~*

~~1. A nursing service unit accommodating Section 420A.14.~~

2. ~~Dining and recreation space providing a minimum of 100 square feet (9.3m^2) plus 12 square feet (1.1 m^2) per patient and a minimum of 100 square feet (9.3 m^2) of recreation room in each building and on each floor of a building if six or more patients are housed in more than one building or floor of a building.~~

…

420A.49 Skilled Nursing Service Space. *A skilled nursing service unit shall be housed in a separate and distinct nursing unit and shall comply with the applicable requirements of Section 421A. ~~provide the following:~~*

~~1. A nursing service unit accommodating Section 420A.14.~~

2. ~~Dining and recreation space providing a minimum of 100 square feet (9.3m^2) plus 12 square feet (1.1 m^2) per patient and a minimum of 100 square feet (9.3 m^2) of recreation room in each building and on each floor of a building if six or more patients are housed in more than one building or floor of a building.~~

…

421A.1 Scope. *The provisions of this chapter shall apply to skilled nursing and intermediate-care facilities, including distinct part skilled nursing and intermediate care services on a general acute-care or acute psychiatric hospital license, provided either in a separate unit or a freestanding building.*

…

421A.4 Nursing Service Space. *The nursing service space shall accommodate the provisions of Section 420A.14.*

EXCEPTIONS: *1. Patient bedrooms shall be designed to accommodate no more than 4 beds.*

2. The negative-pressure isolation rooms required by Section 420A.14.6 need not be provided.

~~2~~3. Special purpose rooms for the purpose of single-patient occupancy shall be provided at a ratio of one room for every 35 patients or major fraction thereof. Negative-pressure isolation rooms may be included in determining the number of special-purpose rooms required for the facilities.

~~3~~4. If provided, negative-pressure isolation rooms shall comply with the space and equipment requirements of Section 420A.14.6. The mechanical and plumbing systems shall comply with the California Mechanical Code and California Plumbing Code for a negative-pressure isolation room.

~~4~~5. A minimum of one bathtub or shower shall be provided for every 20 patients or major fraction thereof. Patients shall have access to at least one bathtub per floor.

~~5~~6. Nurses' stations in freestanding skilled nursing and intermediate-care facilities shall be designed to serve no more than 60 beds with a maximum travel distance between the nurses' station entrance and the center of the doorway of the most remote patient bedroom, not exceeding 150 linear feet (45.72 linear m).

~~NOTE: Also applies to freestanding supplemental skilled and intermediate care services of general acute care hospitals~~. This exception does not apply to distinct part skilled nursing and intermediate-care services provided as a separate unit in a general acute care hospital or acute psychiatric hospital.

~~NOTE: OSHPD 7/99 filed with the Secretary of State on June 8, 2000, becomes effective July 8, 2000.~~

…

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

*** * ***

(END OF ITEM)

ITEM 7-5
OSHPD 02/04
Part 2, Volume 1, Chapter 4A **APPROVED**

422A.4 General Construction. *Clinics shall comply with ~~Section 420A.4~~ Sections 420A.4.1 through 420A.4.5 wherever applicable.*

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1226 and 129850*

*** * ***

(END OF ITEM)

ITEM 7-6
OSHPD 02/04
Part 2, Volume 2, Chapter 16 **APPROVED**

Title 24, Part 2, Volume 2
Chapter 16

Section 1605.2.2

1605.2.2 Stability against overturning. Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1611.6 for retaining walls, Section ~~1615~~ 1621 for wind and Section ~~1626~~ 1630.8 for seismic.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

* * *

(END OF ITEM)

ITEM 7-7
OSHPD 02/04
Part 2, Volume 2, Chapter 16 **APPROVED**

Section 1633.2.6

1633.2.6 Collector elements. Collector elements shall be provided that are capable of transferring the seismic forces originating in other portions of the structure to the element providing the resistance to those forces.

Collector elements, splices and their connections to resisting elements shall resist the forces determined in accordance with Formula (33-1). In addition, collector elements, splices, and their connections to resisting elements shall have the design strength to resist the combined loads resulting from the special seismic load of Section 1612.4.

> **EXCEPTION:** In structures, or portions thereof, braced entirely by light-frame wood shear walls or light-frame steel and wood structural panel shear wall systems, collector elements, splices and connections to resisting elements need only be designed to resist forces in accordance with Formula (33-1).

The quantity ~~E_M~~ E_m need not exceed the maximum force that can be transferred to the collector by the diaphragm and other elements of the lateral-force-resisting system. For Allowable Stress Design, the design strength may be determined using an allowable stress increase of 1.7 and for LRFD a resistance factor, ϕ, of 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 Division III of Chapter 23.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

* * *

(END OF ITEM)

ITEM 7-8
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Chapter 16A

Section 1605A.2.2

1605A.2.2 Stability against overturning. Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1611A.6 for retaining walls, Section ~~1615A~~ 1621A for wind and Section ~~1626A~~ 1630A.8 for seismic.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

Section 1611A.7

1611A.7 Water Accumulation. All roofs shall be designed with sufficient slope or camber to ensure adequate drainage after the long-term deflection from dead load or shall be designed to resist ponding load, *P,* combined in accordance with Section 1612A.2 or 1612A.3. Ponding load shall include water accumulation from any source, including snow, due to deflection. See Section 1506 and Table 16A-C, Footnote 3, for drainage slope. See Section ~~1615A~~ 1613A for deflection criteria.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275,129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-9
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1629A.1

1629A.1 Basis for Design. The procedures and the limitations for the design of structures shall be determined considering seismic zoning, site characteristics, occupancy, configuration, structural system and height in accordance with this section. Structures shall be designed with adequate strength to withstand the lateral displacements induced by the Design Basis Ground Motion, considering the inelastic response of the structure and the inherent redundancy, overstrength and ductility of the lateral-force-resisting system. The minimum design strength shall be based on the Design Seismic Forces determined in accordance with the static lateral force procedure of Section 1630A, except as modified by Section 1631A.5.4.Where strength design is used, the load combinations of Section 1612A.2 shall apply. Where Allowable Stress Design is used, the load combinations of Section 1612A.3 shall apply. Allowable Stress Design may be used to evaluate sliding or overturning at the soil-structure interface regardless of the design approach used in the design of the structure, provided load combinations of Section 1612A.3 are utilized *and the foundation conforms with the requirements of Section 1633A.2.12*. ~~One- and two-family dwellings in Seismic Zone 1 need not conform to the provisions of this section.~~

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-10
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1629A.9.2

1629A.9.2 Undefined structural systems. For undefined structural systems not listed in Table 16A-N, the coefficient R shall be substantiated by approved cyclic test data and analyses. The following items shall be addressed when establishing R:

1. Dynamic response characteristics,
2. Lateral force resistance,
3. Overstrength and strain hardening or softening,
4. Strength and stiffness degradation,
5. Energy dissipation characteristics,
6. System ductility, and
7. Redundancy.

Undefined systems shall comply with Section 1631A.2.2.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-11
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1630A.1.1

1630A.1.1 Earthquake loads. *Any structure which does not have a highly irregular shape, large differences in lateral resistance or stiffness between adjacent stories, or other unusual structural features which could significantly affect the dynamic response, may be designed and constructed to resist the minimum lateral seismic forces set forth in the provisions of this section. The equivalent static lateral seismic forces assumed to act on parts or portions of structures and their anchorage shall be as set forth in Section 1632A. The equivalent static lateral seismic forces assumed to act on nonstructural components and their anchorage shall be as set forth in Section 1632A.* Structures shall be designed for ground motion producing structural response and seismic forces in any horizontal direction. The following earthquake loads shall be used in the load combinations set forth in Section 1612A:

$$E = \rho E_h \pm E_v \qquad (30A\text{-}1)$$

$$E_m = \Omega_0 E_h \qquad (30A\text{-}2)$$

WHERE:

E = the earthquake load on an element of the structure resulting from the combination of the horizontal component, E_h, and the vertical component, E_v.

E_h = the earthquake load due to the base shear, *V,* as set forth in Section 1630A.2 or the design lateral force, *Fp,* as set forth in Section 1632A.

E_m = the estimated maximum earthquake force that can be developed in the structure as set forth in Section 1630A.1.1.

E_v = the load effect resulting from the vertical component of the earthquake ground motion and is equal to * * * $0.5C_aID$ *applied* to the dead load effect, *D,* for Strength Design, and may be taken as zero for Allowable Stress Design.
Exception: See Section 1632A.2 for the definition of E_v for nonstructural components.

… Remainder of section unchanged

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-12
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1630A.8.3

1630A.8.3 At foundation. See Sections 1629A.1, 1633A.2.12 and 1809A.4 for overturning moments to be resisted at the foundation soil interface.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-13
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1631A.2

1631A.2 Ground Motion. *The dynamic analysis shall be based on the maximum probable ground motions prescribed in the Supplemental Ground-response Reports described in Section 1637A.2. The maximum probable*

ground motion representation shall, as a minimum, be one having a 10-percent probability of being exceeded in 50 years, shall not be reduced by the quantity R and may be one of the following:

1. An elastic design response spectrum constructed in accordance with Figure 16A-3, using the values of C_a and C_v consistent with the specific site. The design acceleration ordinates shall be multiplied by the acceleration of gravity, 386.4 in./sec.2 (9.815 m/sec.2). *This spectrum may be used for regular structures only.*

2. A site-specific elastic design response spectrum based on the geologic, tectonic, seismologic and soil characteristics associated with the specific site. The spectrum shall be developed for a damping ratio of 0.05, unless a different value is shown to be consistent with the anticipated structural behavior at the intensity of shaking established for the site. *The site-specific response spectra shall be used for irregular structures and for all structures located on Soil Profile Type S_F.*

3. Ground motion time histories developed for the specific site shall be representative of actual earthquake motions. Response spectra from time histories, either individually or in combination, shall approximate the site design spectrum conforming to Section 1631A.2, Item 2.

4. For structures on Soil Profile Type S_F, the following requirements shall apply when required by Section 1629A.8.4, Item 4:

   4.1 The ground motion representation shall be developed in accordance with Items 2 and 3.

   4.2 Possible amplification of building response due to the effects of soil-structure interaction and lengthening of building period caused by inelastic behavior shall be considered.

1631A.2.1 Vertical Ground Motion ~~5.~~ The vertical component of ground motion may be defined by scaling corresponding horizontal accelerations by a factor of two-thirds. Alternative factors may be used when substantiated by site-specific data. Where the Near Source Factor, N_a, is greater than 1.0, site-specific vertical response spectra shall be used in lieu of the factor of two-thirds.

1631A.2.2 Upper Bound Earthquake ~~6~~. *The "upper bound earthquake" ground motion is defined as the motion having a 10 percent probability of being exceeded in a 100-year period or maximum level of motion which may ever be expected at the building site within the known geological framework. Where required by other sections of this code, ~~S~~ structures shall be designed to sustain the upper bound earthquake motion, including the P∆ effects, without forming a story collapse mechanism along any frameline. ~~Every~~ Such structures shall have sufficient ductility and strength to undergo the displacement caused by the upper bound earthquake motion without collapse. For irregular or unusual structures located in an area having large site-specific ground motion, criteria as determined by the project architect or structural engineer and approved by the enforcement agency will be required to demonstrate safety against collapse from the upper bound earthquake motion.*

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-14
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section: 1632A.1

1632A.1 General. Elements of structures and their attachments, permanent nonstructural components and their attachments, and the attachments for permanent equipment supported by a structure shall be designed to resist the total design seismic forces prescribed in Section 1632A.2.

Attachments shall include anchorages and required bracing *of components, including legs, platforms, frames, skids, or other elements providing gravity or lateral support to the equipment or component. Welded, bolted or other intermittent connections, such as inserts for anchorage of nonstructural components, shall not be allowed the one-third increase in allowable stresses permitted in Section 1612A.3.2.* Friction resulting from gravity loads shall not be considered to provide resistance to seismic forces.

When the structural failure of the lateral-force-resisting systems of nonrigid equipment would cause a life hazard, such systems shall be designed to resist the seismic forces prescribed in Section 1632A.2.

When permissible design strengths and other acceptance criteria are not contained in or referenced by this code, such criteria shall be obtained from approved national standards subject to the approval of the *enforcement agency*.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-15
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section: 1632A.2

1632*A*.2 Design for Total Lateral Force. The total design lateral seismic force, F_p, shall be determined from the following formula:

$$F_p = 4.0 C_a I_p W_p \qquad (32A\text{-}1)$$

Alternatively, F_p may be calculated using the following formula:

$$\cancel{F_p = \frac{a_p C_a I_p}{R_p}\left(1 + 2\frac{h_x}{h_r}\right)W_p} \qquad F_p = \frac{a_p C_a I_p}{R_p}\left(1 + 2\frac{h_x}{h_r}\right)W_p$$

(32*A*-2)

Except that:

F_p shall not be less than $0.7 C_a I_p W_p$ and need not be more than $4 C_a I_p W_p$ (32*A*-3)

WHERE:

h_x is the element or component attachment elevation with respect to grade. h_x shall not be taken less than 0.0. *The value of h_x/h_r need not exceed 1.0.*
h_r is the structure roof elevation with respect to grade.
a_p is the in-structure Component Amplification Factor that varies from 1.0 to 2.5.

A value for a_p shall be selected from Table 16*A*-O. Alternatively, this factor may be determined based on the dynamic properties or empirical data of the component and the structure that supports it. The value shall not be taken less than 1.0. *For elevator-related equipment, see Part 7, Title 24, California Code of Regulations in addition to Table 16A-O.*

R_p is the Component Response Modification Factor that shall be taken from Table 16*A*-O, except that R_p for anchorages shall equal 1.5 for shallow expansion anchor bolts, shallow chemical anchors or shallow cast-in-place anchors. Shallow anchors are those with an embedment length-to-diameter ratio of less than 8. When anchorage is constructed of nonductile materials, or by use of adhesive, R_p shall equal 1.0.

The design lateral forces determined using Formula (32*A*-1) or (32*A*-2) shall be distributed in proportion to the mass distribution of the element or component. *To determine the out-of-plane loading for elements such as walls or wall panels that have points of attachment at two or more different elevations, the following procedure may be used. For the vertical span of the element having a unit weight w_p between two successive attachment elevations h_x and h_{x+i} evaluate the force coefficients F_p and W_p at each of the two points, observing the minimum and maximum limits, and compute the average of the two values. The resulting average coefficient times the unit weight w_p provides the distributed seismic load for the span between the attachment points, and this load may be extended to the top of any wall parapet above the roof attachment point at h_r.*

Forces determined using Formulas (32*A*-1) or (32*A*-2) shall be used to design members and connections that transfer these forces to the seismic-resisting systems. Members and connection design shall use the load combinations and factors specified in Section 1612*A*.2 or 1612*A*.3. *The vertical earthquake effect E_v, shall be applied simultaneously with the horizontal earthquake effect E_h. E_v shall be taken as $0.5C_aIW_p$ for Strength Design and $0.35C_aIW_p$ for Allowable Stress Design. E_v shall be applied to the dead load effect D, in a manner that produces the most severe member and connection demands* The Reliability/Redundancy Factor, ρ, may be taken equal to 1.0. *A continuous load path of sufficient strength and stiffness between the component and the supporting structure shall be verified. Local elements of the supporting structure shall be verified for the component loads where they control the design of the elements or their connections. The component loads shall be those determined using Formula (32A-1) or (32A-2), except that modifications to R_p due to anchorage conditions need not be considered.*

…

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

*** * ***

(END OF ITEM)

ITEM 7-16
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section: 1632A.6

1632A.6 HVAC Ductwork, Plumbing/Piping and Conduit Systems. *All pipes, ducts and conduit shall be braced to resist the forces prescribed in Section 1632A.2. Ductwork shall be constructed in accordance with provisions contained in Part 4, Title 24, California Mechanical Code. Pipes and their connections constructed of ductile materials (copper, ductile iron, steel or aluminum with brazed or welded connections) shall have brace spacing not exceeding that specified in Section 1632A.5 or other standards approved by the enforcement agency. Pipes and their connections, constructed of nonductile materials (e.g., cast iron, no-hub pipe and plastic), or with screwed connections shall have the brace spacing reduced to one-half of the spacing allowed for ductile material in accordance with Section 1632A.5 or other standards approved by the enforcement agency.*

Seismic restraints may be omitted for the following conditions, where flexible connections are provided between components or equipment and the associated ductwork, piping and conduit:

1. Fuel, medical gas, and vacuum piping less than 1 inch (25 mm) inside diameter, or

2. All other piping less than 2.5 inches (64 mm) diameter, or

3. All piping suspended by individual hangers 12 inches (305 mm) or less in length from the top of the pipe to the bottom of the structural support for the hanger, where the hangers are detailed to avoid bending of the hangers and their connections, or

4. All electrical conduit less than 2.5 inches (64 mm) trade size~~.~~, or

~~3.~~5. All rectangular air-handling ducts less than 6 square feet (0.56 m^2) in cross-sectional area, or

6. All round air-handling ducts less than 28 inches (711 mm) in diameter, or

7. All ducts suspended by hangers 12 inches (305 mm) or less in length from the top of the duct to the bottom of the structural support for the hanger, where the hangers are detailed to avoid bending of the hangers and their connections.

Where lateral restraints are omitted, the piping, ducts or conduit shall be installed such that lateral motion of the piping or duct will not cause damaging impact with other systems or structural members, or loss of vertical support.

…

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

*** * ***

(END OF ITEM)

ITEM 7-17
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1633A.2.6

1633A.2.6 Collector elements. Collector elements shall be provided that are capable of transferring the seismic forces originating in other portions of the structure to the element providing the resistance to those forces.

Collector elements, splices and their connections to resisting elements shall resist the forces determined in accordance with Formula (33A-1). In addition, collector elements, splices, and their connections to resisting elements shall have the design strength to resist the combined loads resulting from the special seismic load of Section 1612A.4.

> **EXCEPTION:** In structures, or portions thereof, braced entirely by light-frame wood shear walls or light-frame steel and wood structural panel shear wall systems, collector elements, splices and connections to resisting elements need only be designed to resist forces in accordance with Formula (33A-1).

The quantity ~~E_M~~ $\underline{E_m}$ need not exceed the maximum force that can be transferred to the collector by the diaphragm and other elements of the lateral-force-resisting system. For Allowable Stress Design, the design strength may be determined using an allowable stress increase of 1.7 and *for LRFD* a resistance factor, ϕ, of 1.0. This increase shall not be combined with the one-third stress increase permitted by Section 1612A.3, but may be combined with the duration of load increase permitted in Division III of Chapter 23A.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-18
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1633A.2.12

1633A.2.12 Foundations and superstructure-to-foundation connections. *The foundation shall be capable of transmitting the design base shear and the overturning forces from the structure into the supporting soil.*

~~The~~ In addition, the foundation and the connection of the superstructure elements to the foundation shall have the strength to resist, in addition to gravity loads, the lesser of the following seismic loads:

1. The strength of the superstructure elements.

2. The maximum forces that would occur in the fully yielded structural system.

3. Ω_o times the forces in the superstructure elements due to the seismic forces as prescribed in this chapter.

> ***EXCEPTIONS:*** *1. Where structures are designed using $R \leq 2.2$ such as for inverted pendulum-type structures.*
> *2. When it can be demonstrated that inelastic deformation of the foundation and superstructure-to-foundation connection will not result in a weak story or cause collapse of the structure.*
> *3. Where the basic structural system as described in Table 16A-N consists of light-framed walls with shear panels.*

Where moment resistance is assumed at the base of the superstructure elements, the rotation and flexural deformation of the foundation as well as deformation of the superstructure-to-foundation connection shall be considered in the drift and deformation compatibility analyses.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-19
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Table 16A-M

Amend Table 16A-M to the following:

TABLE 16*A*-M—PLAN STRUCTURAL IRREGULARITIES

IRREGULARITY TYPE AND DEFINITION	REFERENCE SECTION
1a. **Torsional irregularity-to be considered when diaphragms are not flexible** Torsional irregularity shall be considered to exist when the maximum story drift, computed including accidental torsion, at one end of the structure transverse to an axis is more than 1.2 times the average of the story drifts of the two ends of the structure.	1633A.1 1633A.2.9, Item 6
1b. ***Severe Torsional irregularity-to be considered when diaphragms are not flexible*** *Severe torsional irregularity shall be considered to exist when the maximum story drift, computed including accidental torsion, at one end of the structure transverse to an axis is more than 1.4 times the average of the story drifts of the two ends of the structure.*	*1629A.9.5* *~~1631B.2.9~~ 1633A.2.9, Item 6*
2. **Reentrant corners** Plan configurations of a structure and its lateral force-resisting system contain reentrant corners, where both projections of the structure beyond a reentrant corner are greater than 15 percent of the plan dimension of the structure in the given direction.	1633A.2.9, Items 6 and 7
3. **Diaphragm discontinuity** Diaphragms with abrupt discontinuities or variations in stiffness, including those having cutout or open areas greater than 50 percent of the gross enclosed area of the diaphragm, or changes in effective diaphragm stiffness of more than 50 percent from one story to the next.	1633A.2.9, Item 6
4. **Out-of-plane offsets** Discontinuities in a lateral force path, such as out-of-plane offsets of the vertical elements.	1630A.8.2; 1633A.2.9, Item 6; 2213A.9.1
5. **Nonparallel systems** The vertical lateral load-resisting elements are not parallel to or symmetric about the major orthogonal axes of the lateral force-resisting system.	1633A.1

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-20
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Table: 16A-O

Amend Table 16A-O to the following:

TABLE 16A-O—HORIZONTAL FORCE FACTORS, a_P AND R_p

ELEMENTS OF STRUCTURES AND NONSTRUCTURAL	a_p	R_p	FOOTNOTE

COMPONENTS AND EQUIPMENT[1]			
1. Elements of Structures A. Walls including the following: (1) Unbraced (cantilevered) parapets.	2.5	3.0	
(2) Exterior walls at or above the ground floor and parapets braced above their centers of gravity.	1.0	3.0	2
(3) All interior-bearing and nonbearing walls.	1.0	3.0	2, *11* ~~*8*~~
B. Penthouse (except when framed by an extension of the structural frame).	2.5	4.0	
C. Connections for prefabricated structural elements other than walls. See also Section 1632*A*.2.	1.0	3.0	3~~, *20*~~
2. Nonstructural Components A. Exterior and interior ornamentations and appendages.	2.5	3.0	~~*20*~~
B. Chimneys, stacks and trussed towers supported on or projecting above the roof: (1) Laterally braced or anchored to the structural frame at a point below their centers of mass.	2.5	3.0	
(2) Laterally braced or anchored to the structural frame at or above their centers of mass.	1.0	3.0	
C. Signs and billboards.	2.5	3.0	
D. Storage racks (include contents) *with upper storage level more than 5 feet (1524 mm) in height*	2.5	4.0	4, *23*
E. Permanent floor-supported cabinets and book stacks more than 6 feet (1829 mm) in height (include contents).	1.0	3.0	5, ~~*20,*~~ *23, 24*
F. Anchorage and lateral bracing for suspended ceilings and light fixtures.	1.0	3.0	3, 6, 7, 8, *25, 26*
G. Access floor systems.	1.0	3.0	9, *14* ~~*20*~~
H. Masonry or concrete fences over 6 feet (1829 mm) high.	1.0	3.0	
I. Partitions.	1.0	3.0	~~*8*~~ *11*
J. Wall hung cabinets and storage shelving (plus contents)	*1.0*	*3.0*	
3. Equipment A. Tanks and vessels (include contents), including support systems.	1.0	3.0	~~*20*~~
B. Electrical, mechanical and plumbing equipment and associated conduit and ductwork and piping*, and machinery. In hospitals and essential services buildings, this includes all piping, electrical conduits, cable trays and air-handling ducting necessary to the continuing operation of the facility.*	1.0	3.0	5, 10, ~~11~~, 12, 13, 14, 15, 16, ~~*20*~~
C. Any flexible equipment laterally braced or anchored to the structural frame at a point below their center of mass.	2.5	3.0	5, 10, 14, 15, 16, ~~*20*~~
D. Anchorage of emergency power supply systems and essential communications equipment. Anchorage and support systems for battery racks and fuel tanks necessary for operation of emergency equipment. See also Section 1632*A*.2.	~~*1.3*~~ *1.0*	~~*3.0*~~ *2.5*	*14,* 17, 18, ~~*20,*~~ *21*
E. Temporary containers with flammable or hazardous materials.	1.0	3.0	19
F. Power cable-driven elevators or hydraulic elevators with lifts over 5 feet (1524 mm): *(1) Hoistway structural framing providing the support for guide rail brackets*			~~*25*~~ *27*
(2) Guide rails and guide rail brackets			
(3) Car and counterweight auxiliary guiding members or retainer plates			
(4) Driving machinery, pump unit tanks operating devices and control equipment cabinets			
4. Other Components A. Rigid components with ductile material and attachments.	1.0	3.0	1, *14,* ~~*20*~~
B. Rigid components with nonductile material or attachments.	1.0	1.5	1, *14,* ~~*20*~~
C. Flexible components with ductile material and attachments.	2.5	3.0	1, *14,* ~~*20*~~
D. Flexible components with nonductile material or attachments.	2.5	1.5	1, *14,* ~~*20*~~

[1]See Section 1627A for definitions of flexible components and rigid components. *See Section 1632A for formula using a_p. Horizontal forces are to be applied in any horizontal direction. The value of a_p shall not be reduced for all walls. Welded, bolted or other intermittent connections such as inserts for anchorage of nonstructural components shall not be allowed the one-third increase in allowable stress permitted in Section 1612A.3.2.*

[2]See Sections 1633A.2.4 and 1633A.2.8 for concrete and masonry walls and Section 1632A.2 for connections for ~~panel connectors for~~ *wall* panels.

[3]Applies to Seismic Zones 2, 3 and 4 only.

[4]Ground supported steel storage racks may be designed using the provisions of Section 1634A. Chapter 22A,Division ~~VI~~ X, may be used for design, provided seismic design forces are equal to or greater than those specified in Section 1632A.5 or 1634A.5, as appropriate.

[5]Only attachments, anchorage or restraints need be designed. *See Section 1632A.1.*

[6]Ceiling weight shall include all light fixtures and other equipment or partitions that are laterally supported by the ceiling. For purposes of determining the seismic force, a ceiling weight of not less than 4 psf (0.19 kN/m2) shall be used.

[7]Ceilings constructed of lath and plaster or gypsum board screw or nail attached to suspended members that support a ceiling at one level extending from wall to wall need not be analyzed, provided the walls are not over 50 feet (15 240 mm) apart.

[8]Light fixtures and mechanical services installed in metal suspension systems for acoustical tile and lay-in panel ceilings shall be independently supported from the structure above as specified in UBC Standard 25-2, Part III. ~~*See also Section 1611A.5 for minimum load and deflection criteria for interior partitions.*~~

[9]*Wp* for access floor systems shall be the dead load of the access floor system plus 25 percent of the floor live load plus a 10-psf (0.48 kN/m2) partition load allowance.

[10]Equipment includes, but is not limited to, boilers, chillers, heat exchangers, pumps, air-handling units, cooling towers, control panels, motors, switchgear, transformers and life-safety equipment. It shall include major conduit, ducting and piping, which services such machinery and equipment and fire sprinkler systems. See Section 1632A.2 for additional requirements for determining a_p for nonrigid or flexibly mounted equipment.

[11]~~*Deleted*~~ *See also Section 1611A.5 for minimum load and deflection criteria for interior partitions.*

[12]Seismic restraints may be omitted from electrical raceways, such as cable trays, conduit and bus ducts, if all the following conditions are satisfied:

[12.1] Lateral motion of the raceway will not cause damaging impact with other systems.

[12.2] Lateral motion of the raceway does not cause loss of system vertical support.

[12.3] Rod-hung supports of less than 12 inches (305 mm) in length ~~have top connections that cannot develop moments~~ *where the hangers are detailed to avoid bending of the hangers and their connections.*

[12.4] Support members cantilevered up from the floor are checked for stability.

[13]Piping, ducts and electrical raceways, which must be functional following an earthquake, spanning between different buildings or structural systems shall be sufficiently flexible to withstand relative motion of support points assuming out-of-phase motions.

[14]Vibration isolators supporting *nonstructural components and* equipment shall be designed for lateral loads or restrained from displacing laterally by other means. Restraint shall also be provided, which limits vertical displacement, such that lateral restraints do not become disengaged. a_p and R_p for equipment supported on vibration isolators shall be taken as 2.5 and 1.5, respectively~~;~~. ~~except that if~~ *If* the isolation mounting frame is supported by shallow or expansion anchors, the design forces for the anchors calculated by Formula (32A-1), (32A-2) or (32A-3) shall be ~~additionally~~ multiplied by a factor of *1.3*.

[15]Equipment anchorage shall not be designed such that lateral loads are resisted by ~~gravity~~ friction induced solely by the effects of gravity (e.g., friction clips).

[16]Expansion anchors, which are required to resist seismic loads in tension, shall not be used where operational vibrating loads are present.

[17]Movement of components within electrical cabinets, rack- and skid-mounted equipment and portions of skid-mounted electromechanical equipment that may cause damage to other components by displacing, shall be restricted by attachment to anchored equipment or support frames.

[18]Batteries on racks shall be restrained against movement in all directions due to earthquake forces.

[19]Seismic restraints may include straps, chains, bolts, barriers or other mechanisms that prevent sliding, falling and breach of containment of flammable and toxic materials. Friction forces may not be used to resist lateral loads in these restraints unless positive uplift restraint is provided which ensures that the friction forces act continuously.

[20] Not used. ~~The component anchorage shall be designed for the horizontal force, Fp, acting simultaneously with a vertical seismic force equal to one third of the horizontal force, Fp.~~

[21]Emergency equipment should be located where there is the least likelihood of damage due to earthquake. Such equipment should be located at ground level, and where it can be easily maintained to assure its operation during an emergency.

[22]Not used.

[23]Floor-supported storage racks, cabinets or book stacks not more than 5 feet (1524 mm) in height need not be anchored if the width of the supporting base or width between the exterior legs is equal to or greater than two thirds the height. In addition to gravity loads, storage racks or cabinets shall be designed and constructed to resist the horizontal force, F_p, with the base assumed to be anchored.

[24]Mobile storage racks or cabinets mounted on wheels and not restrained by fixed tracks are not subject to approval by the enforcement agency when the rack or cabinet is not more than 5 feet (1524 mm) in height and the width of the supporting base or width between the exterior legs/wheels is equal to or greater than two thirds the height. All such racks or cabinets shall be restrained to prevent movement when not in use. Movable storage racks or cabinets mounted on wheels or glides restrained by fixed tracks shall be designed and constructed to resist the horizontal force, F_p, with the base of the rack or cabinet assumed to be anchored. Provisions shall be made to resist translation perpendicular to the track and overturning both perpendicular and parallel to the track.

[25]Suspension systems for light fixtures which have passed shaking table tests approved by the enforcement agency, or which, as installed, are free to swing a minimum of 45 degrees from the vertical in all directions without contacting obstructions, shall be assumed to comply with the lateral-force requirements of Section 1632A.2. Unless the cable-type, free-swinging suspension systems shall have a safety wire or cable attached to the fixture and structure at each support capable of supporting four times the supported load.

[26]For suspended and surface-mounted light fixtures, the product of $I\ a_p$ need not exceed 1.5 for any value of I.

[27]See Section 1633A.2.13.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

*** * ***

(END OF ITEM)

ITEM 7-21
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1641A . DEFINITIONS

…

LATERAL LOAD CAPACITY *is the capacity as determined either by Method A or Method B of the subject element. ~~A~~ The capacity of a system is the sum of all element capacities acting individually reduced by the β factor for the element and meeting the requirements of Section 1646A.2.4. All forms of loading are to consider both displacements in orthogonal directions and torsion.*

…(Section unchanged except as noted above)

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-22
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

SECTION 1642A . SYMBOLS AND NOTATIONS

1642A.1 *The following symbols and notations apply to this division in addition to those of Section 1628A:*

ϕC_n = Usable strength or capacity of an element as determined in the materials chapters where ϕ is the strength reduction factor and C_n is the nominal strength.

…(Section unchanged except as noted above)

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-23
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1643A.1

1643A.1 Basis for Evaluation and Design. *This section determines what technical approach is to be used for the seismic evaluation and design for existing buildings. For those buildings or portions of buildings for which Section 1640A.2 requires action, the procedures and limitations for the evaluation of existing buildings and design of retrofit systems and/or repair thereof shall be implemented in accordance with this section. One of three alternative approaches must be used: the first, Method A (Sections 1644A-1647A), is prescriptive and comparable to the Division ~~VI~~ IV provisions for new structures; the second, Method B (Section 1648A), for complex or potentially hazardous situations is performance based and depends on the independent review of a peer reviewer (Section 1649A); the third is the use of one of the applicable Uniform Code for Building Conservation (UCBC) special procedures given in Section 1643A.1.1.*

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

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(END OF ITEM)

ITEM 7-24
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1644A.9.2.3.2

1644A.9.2.3.2 [For OSHPD 1&4] *In order to qualify for a β value equal to 1.0, such columns shall meet the following detailing and member limitations:*

1. Chapter 19A, Section 1921A.4, for concrete, and Chapter 22A, Section 2210A~~, 2211.4, Items 4 and 5~~ 2211A and 2213A.5, for steel in structures in Seismic Zones 3 and 4, except for welded steel moment connections where the SAC Interim Guidelines for the Evaluation, Repair, Modification, and Design of Welded Steel Moment Frame Structures, FEMA 267, August, 1995, provisions for columns apply.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

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(END OF ITEM)

ITEM 7-25
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section: ***1644A.13.1.2***

1644A.13.1.2 [For OSHPD 1&4] *Critical nonstructural components and systems, as defined in Table 11.1, Chapter 6, California Building Standards Administrative Code, and all components and systems in buildings in seismic performance categories SPC-3 through SPC-5 shall meet the requirements for new buildings, Section 1632A. All other elements of structures, nonstructural components and equipment supported by structures shall comply with provisions of Section 1645A.7 and this section.*

[For OSHPD] *The total design lateral force, F_p, shall be determined from the following formula:*

$\cancel{F_p = \beta H C_a I_p W_p}$ $\underline{F_p = 4.0 H C_a I_p W_p}$ *(44A-14)*

Alternatively, F_p may be calculated using the following formula:

$\cancel{F_p = \beta a_p H C_a (1 + 3h_x/h_r) W_p/R_p}$ $\underline{F_p = \frac{a_p H C_a I_p}{R_p}\left(1 + 2\frac{h_x}{h_r}\right) W_p}$ *(44A-15)*

Except that:

F_p shall not be less than $\cancel{0.7\beta H C_a I_p W_p}$ $\underline{0.7 H C_a I_p W_p}$ and need not be more than $\cancel{4\beta H C_a I_p W_p}$ $\underline{4 H C_a I_p W_p}$. (44A-16)

Where:

β = ~~is the value for the connection, not the element to which it is attached. The values of β for connections, bracing and materials shall be as prescribed in Section 1645A.7.2.~~

I_p = ~~is~~ the value used for the structure selected from Table 16A-K.

h_x = ~~is~~ the element or component attachment elevation with respect to grade. h_x shall not be taken less than 0.0.

h_r = ~~is~~ the structure roof elevation with respect to grade. The value of h_x/h_r need not exceed 1.0.

a_p = ~~is~~ the in-structure Component Amplification Factor that varies from 1.0 to 2.5. A value for a_p shall be selected from Table 16A-O.

R_p = ~~is~~ the Component Response Modification Factor that shall be taken from Table 16A-0, except that R_p for anchorages shall equal 1.5 for shallow expansion bolts, shallow chemical anchors or shallow cast-in-place anchors. Shallow anchors are those with an embedment length-to-diameter ratio of less than 8. Where anchorage is constructed of nonductile materials, or has nonductile behavior, or the component is attached with an adhesive surface joint, R_p shall equal 1.0.

The design lateral forces determined using Formula (44A-14) or (44A-15) shall be distributed in proportion to the mass distribution of the element or component.

Forces determined using Formula (44A-14) or (44A-15) shall be used to design members and connections that transfer these forces to the seismic-resisting systems. Members and connections shall use the load combinations and factors specified in Section 1644A.4.1.1 or 1644A.4.1.2. The member or connection actions due to F_p are the earthquake load E to be used in the load combinations. The vertical earthquake effect E_v, shall be applied simultaneously with the horizontal earthquake effect E_h. E_v shall be taken as $0.5HC_aIW_p$ for Strength Design and

$0.35HC_aIW_p$ for Allowable Stress Design. E_v shall be applied to the dead load effect D, in a manner that produces the most severe member and connection demands

> ***EXCEPTION:*** *Where a probabilistic hazard analysis has been performed, exception 2 of Section 1643A.8.2 may be applied for the term HI_p in formula 44A-11.*

To determine the out-of-plane loading for elements such as walls or wall panels that have points of attachment at two or more different elevations, the following procedure may be used. For the vertical span of the element having a unit weight w_p between two successive attachment elevations h_x and h_{x+i} evaluate the force coefficients ~~F_pAW_p~~ F_p and W_p at each of the two points, observing the minimum and maximum limits, and compute the average of the two values. The resulting average coefficient times the unit weight w_p provides the distributed seismic load for the span between the attachment points, and this load may be extended to the top of any wall parapet above the roof attachment point at h_r.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

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(END OF ITEM)

ITEM 7-26
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1648A.2.3.1

1648A.2.3.1 *If load (e.g., R_w, β) factors, capacity reduction factors (e.g., ϕ), or measures of inelastic deformation capability (e.g., IDR_L, μ_L, ε_L, rotation, θ_L) are used, the basis for their use and the specific values assigned shall be assessed and supported in a consistent manner.*

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

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(END OF ITEM)

ITEM 7-27
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1648A.2.4

1648A.2.4 *The ground motion characterization used for Method B shall be consistent with this ~~those required by~~ Section ~~1643A.8~~.*

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-28
OSHPD 02/04
Part 2, Volume 2, Appendix Chapter 16A **APPROVED**

Appendix Chapter 16A

Section 1665A.2.3

1665A.2.3 Sequence and cycles. The following sequence of tests shall be performed for the prescribed number of cycles at a vertical load equal to the average D+ 0.5L on all isolator units of a common type and size:

1. Twenty fully reversed cycles of loading at a lateral force corresponding to the wind design force.

2. Three fully reversed cycles of loading at each of the following increments of displacement: 0.2 D_D, 0.5 D_D and 1.0 D_D, 1.0D_M.

3. Three fully reversed cycles at the total maximum displacement, 1.0D_{TM}.

4. ~~($15C_{VD}/C_{VA}B_D$)~~ ($15C_{VD}/C_{AD}B_D$), but not less than 10, fully reversed cycles of loading at 1.0 times the total design displacement, 1.0D_{TD}.

…Remainder of section unchanged

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-29
OSHPD 02/04
Part 2, Volume 2, Chapter 16A **APPROVED**

Section 1665A.4

1665A.4 System Adequacy. The performance of the test specimens shall be assessed as adequate if the following conditions are satisfied:

1. The force-deflection plots of all tests specified in Section 1665A.2 have a positive incremental force-carrying capacity.

2. For each increment of test displacement specified in Section 1665A.2.3, Item 2, and for each vertical load case specified in Section 1665A.2.3:

2.1 There is no greater than a plus or minus 10 percent difference between the effective stiffness at each of the three cycles of test and the average value of effective stiffness for each test specimen.

2.2 There is no greater than a 10 percent difference in the average value of effective stiffness of the two test specimens of a common type and size of the isolator unit over the required three cycles of test.

3. For each specimen there is no greater than a plus or minus 20 percent change in the initial effective stiffness of each test specimen over the ~~($15C_{VD}/C_{VA}B_D$)~~ ($15C_{VD}/C_{AD}B_D$), but not less than 10, cycles of the test specified in Section 1665A.2.3, Item 4.

4. For each specimen there is no greater than a 20 percent decrease in the initial effective damping over for the ~~($15C_{VD}/C_{VA}B_D$)~~ ($15C_{VD}/C_{AD}B_D$), but not less than 10, cycles of the test specified in Section 1665A.2.3, Item 4.

5. All specimens of vertical load-carrying elements of the isolation system remain stable at the total maximum displacement for static load as prescribed in Section 1665A.2.6.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-30
OSHPD 02/04
Part 2, Volume 2, Chapter 18A **APPROVED**

Chapter 18A

SECTION 1804A . FOUNDATION INVESTIGATION
1804A.1 General. *Soil investigation reports which include foundation or pile capacity recommendations, recommendations regarding installation, and, in the case of engineered fills, directions as to materials and construction procedures shall be prepared by a geotechnical engineer qualified to undertake investigations for foundation and earthwork design. Investigations involving test borings, exploration shafts or load tests shall be made under the engineering control of such a geotechnical engineer.*

Site investigations and reports pertaining to geologic hazards shall be made where required by Sections 17212 and 17212.5 of the Education Code for public school buildings, Sections ~~15044~~ 129775 and ~~15045~~ 129780 of the Health and Safety Code for hospital buildings, and Section 16014 of the Health and Safety Code for essential services buildings. See also Section 1629A.3 and 1637A.

… Remainder unchanged of section unchanged

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

Section: 1809A.5

1809A.5 Special Requirements for Piles and Caissons.

1809A.5.1 General. Piles, caissons and caps shall be designed according to the provisions of Section ~~1603A~~ 1605A, including the effects of lateral displacements. *Whenever such members are founded in Type S_D, S_E, or S_F soils,* special detailing requirements as described in Section 1809A.5.2 shall apply for a length of *such members* equal to 120 percent of the flexural length. Flexural length shall be considered as a length of pile from the first point of zero lateral deflection to the underside of the pile cap or grade beam.

…Remainder of section unchanged

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-31
OSHPD 02/04
Part 2, Volume 2, Chapter 19 **APPROVED**

Chapter 19

Section 1921.0

1921.0 Notations.
…
$\cancel{\Delta_m}$ $\underline{\Delta_M} = 0.7R\Delta_s$.
$\cancel{\Delta_m = R_w\Delta_s}$ *~~[for OSHPD 2]~~* $\cancel{\Delta_M = 0.7\,R\Delta_s}$.
Δ_s = *Design Level Response Displacement, which is the total drift or total story drift that occurs when the structure is subjected to the design seismic forces.*
…

…Section unchanged except as noted above

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

* * *

(END OF ITEM)

ITEM 7-32
OSHPD 02/04
Part 2, Volume 2, Chapter 19A **APPROVED**

Chapter 19A

Section: 1903A.11

1903A.11 Glass Fiber Reinforced Concrete. Recommended Practice for Glass Fiber Reinforced Concrete Panels, PCI Manual 128.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-33
OSHPD 02/04
Part 2, Volume 2, Chapter 19A **APPROVED**

Section: 1905A.2.3

1905A.2.3 *Concrete specified by compressive strength shall be proportioned by one of the following methods:*

Method A. *As an alternate to Methods B and C, below, the compressive strength of 2,500 psi (17.2 MPa) and 3,000 psi (20.7 MPa) concrete shall be permitted to be used for structural concrete in accordance with Table ~~19A-A-7~~ 19A-A-8.*

… Remainder of section unchanged

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-34
OSHPD 02/04
Part 2, Volume 2, Chapter 19A **APPROVED**

Section 1921A.0

1921A.0 Notations.

…
$\cancel{\Delta_m}$ $\underline{\Delta_M} = 0.7R\Delta_s$.

…`
…Section unchanged except as noted above

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-35
OSHPD 02/04
Part 2, Volume 2, Chapter 19A **APPROVED**

Section: 1921A.3.2

1921A.3.2 Longitudinal reinforcement.
1921A.3.2.1 At any section of a flexural member, except as provided in Section 1910A.5.3, for top as well as for bottom reinforcement, the amount of reinforcement shall not be less than that given by Formula (~~20A-3~~ 10A-3) but not less than 200 $b_w d/f_y$, (For **SI:** 1.38 $b_w d/f_y$) and the reinforcement ratio, ρ, shall not exceed 0.025. At least two bars shall be provided continuously, both top and bottom.

…Remainder of section unchanged

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

1921A.5.3 Shear strength.

1921A.5.3.1 The nominal shear strength of the joint shall not be taken greater than the forces specified below for normal-weight aggregate concrete.

For joints confined on all four faces 20 $\sqrt{f'_c}A_j$

(For **SI:** 1.66 $\sqrt{f'_c}A_j$)

For joints confined on three faces or on two opposite faces 15 $\sqrt{f'_c}A_j$

(For **SI:** 1.25 $\sqrt{f'_c}A_j$)

For others 12 $\sqrt{f'_c}A_j$

(For **SI:** 1.00 $\sqrt{f'_c}A_j$)

A member that frames into a face is considered to provide confinement to the joint if at least three fourths of the face of the joint is covered by the framing member. A joint is considered to be confined ~~is~~ if such confining members frame into all faces of the joint.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

Chapter 21A

2108A.2.2.6 Development. The calculated tension or compression reinforcement shall be developed in accordance with the following provisions:

The embedment length of reinforcement shall be determined by Formula (8A-12).

$$l_d = l_{de} / \phi \qquad \text{(8A-12)}$$

WHERE:

$$l_{de} = \frac{0.15 d_b^2 f_y}{K\sqrt{f_m^{'}}} \underline{\leq 52 d_b} \qquad \text{(8A-13)}$$

For SI:

$$l_{de} = \frac{1.8 d_b^2 f_y}{K\sqrt{f_m^{'}}} \underline{\leq 52 d_b}$$

K shall not exceed $3d_b$.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

Section: 2108A.2.6.2.6

2108A.2.6.2.6 Members subjected to axial force and flexure.
The requirements set forth in this subsection apply to piers proportioned to resist flexure in conjunction with axial loads.

1. **Longitudinal reinforcement.** A minimum of four longitudinal bars shall be provided at all sections of every pier.

Flexural reinforcement shall be distributed across the member depth. Variation in reinforcement area between reinforced cells shall not exceed 50 percent.

Minimum reinforcement ratio calculated over the gross cross section shall be 0.002.

Maximum reinforcement ratio calculated over the gross cross section shall be 0.15*f.m / fy*.

Maximum bar diameter shall be one eighth nominal width of the pier.

2. **Transverse reinforcement.** Transverse reinforcement shall be hooked around the extreme longitudinal bars with standard 180-degree hook as defined in Section 2108A.2.2.4.

Within an end region extending one pier depth from the end of the beam, and at any region at which flexural yielding may occur during seismic or wind loading, the maximum spacing of transverse reinforcement shall not exceed one fourth the nominal depth of the pier.

The maximum spacing of transverse reinforcement shall not exceed one half the nominal depth of the pier. The minimum transverse reinforcement ratio shall be 0.0015.

3. **Lateral reinforcement.** Lateral reinforcement shall be provided to confine the grouted core when compressive strains due to axial and bending forces exceed 0.0015, corresponding to factored forces with ~~R_w~~ $\underline{R}$ equal to ~~1.5~~ *1.1*. The unconfined portion of the cross section with strain exceeding 0.0015 shall be neglected in computing the nominal strength of the section.

… Remainder of section unchanged

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-38
OSHPD 02/04
Part 2, Volume 2, Chapter 22 **APPROVED**

Chapter 22

Section 2210
…

3. LOADS, LOAD COMBINATIONS AND NOMINAL STRENGTHS
3.1 Loads and Load Combinations
The required strength of the structure and its elements shall be determined from the appropriate critical combination of factored loads, as determined by the load combinations in accordance with Section 1612.2. Wherever load combinations 3-1 through 3-6 are used in these provisions, they shall be taken as combinations 12-1 through 12-6 in Section 1612.2.1 of this code.

Orthogonal earthquake effects shall be included in the analysis unless noted specifically otherwise in Chapter 16.

Where required by these provisions, an amplified horizontal earthquake load of Ω_o as defined in Section 1630.3.1 shall be applied in load combinations 3-7 through 3-8 below.

The additional load combinations using the amplified horizontal earthquake are:

$1.2\,D + f_1 L + \Omega_o\, \underline{E_h}$

$0.9\,D \pm \Omega_o\, \underline{E_h}$ *(note to BSC – that is a "plus or minus" sign in the formula)*

…Section unchanged except as noted above

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

* * *

(END OF ITEM)

ITEM 7-39
OSHPD 02/04
Part 2, Volume 2, Chapter 22A **APPROVED**

Chapter 22A

Section: 2213A.7.3

2213A.7.3 Width-thickness ratio. Girders shall comply with Division III, except that the flange width-thickness ratio, $b_f / 2t_f$, shall not exceed $52 \Big/ \sqrt{F_y}$ (For **SI:** $0.31 \Big/ \sqrt{E/F_y}$). The width-thickness ratio of column sections

shall meet the requirements of Division III, Section ~~2251 N7~~ 2208 N7. The outside wall width-thickness ratio of rectangular tubes used for columns shall not exceed $110 \Big/ \sqrt{F_y}$

(For **SI:** $0.65 \Big/ \sqrt{E/F_y}$), unless otherwise stiffened.

… Remainder of section unchanged

…

Section: 2213A.9

2213A.9 Requirements for Special Concentrically Braced Frames.
2213A.9.1 General. The provisions of this section apply to special concentrically braced frame structures as defined in Section ~~1625A~~ 1627A. All members and connections in special braced frames shall be designed and detailed to resist shear and flexure caused by eccentricities in the geometry of the members comprising the frame in accordance with Section 2213A.9. Any member intersected by a brace shall be continuous through the connection. Horizontal bracing that transfers forces between horizontally offset bracing in the vertical plane shall be subject to the requirements of Section 2213A.9, except Sections 2213A.9.2.3; 2213A.9.4.1, Item 3; and 2213A.9.4.2. Horizontal bracing other than the above is not subjected to the requirements of Section 2213A.9.

… Remainder of section unchanged

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

*** * ***

(END OF ITEM)

ITEM 7-40
OSHPD 02/04
Part 2, Volume 2, Chapter 22A **APPROVED**

Section: 2219A

SECTION 2219A . GENERAL
Steel stud wall systems in which shear panels are used to resist lateral loads produced by wind or earthquake shall comply with the requirements of this section. The nominal shear value used to establish the allowable shear value or design shear value shall not exceed the values set forth in Table 22A-VIII-A * * * for wind loads or Table 22A-VIII-C for seismic loads. The allowable shear value (ASD) or design *shear* value (LRFD) shall be determined using the ~~*f*~~ *Φ* or ~~*W*~~ *Ω* factors as set forth in Section 2219A.3.

… Remainder of section unchanged

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

Section: 2219A.3

2219A.3 Design. Where allowable stress design is used, the allowable shear value shall be determined by dividing the nominal shear value, shown in Table 22A-VIII-A, * * * by a factor of safety (~~*W*~~ *Ω*) which shall be taken as 3.0. The factor of safety (~~*W*~~ *Ω*) for the nominal loads shown in Table 22A-VIII-C shall be taken as *3.0*.

Where Load and Resistance Factor Design is used, the design shear value shall be determined by multiplying the nominal shear value, shown in Table~~s~~ 22A-VIII-A ~~and 22A-VIII-B~~, by a resistance factor *(~~f~~ Φ)* which shall be taken as 0.45. The resistance factor *(~~f~~ Φ)* for the nominal loads shown in Table 22A-VIII-C shall be taken as 0.55.

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-41
OSHPD 02/04
Part 2, Volume 2, Chapter 22A **APPROVED**

Section: 2220A.2

2220A.2 Boundary Members and Anchorage. Boundary members and the uplift anchorage thereto shall have the strength to resist the forces determined by the *following* load ~~*modifications*~~ *combinations*:

1. Axial compression $1.0P_{DL} + 0.7P_{LL} + \underline{\Omega_O}P_E$

2. Axial tension $0.85P_{DL} \cancel{+} \underline{-\Omega_O}P_E$

...

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-42
OSHPD 02/04
Part 2, Volume 2, Chapter 23 **APPROVED**

CHAPTER 23 – WOOD

Division III – DESIGN SPECIFICATIONS FOR ALLOWABLE STRESS DESIGN OF WOOD BUILDINGS

Part I – ALLOWABLE STRESS DESIGN OF WOOD

This standard, with certain exceptions, is the ANSI/NFoPA NDS-91 ~~[For BSC] *NDS-97*~~ National Design Specification for Wood Construction of the American Forest and Paper Association, Revised 1991 ~~[For BSC] *1997*~~ Edition, and the Supplement to the 1991 ~~[For BSC] *1997*~~ Edition, National Design Specification, adopted by reference.

The National Design Specification for Wood Construction, Revised 1991 ~~[For BSC] *1997*~~ Edition, and supplement are available from the American Forest and Paper Association, 1111 19th Street, NW, Eighth Floor, Washington, DC, 20036.

[For BSC, OSHPD 2] *For applications regulated by the Building Standards Commission as referenced in section 101.17.3 and for applications regulated by the Office of Statewide Health Planning and Development in section 101.17.13, Item 2 this standard, with certain exceptions, is the ANSI/AF&PA NDS-01 National Design Specification for Wood Construction of the American Forest and Paper Association, 2001 Edition, and the Supplement to the 2001 Edition, National Design Specification, adopted by reference.*

SECTION 2316 DESIGN SPECIFICATIONS

2316.1 Adoption and Scope.

2316.1.1 The National Design Specification for Wood Construction, Revised 1991 ~~[For BSC] *1997*~~ Edition (NDS), which is hereby adopted as a part of this code, shall apply to the design and construction of wood structures using visually graded lumber, mechanically graded lumber, structural glued laminated 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 1991 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.

Other codes, standards or specifications referred to in this standard 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, except where such other codes, standards or specifications are specifically adopted by this code as primary standards.

2316.1.2 [For BSC, OSHPD 2] *The National Design Specification for Wood Construction, 2001 Edition (NDS), as amended by Section 2316.3, which is hereby adopted as a part of this code, shall apply to the allowable stress design and construction of wood structures. The Supplement to the 2001 Edition National Design Specification, is specifically adopted and made a part of this standard.*

Where a code, standard or specification referred to in this code conflict with a code, standard or specification referenced in the NDS-01 for allowable stress design of wood building, the NDS-01 shall prevail.

2316.2 Amendments.

Note: The provisions of this section shall not apply to applications regulated by the Building Standards Commission as referenced in section 101.17.3.and for applications regulated by the Office of Statewide Health Planning and Development as referenced in section 101.17.13, Item 2.

~~1. Sec. 1.1 Delete and substitute the following: …~~

~~2. Secs. 1.2 through 1.5. Delete.~~

~~3. Sec. 2.2 Delete first sentence and …~~

~~4. Sec. 2.3.2.1. In fourth sentence …~~

~~5. Sec. 2.3.2.3. Delete and substitute …~~

~~6. Table 2.3.2. Delete and substitute …~~

~~7. Sec. 2.3.4. Add paragraph …~~

~~8. Sec. 2.3.6. Add second …~~

~~9. Sec. 2.3.8. Add new second …~~

~~10. Sec. 2.3.10. Add a paragraph …~~

~~11. Sec. 3.2.1. Add a second …~~

~~12. Sec.~~ 3.2.3.2 ~~[For BSC] *3.2.3.3.* Add to the end …~~

~~13. Sec. 3.3.2. Add a last …~~

~~14. Sec. 3. 4. 4.~~ Add a section as follows; ~~*Not adopted by the State of California*~~

3.4.4.5 When girders, beams or joists are notched at points of support on the compression side, they shall meet design requirements for the net section in bending and in shear. The actual shear stress as such point shall be calculated as follows:

$f_v = 3V / 2b\ [d – ((d – d') / d')\ e]$

where

d = total depth.
d' = actual depth of beam at notch.
e = distance notch extends inside the inner edge of support.
V = shear force.

Where e exceeds d', the actual shear stress for the notch on the compression side shall be calculated as follows:

$F_v = 3V / 2bd'$

~~15. Sec. 3.7.1. 4. Delete and substitute …~~

~~16. Sec. 3.8. 2. Delete and substitute …~~

~~17. Sec. 4.2. 5.5. Delete.~~

~~18. Sec. 4.4.1.1. Delete and substitute …~~

~~19. Sec. 4.4. 1.2. Delete first …~~

~~20. Sec. 5.4.1. Delete second …~~

~~21. Sec. 5.4.1. 2 Add a second …~~

~~22. Sec. 5.5.5. Add a section …~~

~~23. Sec. 5.4.5. Add a new section …~~

~~24. Sec. 8.3. Add a section …~~

~~25. Sec. 12.4.1 Delete and substitute …~~

2316.3 [For BSC, OSHPD 2] Amendments.

1. [For BSC, OSHPD 2] Sec. 2.2. Add a fourth sentence as follows:

Values for species and grades not tabulated shall be submitted to the enforcing agency for approval.

2. [For BSC, OSHPD 2] Sec. 2.3.2.1. In fourth sentence, delete "or Figure B1 (see Appendix B)."

3. [For BSC,OSHPD 2] Sec. 2.3.2.3. Delete and substitute the following:

2.3.2.3 *When using Section 1612.3.1 basic load combinations, the Load Duration Factor, C_D, noted in Table 2.3.2 shall be permitted to be used. When using Section 1612.3.2 alternate load combinations, the one-third increase shall not be used concurrently with the Load Duration Factor, C_D.*

4. [For BSC, OSHPD 2] Table 2.3.2. Delete and substitute as follows:

TABLE 2.3.2 LOAD DURATION FACTORS, C_D

DESIGN LOAD	LOAD DURATION	C_D
Dead Load	Permanent	0.9
Floor, Occupancy Live Load	Ten Years	1.0
Snow Load	Two Months	1.15
Roof Live Load	Seven Days	1.25
Earthquake Load[1]	—	1.33
Wind Load[2]	—	1.33
Impact	—	2.0

[1] *1.60 may be used for nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for earthquake are not combined with the increase allowed in Section 1612.3. The 60-percent increase for nailed and bolted connections exhibiting Mode III or IV behavior for earthquake shall not be applicable to joist hangers, framing anchors, and other mechanical fastenings, including straps and hold-down anchors. The 60-percent increase shall not apply to the allowable shear values in Tables 23-II-H, 23-II-I-1, 23-II-I-2, 23-II-J or in Section 2315.3.*

[2] *1.60 may be used for members and nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for wind are not combined with the increase allowed in Section 1612.3. The 60-percent increase shall not apply to the allowable shear values in Tables 23-II-H, 23-II-I-1, 23-II-I-2, 23-II-J or in Section 2315.3.*

5. [For BSC, OSHPD 2] Sec. 2.3.3. Add a second paragraph following Table 2.3.3:

The allowable unit stresses for fire-retardant-treated solid-sawn lumber and plywood, including fastener values, subject to prolonged elevated temperatures from manufacturing or equipment processes, but not exceeding 150_F (66_C), shall be developed from approved test methods that properly consider potential strength-reduction characteristics, including effects of heat and moisture.

6. [For BSC, OSHPD 2] Sec. 2.3.4. Add second, third and fourth paragraphs as follows:

The values for lumber and plywood impregnated with approved fire-retardant chemicals, including fastener values, shall be submitted to the enforcement agency for approval. Submittal to the enforcement agency shall include all

substantiating data. Such values shall be developed from approved test methods and procedures that consider potential strength-reduction characteristics, including the effects of elevated temperatures and moisture. Other adjustments are applicable, except that the impact load-duration factor shall not apply.

Values for glued-laminated timber, including fastener design values, shall be recommended by the treater and submitted to the enforcement agency for approval. Submittal to the enforcement agency shall include all substantiating data.

In addition to the requirements specified in Section 207, fire retardant lumber having structural applications shall be tested and identified by an approved inspection agency in accordance with UBC Standard 23-5.

7. [For BSC, OSHPD 2] Sec. 5.4. Add a section as follows:

5.4.5 Ponding. *Roof-framing members shall be designed for the deflection and drainage or ponding requirements specified in Section 1506 and Chapter 16. In glued-laminated timbers, the minimum slope for roof drainage required by Section 1506 shall be in addition to a camber of one and one-half times the calculated dead load deflection. The calculation of the required slope shall not include any vertical displacement created by short taper cuts. In no case shall the deflection of glued-laminated timber roof members exceed 1/2-inch (13 mm) for a 5 pound-per-square-foot (239 Pa) uniform load.*

8. [For BSC, OSHPD 2] Sec. 5.4. Add a new section as follows:

5.4.6 Tapered Faces. *Sawn tapered cuts shall not be permitted on the tension face of any beam. Pitched or curved beams shall be so fabricated that the laminations are parallel to the tension face. Straight, pitched or curved beams may have sawn tapered cuts on the compression face.*

For other members subject to bending, the slope of tapered faces, measured from the tangent to the lamination of the section under consideration, shall not be steeper than 1 unit vertical in 24 units horizontal (4% slope) on the tension side.

EXCEPTION: *1.This requirement does not apply to arches.*

2. Taper may be steeper at sections increased in size beyond design requirements for architectural projections.

9. [For BSC, OSHPD 2] Sec. 11.1.5.6. Delete and substitute as follows:

11.1.5.6 *For wood-to-wood joints, the spacing center to center of nails in the direction of stress shall not be less than the required penetration. Edge or end distances in the direction of stress shall not be less than one-half of the required penetration. All spacing and edge and end distances shall be such as to avoid splitting of the wood.*

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275 and 129850*

*** * ***

(END OF ITEM)

ITEM 7-43
OSHPD 02/04
Part 2, Volume 2, Chapter 23A **APPROVED**

CHAPTER 23A - WOOD

Division III - DESIGN SPECIFICATIONS FOR ALLOWABLE STRESS DESIGN OF WOOD BUILDINGS

Part I - ALLOWABLE STRESS DESIGN OF WOOD

This standard, with certain exceptions, is the ~~ANSI/NfoPA NDS-91~~ ANSI/AF&PA NDS-2001 National Design Specification for Wood Construction of the American Forest and Paper Association, ~~Revised 1991Edition,~~ and the Supplement to the ~~1991~~ 2001 Edition, National Design Specification, adopted by reference.

The National Design Specification for Wood Construction, ~~Revised 1991~~ 2001 Edition, and 2001 Supplement are available from the American Forest and Paper Association, 1111 19th Street, NW, Eighth Floor, Washington, DC, 20036.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

SECTION 2316A - DESIGN SPECIFICATIONS

2316A.1 Adoption and Scope. The National Design Specification for Wood Construction, ~~Revised 1991~~ 2001 Edition (NDS), which is hereby adopted as a part of this code, shall apply to the allowable stress design and construction of wood structures using visually graded lumber, mechanically graded lumber, structural glued laminated 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 1991Edition National Design Specification, Tables 2A, 4A except for the Repetitive Member Factor, Cr, 4B except for the Repetitive Member Factor,Cr, 4C except for the Repetitive Member Factor Cr, 4D, 4E except for the Repetitive Member Factor, Cr, 5A, 5B and 5C are specifically adopted and made a part of this standard.~~

~~Other codes, standards or specifications referred to in this standard are to be considered as only an indication of an acceptable method or material that can be used with the approval of the enforcement agency, except where such other codes, standards or specifications are specifically adopted by this code as primary standards.~~ *Where a standard or specification referred to in this code conflicts with a standard or specification referenced in the 2001 NDS for wood construction, the 2001 NDS shall prevail.*

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

2316A.2 Amendments.

~~**1. Sec. 1.1. Delete and substitute the following:**~~

~~The design of elements of structures using visually graded lumber, mechanically graded lumber, structural glued laminated timber, timber piles, and design of their connections shall be in accordance with Chapter 23A, Division III, Part 1.~~

~~**2. Secs. 1.2 through 1.5. Delete.**~~

~~**3. Sec. 2.2. Delete first sentence and substitute the following:**~~

~~Allowable stress design values for visually graded structural lumber, mechanically graded structural lumber and structural glued laminated timber shall be in accordance with NDS Supplement Tables 2A, 4A except for the Repetitive Member Factor, Cr, 4B except for the Repetitive Member Factor Cr, 4C except for the Repetitive Member Factor, Cr, 4D, 5A, 5B and 5C. The Repetitive Member Factor, Cr, shall not be used to adjust the allowable stresses set forth in Tables 4A, 4B, 4C and 4E. Values for species and grades not tabulated shall be submitted to the enforcement agency for approval.~~

~~4.~~ *1.* Sec. 2.3.2.1. In fourth sentence, delete "or Figure B1 (see Appendix B)."

~~5.~~ *2.* Sec. 2.3.2.3. Delete and substitute the following:

2.3.2.3 When using Section 1612A.3.1 basic load combinations, the Load Duration Factor, C~~D~~ $_D$, except for dead load noted in Table 2.3.2 shall *NOT* be permitted to be used. When using Section 1612A.3.2 alternate load combinations, the one-third increase shall not be used concurrently with the Load Duration Factor, C~~D~~ $_D$.

~~6.~~ *3.* Table 2.3.2. Delete and substitute as follows:

TABLE 2.3.2—LOAD DURATION FACTORS, C_D

DESIGN LOAD	LOAD DURATION	C_D
Dead Load	Permanent	0.9
Floor, Occupancy Live Load	Ten Years	1.0
Snow Load	Two Months	1.15
Roof Live Load[3]	Seven Days	1.25
Earthquake Load[1]	—	1.33
Wind Load[2]	—	1.33
Impact	—	2.0

C
A

[1] 1.60 may be used for nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for earthquake are not combined with the increase allowed in Section 1612A.3. The 60-percent increase for nailed and bolted connections exhibiting Mode III or IV behavior for earthquake shall not be applicable to joist hangers, framing anchors, and other mechanical fastenings, including straps and hold-down anchors. The 60-percent increase shall not apply to the allowable shear values in Tables 23A-II-H, 23A-II-I-1, 23A-II-I-2, 23A-II-J or in Section 2315A.3.

[2] 1.60 may be used for members and nailed and bolted connections exhibiting Mode III or IV behavior, except that the increases for wind are not combined with the increase allowed in Section 1612A.3. The 60-percent increase shall not apply to the allowable shear values in Tables 23A-II-H, 23A-II-I-1, 23A-II-I-2, 23A-II-J or in Section 2315A.3.

[3] Provided the dead load includes the weight of at least one reroofing.

~~7.~~ *4.* Sec. 2.3.4. Add a second paragraph following Table 2.3.4:
The allowable unit stresses for fire-retardant-treated solid-sawn lumber and plywood, including fastener values, subject to prolonged elevated temperatures from manufacturing or equipment processes, but not exceeding 150° F (66° C), shall be developed from approved test methods that properly consider potential strength-reduction characteristics, including effects of heat and moisture.

~~8.~~ *5.* Sec. 2.3.6. Add second, third and fourth paragraphs as follows:
The values for lumber and plywood impregnated with approved fire-retardant chemicals, including fastener values, shall be submitted to the enforcement agency for approval. Submittal to the enforcement agency shall include all substantiating data. Such values shall be developed from approved test methods and procedures that consider potential strength-reduction characteristics, including the effects of elevated temperatures and moisture. Other adjustments are applicable, except that the impact load-duration factor shall not apply.

The values for fasteners specified in Division III shall be reduced to 90 percent, except that values for light metal plate connectors shall be recommended by each truss plate manufacturer and approved by the enforcement agency.

Values for glued-laminated timber, including fastener design values, shall be recommended by the treater and submitted to the enforcement agency for approval. Submittal to the enforcement agency shall include all substantiating data.

In addition to the requirements specified in Section 207, fire retardant lumber having structural applications shall be tested and identified by an approved inspection agency in accordance with UBC Standard 23-5.

~~**9. Sec. 2.3.8. Add new second and third paragraphs following Table 2.3.8:**~~
~~For lumber I beams and box beams, the form factor, Cf, shall be calculated as:~~

$$C_f = \left[1 + \left(\frac{d^2 + 143}{d^2 + 88} - 1\right) C_g\right]$$

For **SI:**

$$C_f = \left[1 + \left(\frac{\left(\frac{d}{25.4}\right)^2 + 143}{\left(\frac{d}{25.4}\right)^2 + 88} - 1\right) C_g\right]$$

~~**WHERE:**~~

~~C_f = form factor.~~
~~C_g = support factor = $p2(6 - 8p + 3p2)(1 - q) + q$.~~
~~d = depth of I or box beam.~~
~~p = ratio of depth of compression flange to full depth of beam.~~
~~q = ratio of thickness of web or webs to full width of beam.~~

~~10. Sec. 2.3.10. Add a paragraph at end of section as follows:~~
~~In joists supported on a ribbon or ledger board and spiked to the studding, the allowable stress in compression perpendicular to grain may be increased 50 percent.~~

~~11. Sec. 3.2.1. Add a second sentence as follows:~~
~~For continuous beams, the span shall be taken as the distance between centers of bearings on supports over which the beam is continuous.~~

~~12. Sec. 3.2.3.2. *Delete and substitute* as follows:~~
~~*Notches in sawn lumber bending members shall not exceed one tenth the depth of the member and shall not be located in the middle third of the span. Where members are notched at the ends, the notch depth shall not exceed one fourth the beam depth. The tension side of sawn lumber bending members of 4 inches (102 mm) or greater nominal thickness shall not be notched except at ends of members. Cantilevered portions of beams less than 4 inches (102 mm) 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.*~~

~~13. Sec. 3.2.3.3. Delete and substitute as follows:~~
~~*Notched glued-laminated members shall be designed as required for sawn lumber using the allowable stress of a combination, with the outer lamination being the grade of laminations exposed by the notch. Where a notch is located on the tension face of a member, at least one fully threaded lag bolt, or equal, shall be provided on each side of the notch to prevent splitting.*~~

~~14. Sec. 3.3.2. Add a last paragraph as follows:~~
~~A beam of circular cross section may be assumed to have the same strength as a square beam having the same cross sectional area. If a circular beam is tapered, it shall be considered a beam of variable cross section.~~

~~15. Sec. 3.4.4. Add a section as follows:~~
~~3.4.4.5~~ ~~When girders, beams or joists are notched at points of support on the compression side, they shall meet design requirements for the net section in bending and in shear. The actual shear stress at such point shall be calculated as follows:~~

$$f_v = \frac{3V}{2b\left[d - \left(\frac{d-d'}{d'}\right)e\right]}$$

~~WHERE:~~
~~d = total depth of beam.~~
~~d' = actual depth of beam at notch.~~
~~e = distance notch extends inside the inner edge of support.~~
~~V = shear force.~~

~~Where e exceeds d', the actual shear stress for the notch on the compression side shall be calculated as follows:~~

$$f_v = \frac{3V}{2bd'}$$

~~16. Sec. 3.7.1.4. Delete and substitute as follows:~~
~~The slenderness ratio for solid columns, le/d shall not exceed 50.~~

~~17. Sec. 3.8.2. Delete and substitute as follows:~~
~~Where designs that induce tension stresses perpendicular to grain cannot be avoided, mechanical reinforcement sufficient to resist such forces shall be provided.~~

~~18. Sec. 4.2.5.5. Delete.~~

~~19. Sec. 4.3.4. Delete and substitute as follows:~~
~~*The provisions of Item (b) above apply.*~~

~~**20. Sec. 4.4.1.1. Delete and substitute as follows:**~~
~~Rectangular sawn lumber beams, rafters, joists or other bending members shall be supported laterally to prevent rotation or lateral displacement in accordance with Section 4.4.1.2, or shall be designed in accordance with the lateral stability provisions in Section 3.3.3.~~

~~**21. Sec. 4.4.1.2. Delete first sentence.**~~
~~*(c) Add: The provisions of Item (b) above apply.*~~

~~*(d) Delete and substitute as follows:*~~

~~*Six to 1; bridging, full depth solid blocking or cross bracing shall be installed at intervals not exceeding 8 feet (2438 mm) and the provisions of Item (b) above shall apply unless:*~~

~~*Both edges of the member are held in line or,*~~

~~*The compression edge of the member is supported throughout its length to prevent lateral displacement, as by adequate sheathing or subflooring, and the ends and all points of bearing have lateral support to prevent rotation.*~~

~~22.~~ 6. Sec. 4.4.1. Add a section as follows:

4.4.1.4 Bridging for Floor Joists and Roof Joists or Rafters.
Roof joists or rafters of more than 8-inch (203 mm) depth and floor joists of more than 4-inch (102 mm) depth which are spaced 32 inches (813 mm) on center or less shall be provided with bridging to distribute superimposed loads. Floor joists shall be bridged every 8 feet (2438 mm) and roof joists or rafters every 10 feet (3048 mm) by solid blocking 2 inches (51 mm) thick and the full depth of the joist or rafter, or by wood cross bridging of not less than 1 inch by 3 inches (25 mm by 76 mm) or nailed metal cross bridging of equal strength. Where cross bridging is used, the lower ends of such cross bridging shall be driven up and nailed after the floor, subfloor or roof has been nailed.

~~***23. Sec. 5.2.2. Delete and substitute as follows:***~~
~~***[For DSA/SS] Reinforcement of radial tension.*** *Where mechanical reinforcement is required to resist radial tension, reinforcement shall be as described in the 3rd Edition (1985) of the Timber Construction Manual or as otherwise approved. The maximum spacing of mechanical reinforcement shall not exceed one half the effective embedded thread length of the member at the location of the reinforcement. The effective embedded thread length is the embedded thread length in the tension zone from the neutral axis of the member to the end of the reinforcement.*~~

~~**24. Sec. 5.4.1. Delete second paragraph and substitute as follows:**~~
~~For curved bending members having a varying cross section, the maximum actual radial stress induced, f_r, is given by:~~

$$\cancel{f_r = K_r \frac{6M}{bd^2}}$$

~~**WHERE:**~~
~~b = width of cross section, inches (mm).~~
~~d = depth of cross section at the apex in inches (mm).~~
~~K_r = radial stress factor determined from the following relationship:~~

$$\cancel{K_r = A + B\left(\frac{d}{Rm}\right) + C\left(\frac{d}{Rm}\right)^2}$$

~~M = bending moment at midspan in inch-pounds (N·mm).~~

~~**WHERE:**~~
~~Rm = radius of curvature at the center line of the member at midspan in inches (mm).~~
~~A, B and C = constants as follows:~~

β (1)	A (2)	B (3)	C (4)
(0.0)	(0.0)	(0.2500)	(0.0)
2.5°	0.0079	0.1747	0.1284
5.0°	0.0174	0.1251	0.1939
7.5°	0.0279	0.0937	0.2162
10.0°	0.0391	0.0754	0.2119
15.0°	0.0629	0.0619	0.1722
20.0°	0.0893	0.0608	0.1393
25.0°	0.1214	0.0605	0.1238
30.0°	0.1649	0.0603	0.1115

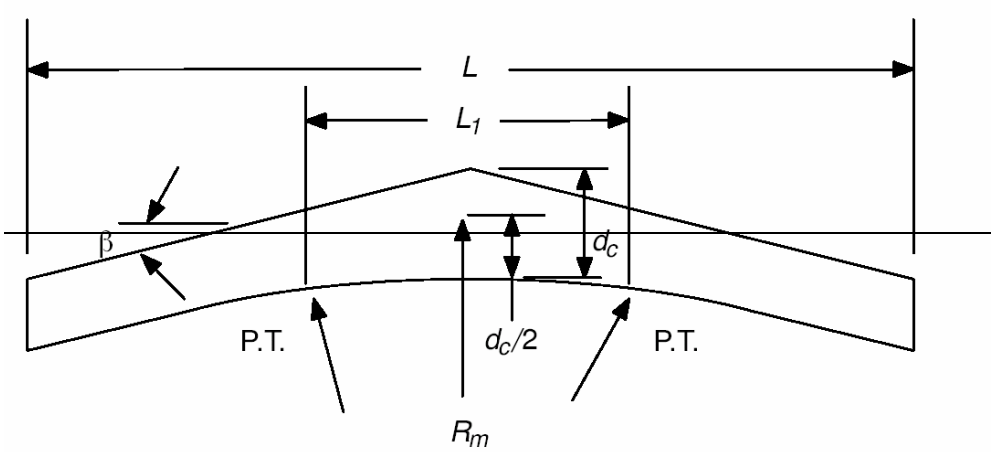
~~and β = angle between the upper edge of the member and the horizontal in degrees. Values of K_r for intermediate values of β may be interpolated linearly.~~
~~When the beam is loaded with a uniform load, *Kr* may be modified by multiplying by the reduction factor C_r as calculated by the following formula:~~

$$C_r = A + B\left(\frac{L}{L_t}\right) + C\left(\frac{d_c}{R_m}\right) + D\left(\frac{L}{L_t}\right)^2 + E\left(\frac{d_c}{R_m}\right)^2 + F\left(\frac{d_c}{R_m}\right)\left(\frac{L}{L_t}\right) + G\left(\frac{L}{L_t}\right)^3 + H\left(\frac{d_c}{R_m}\right)^3$$

~~**WHERE:**~~
~~C_r = reduction factor.~~
~~*L* = span of beam.~~
~~L_t = length of beam between tangent points.~~
~~*A, B*~~
~~. . . *H* = constants for a given â as follows:~~

β	A	B	C	D	E	F	G	H
2.3°	-0.142	0.418	-2.358	-0.053	—	—	0.002	—
9.7°	0.143	0.376	-0.541	-0.060	—	—	0.003	—
14.9°	0.406	0.293	-0.927	-0.041	—	—	0.002	—
20.0°	0.423	0.364	-1.022	-0.067	—	0.146	—	—
25.2°	0.540	0.360	-1.061	-0.070	—	0.156	—	—
29.8°	0.502	0.372	—	-0.076	-3.712	0.138	0.004	4.336

~~and β = angle between the upper edge of the member and the horizontal in degrees. Values of C_r for intermediate values may be interpolated linearly.~~



~~PITCHED AND TAPERED CURVED BEAM~~

~~**25. Sec. 5.4.1.2.** ***Delete and substitute as follows:***~~
~~*When M is in the direction tending to decrease the curvature (increase the radius), mechanical reinforcing sufficient to resist all radial tension stresses is required, but in no case shall the calculated radial tension stress exceed one third the allowable unit stress in horizontal shear. When mechanical reinforcing is used, the maximum moisture content of the laminations at time of manufacture shall not exceed 12 percent for dry conditions of use.*~~

~~**26.**~~ ***7.*** **Sec.** ~~**5.4.4.**~~ **5.4. Add a new section as follows:**
~~**5.4.4**~~ **5.4.5 Ponding.** Roof-framing members shall be designed for the deflection and drainage or ponding requirements specified in Section 1506 and Chapter 16A. In glued-laminated timbers, the minimum slope for roof drainage required by Section 1506 shall be in addition to a camber of one and one-half times the calculated dead load deflection. The calculation of the required slope shall not include any vertical displacement created by short taper cuts. In no case shall the deflection of glued-laminated timber roof members exceed 1/2-inch (13 mm) for a 5 pound-per-square-foot (239 Pa) uniform load.

~~**27.**~~ ***8.*** **Sec.** ~~**5.4.5.**~~ **5.4. Add a new section as follows:**
~~**5.4.5**~~ **5.4.6 Tapered Faces.** Sawn tapered cuts shall not be permitted on the tension face of any beam. Pitched or curved beams shall be so fabricated that the laminations are parallel to the tension face. Straight, pitched or curved beams may have sawn tapered cuts on the compression face.

For other members subject to bending, the slope of tapered faces, measured from the tangent to the lamination of the section under consideration, shall not be steeper than 1 unit vertical in 24 units horizontal (4% slope) on the tension side.

EXCEPTIONS:
1. This requirement does not apply to arches.
2. Taper may be steeper at sections increased in size beyond design requirements for architectural projections.

~~***28.***~~ ***9. Sec.*** ~~***5.4.6.***~~ ***5.4. Add a new section as follows:***

5.4.7 Manufacture and Fabrication. *The manufacture and fabrication of structural glued-laminated timber shall be in accordance with ANSI/AITC A 190.1 and the following requirements:*

1. ***Joints.*** *All portions of end joints in adjacent laminations shall be separated in accordance with ANSI/AITC A 190.1 and ASTMD3737. The areas requiring 6-inch (152 mm) spacing shall be shown on the approved drawings or described in the specifications.*

Joints in adjacent laminations of arched members shall be separated as required for bending members.

2. ***Adhesives.*** *Dry-use adhesives shall not be used.*

3. ***Moisture content at the time of gluing.*** *The maximum moisture content of the* ~~*wood*~~ *laminating lumber at the time of gluing shall not exceed 16 percent for projects located in coastal areas, 12 percent for projects located in interior valleys or* ~~*10 percent for projects located in*~~ *desert areas, with the geographical areas as determined by the enforcement agency. The moisture content of the wood for members that will be exposed to direct sunlight in the finished structure shall not exceed* ~~*the following limits*~~ *12 percent at time of gluing*~~*:*~~ *.*

~~*1. 12 percent for Alaskan Yellow Cedar*~~

~~*2. 10 percent for all other species*~~

~~*The minimum moisture content shall not be less than 7 percent.*~~ *The range of moisture content of laminations assembled into a single member shall not exceed 5 percent at the time of gluing.*
When mechanical reinforcing is used, such as radial tension reinforcement, the maximum moisture content of the laminations at time of manufacture shall not exceed 12 percent for dry conditions of use.

~~*3.* **Reinforcement for radial tension.** *Where mechanical reinforcement is required to resist radial tension, reinforcement shall be as described in 3rd Edition (1985) of the Timber Construction Manual or as otherwise approved. The maximum spacing of mechanical reinforcement shall not exceed one half the effective embedded thread length of the member at the location of reinforcement. The effective embedded thread length is the embedded thread length in the tension zone from the neutral axis of the member to the end of the reinforcement.*~~

4. ***Inspection.*** *See Section 2337A for inspection requirements.*

~~***29.***~~ ***10.*** ***Sec.*** ~~***5.4.7.***~~ ***5.4.*** ***Add a new section as follows:***
5.4.8 ***Specifications.*** *For structural glued-laminated timber, the following shall be shown on the plans and in the specifications:*

Whether for dry or wet conditions of use

Species and applicable standard

Stress requirements and combination symbol

If the temperature of the timber exceeds 150°F (66°C) in service

Tension zones for purposes of determining grades of laminations and location of spaced end joints for all members except simple beams supporting uniform loads.

Those portions of glued-laminated timbers which form the structural supports of a building or other structure and are exposed to weather and not properly protected by a roof, eave over-hangs or similar covering shall be pressure treated with an approved preservative or be manufactured from wood of natural resistance to decay.

All weather-exposed surfaces of members shall be protected in an approved manner to prevent decay where they are located in a high-humidity environment such as in direct contact with soil or water and where portions extend beyond the walls and roof cover-age in buildings. When the member is protected with an approved pressure treatment, the treatment process shall not impair the structural integrity of the member. When the member is protected by flashing or is encased, care must be taken to provide ventilation and prevent moisture entrapment on the member.

All members shall have appropriate weather protection during transit, storage and erection.

~~**30. Sec. *8.2. Delete and substitute as follows:***~~
~~***8.2.3*** Allowable shear values for bolts used to connect a wood member to concrete or masonry are permitted to be determined as one half the tabulated double shear value for a wood member twice the thickness of the member attached to the concrete or~~
~~masonry.~~

~~***31.***~~ ***11.*** ***Sec.*** ~~***12.2.3.***~~ ***11.5.4.*** ***Delete.***

~~***32. Sec. 12.3.7. Delete.***~~

~~***33.***~~ ***12.*** **Sec.** ~~**12.4.1.**~~ **11.1.5.6. Delete and substitute as follows:**
~~**12.4.1**~~ **11.1.5.6** For wood-to-wood joints, the spacing center to center of nails in the direction of stress shall not be less than the required penetration. Edge or end distances in the direction of stress shall not be less than one-half of the required penetration. All spacing and edge and end distances shall be such as to avoid splitting of the wood.

~~**34. Sec. 13.2.1. Delete and substitute as follows:**~~
~~**13.2.1 Test for design values.** Tests to determine design values for metal plate connectors in lateral withdrawal, net section shear and net section tension shall be conducted in accordance with the test and evaluation procedures in ANSI/TPI 1-1995. Design values determined in accordance with these test procedures shall be multiplied by all applicable adjustment factors (see Table 7.3.1) to obtain allowable design values.~~

~~35. NDS Supplement Table 5A. Add combinations and design values as follows:~~

COMBINATION SYMBOL[4]	SPECIES OUTER LAMINATIONS/CORE LAMINATIONS[5]	DESIGN VALUES IN POUNDS PER SQUARE INCH (psi)													
		BENDING ABOUT X-X AXIS (Loaded Perpendicular to Wide Faces of Laminations)						BENDING ABOUT Y-Y AXIS (Loaded Parallel to Wide Faces of Laminations)					AXIALLY LOADED		
		Bending		Compression Perpendicular to Grain											
		Tension Zone Stressed in Tension F_{bxx}	Compression Zone Stressed in Tension[6] F_{bxx}	Tension Face[9,10] $F_{c\perp xx}$	Compression Face[9,10] $F_{c\perp xx}$	Shear Parallel to Grain[10] F_{vxx}	Modulus of Elasticity E_{xx}	Bending F_{byy}	Compression Perpendicular to Grain (Side Faces) $F_{c\perp yy}$	Shear Parallel to Grain F_{vyy}	Shear Parallel to Grain (For Members With Mulitple Piece Laminations Which are not Edge glued)[13] F_{vyy}	Modulus of Elasticity E_{yy}	Tension Parallel to Grain F_t	Compression Parallel to Grain F_c	Modulus of Elasticity E
VISUALLY GRADED SOUTHERN PINE															
~~26F-V1~~	~~SP/SP~~	~~2600~~	~~1300~~	~~650~~	~~650~~	~~200~~	~~1,800,000~~	~~1900~~	~~560~~	~~175~~	~~90~~	~~1,600,000~~	~~1150~~	~~1600~~	~~1,600,000~~
26F-V2	SP/SP	2600	1300	650	650	200	1,900,000	2200	650	175	90	1,800,000	1200	1650	1,800,000
26F-V3	SP/SP	2600	1300	650	650	200	1,900,000	2100	560	175	90	1,800,000	1150	1600	1,800,000
26F-V4[8]	SP/SP	2600	2600	650	650	200	1,900,000	2100	560	175	90	1,800,000	1150	1600	1,800,000
E-RATED SOUTHERN PINE															
28F-E1	SP/SP	2800	1400	650	650	200	2,000,000	1600	560	175	90	1,700,000	1300	1850	1,700,000
28F-E2[8]	SP/SP	2800	2800	650	650	200	2,000,000	1600	560	175	90	1,700,000	1300	1850	1,700,000
30F-E1[15]	SP/SP	3000	1500	650	650	200	2,000,000	1750	560	175	90	1,700,000	1250	1750	1,700,000
30F-E2[8,15]	SP/SP	3000	3000	650	650	200	2,000,000	1750	560	175	90	1,700,000	1250	1750	1,700,000

[15]These combinations are only for nominal widths 6 inches and less, in accordance with AITC 117-93.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-44
OSHPD 02/04
Part 2, Volume 2, Chapter 23A **APPROVED**

2318A.3.3 Spacing and penetration. Common wire nails shall have penetration into the piece receiving the point as set forth in Tables 23A-III-C-1 and 23A-III-C-2.Nails or spikes for which the gages or lengths are not set forth in Tables 23A-III-C-1 and 23A-III-C-2 shall have a required penetration of not less than 11 diameters, and allowable loads may be interpolated. Allowable loads shall not be increased when the penetration of nails into the member holding the point is larger than required by this section. *Spacing shall be in accordance with Section 2316A.2, Item ~~33~~ 12.*

Common wire 10d, 12d and 16 d nails may be used to join two members of 2-inch (51 mm) nominal thickness at the tabulated values indicated for these nails.

Nails in plywood shall not be overdriven such that the nail heads penetrate the face ply by more than the thickness of the nail head or break the face-ply wood fibers.

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

2318A.3.4 Corrosion resistance. *Nails and spikes used in wet or exterior locations, such as exterior wall coverings of hospitals, public elementary and secondary schools, community college buildings, and state-owned or state-leased essential services buildings, shall be corrosion resistant and shall have a hot-dipped or tumbled galvanized coating of not less than ~~1.5~~ 1.0 ounces of zinc per square foot (458 gm/m^2) or be fabricated of copper, stainless steel or brass.*

NOTATION:

- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-45
OSHPD 02/04
Part 2, Volume 2, Chapter 23A **APPROVED**

2320A.8.3 Framing details. Joists shall be supported laterally at the ends and at each support by solid blocking except where the ends of joists are nailed to a header, band or rim joist or to an adjoining stud or by other approved means. Solid blocking shall not be less than 2 inches (51 mm) in thickness and the full depth of joist.

Notches on the ends of joists shall not exceed one fourth the joist depth. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist, and the diameter of any such hole shall not exceed one third the depth of the joist. Notches in the top or bottom of joists shall not exceed one ~~*tenth*~~ sixth the depth and shall not be located in the middle third of the span. *Notches or holes shall not be placed in joists unless fully detailed in the approved plans.*

Joist framing from opposite sides of a beam, girder or partition shall be lapped at least 3 inches (76 mm) or the opposing joists shall be tied together in an approved manner.

Ledger strips applied to the sides of girders for support of joists shall not be less than 2 inches by 4 inches (51 mm by 102 mm).

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

2320A.8.7 Bridging. *Floor joists more than 4 inches (102 mm) in depth shall be provided with bridging in accordance with the provisions of Section 2316A.2, Item ~~22~~ 6 ~~, 4.4.1.4~~.*

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

2320A.12.8 Blocking. Roof rafters and ceiling joists shall be supported laterally to prevent rotation and lateral displacement when required by Division III, Part I, Section 4.4.1.2. *In addition, rafters of more than 8 inches (203 mm) in depth shall be provided with bridging in accordance with the provisions of Section 2316A.2, Item ~~22~~ 6.*

NOTATION:
- *Authority: Health and Safety Code Sections 129850*
- *Reference: Health and Safety Code Sections 1275, 129790 and 129850*

* * *

(END OF ITEM)

ITEM 7-46
OSHPD 02/04
Part 2, Volume 2, Matrix Tables **APPROVED**

MATRIX TABLES:

APPENDIX CHAPTER 16 – STRUCTURAL FORCES

ADOPTING AGENCY	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				* DOSH	SL
			1/AC	1	2									1	2	3	4		
Adopts entire UBC chapter without amendments														~~X~~	X				

ADOPTING AGENCY	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				* DOSH	SL
			1/AC	1	2									1	2	3	4		
Adopt entire UBC chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below																			

APPENDIX CHAPTER 16A – DIVISION VII- EARTHQUAKE REGULATIONS FOR SEISMIC-ISOLATED STRUCTURES

ADOPTING AGENCY	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				* DOSH	SL
			1/AC	1	2									1	2	3	4		
Adopt entire California chapter														X			X		

CHAPTER 20 — LIGHTWEIGHT METALS

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCY										
ADOPTING AGENCY	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				* DOSH	SL
			1/AC	1	2									1	2	3	4		
Adopts entire UBC chapter without amendments															X				
Adopt entire UBC chapter as amended (amended sections listed below)														X			X		
Adopt only those sections that are listed below																			

CHAPTER 21 — MASONRY

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCY										
ADOPTING AGENCY	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				* DOSH	SL
			1/AC	1	2									1	2	3	4		
Adopts entire UBC chapter without amendments															X				
Adopt entire UBC chapter as amended (amended sections listed below)														X			X		
Adopt only those sections that are listed below																			

CHAPTER 22 — STEEL

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCY									
ADOPTING AGENCY	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				* DOSH	SL
			1/AC	1	2									1	2	3	4		
Adopts entire UBC chapter without amendments														~~X~~	X		~~X~~		
Adopt entire UBC chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below																			

CHAPTER 23 - WOOD

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCY									
ADOPTING AGENCY	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				* DOSH	SL
			1/AC	1	2									1	2	3	4		
Adopts entire UBC chapter without amendments															X				
Adopt entire UBC chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below																			
2316 CA																			
2321.1.1 CA																			

* * *

(END OF ITEM)

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ITEM 8-1
SFM 05/04
Part 2, Volume 1, Chapter 1 **APPROVED**

CHAPTER 1 – ADMINISTRATIVE

SECTION 101-TITLE, PURPOSE AND SCOPE

101.17.14 SFM-Office of the State Fire Marshal.

Any building or structure used or intended for use as an asylum, jail, mental hospital, hospital, ~~sanitarium,~~ home for the ~~aged~~ elderly, children's nursery, children's home or institution, school or any similar occupancy of any capacity.

Any theater, dance hall, skating rink, auditorium, assembly hall, meeting hall, nightclub, fair building, or similar place of assemblage where 50 or more persons may gather together in a building, room or structure for the purpose of amusement, entertainment, instruction, deliberation, worship, drinking or dining, awaiting transportation, or education.

Authority Cited-Health and Safety Code Section 13143 and 18949.2(b), (c)
Reference-Health and Safety Code Section 13143

NOTE: *The specific statutes authorizing the SFM to propose this amendment to section 101.17.14 as shown above relating to Group E, Division 3 Occupancies are as follows:*

- *Health and Safety Code section 13143 and 18949.2(b), (c)*
- *Health and Safety Code section 1502, 1531.2, 1531.3 and 1584*

*** * ***

(END OF ITEM)

ITEM 8-2
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 2

ITEM 8-3
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 3

ITEM 8-4
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 3

ITEM 8-5
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 3

ITEM 8-6
SFM 05/04
Part 2, Volume 1, Chapter 3 **APPROVED**

[For SFM] 305.11.3 Exempted Portable Buildings*. A portable building as defined in Section 217 and certified by the public school administration as being sited on campus for less than three years is not required to install an automatic fire detection, automatic alarm or automatic sprinkler system.*

NOTE: The specific statutes authorizing the SFM to propose these new regulations as shown above relating to Group E Occupancies are as follows:

- *Health and Safety Code sections 13143 and 18949.2(b), (c)*

* * *

(END OF ITEM)

ITEM 8-7 **SFM 05/04** **Part 2, Volume 1, Chapter 3**	**WITHDRAWN BY SFM**

ITEM 8-8 **SFM 05/04** **Part 2, Volume 1, Chapter 3**	**WITHDRAWN BY SFM**

ITEM 8-9 **SFM 05/04** **Part 2, Volume 1, Chapter 3**	**WITHDRAWN BY SFM**

ITEM 8-10 **SFM 05/04** **Part 2, Volume 1, Chapter 3A**	**WITHDRAWN BY SFM**

ITEM 8-11 **SFM 05/04** **Part 2, Volume 1, Chapter 3A**	**WITHDRAWN BY SFM**

ITEM 8-12 **SFM 05/04** **Part 2, Volume 1, Chapter 5**	**WITHDRAWN BY SFM**

ITEM 8-13 **SFM 05/04** **Part 2, Volume 1, Chapter 5**	**WITHDRAWN BY SFM**

ITEM 8-14 **SFM 05/04** **Part 2, Volume 1, Chapter 9**	**APPROVED**

Chapter 9
Fire Protection Systems

SECTION 904-FIRE EXTINGUISHING SYSTEMS

904.1 Installation Requirements.

904.1.1 General. In buildings used for high-piled combustible storage, fire prevention shall be in accordance with the ***[For SFM]*** *California* Fire Code.

Section 904.1.2 Standards. Fire-extinguishing systems shall comply with UBC Standards 9-1 and 9-2. ***[For SFM]*** *Fire-extinguishing systems shall comply with the applicable standards in Chapter 35 and Article 91 of the California Fire Code.* ~~*The following standards in Chapter 35 shall be utilized:*~~

~~*NFPA 11-1994 Foam Extinguishing Systems; NFPA 11A-1994, Medium- and High-Expansion Foam Systems; NFPA 12-1997, Carbon Dioxide Fire Extinguishing Systems; NFPA 12A, 1992, Halon 1301 Systems; NFPA 2001-1996, Clean Agent Fire Extinguishing Systems; NFPA 13-1999 as amended, Installation of Sprinkler Systems; NFPA 13D-1999, Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes (Installed in Congregate Living Health Facilities); NFPA 13R-1999, Installation of Sprinkler Systems in Residential Occupancies*~~

~~*Up to and Including Four Stories in Height; NFPA 14-2000, Standpipe and Hose Systems; NFPA 15-1996, Water Spray Fixed Systems; NFPA 16A-1994, Closed head Foam water Sprinkler Systems; NFPA 17-1994, Dry Chemical Extinguishing Systems; NFPA 17A-1994, Wet Chemical Extinguishing Systems; NFPA 20-1996, Centrifugal Fire Pumps; NFPA 22-1996, Water Tanks for Private Fire Protection; NFPA 24-1995, Private Fire Service Mains (except as noted in Section 904.1.2, Exception 2).*~~

NOTE: *The specific statute authorizing the SFM to propose these new regulations as shown above relating to Fire Protection Systems is as follows:*

- *Health and Safety Code sections 13114 & 18949.2(b), (c)*

~~*4.*~~ ***[For SFM] 904.1.2.1.*** *Group I Occupancies housed in existing single-family dwellings may utilize the following deviations from NFPA 13, provided the floor area and height of any single – or multi-story building does not exceed those allowed by Table 5-B, and further provided the system is hydraulically calculated in accordance with light hazard requirements without allowance for hose.*

{The remainder of the existing text of Section 904.1.2, exception no. 4 is to remain as published in the 2001 CBC.}

NOTE: *The specific statutes authorizing the SFM to propose this amendment to section 904.1.2.1 as shown above relating to Group I, Division 1.2.1 Occupancies are as follows:*

- *Health and Safety Code sections 13143 and 18949.2(b), (c)*
- *Health and Safety Code sections 1531.2, 1531.3, 1570.7 and 1584*
- *Title 22, Division 5, Chapter 10, Article 1, commencing with Section 78007*

*** * ***

(END OF ITEM)

ITEM 8-15
SFM 05/04
Part 2, Volume 1, Chapter 9 **APPROVED**

904.2 Automatic Fire-extinguishing Systems.

904.2.1 Where required.

[For SFM] *For special provisions on hazardous chemicals and magnesium, and calcium carbide, see the California Fire Code.*

NOTE: *The specific statute authorizing the SFM to propose this amendment as shown above in section 904.2.1, is as follows:*

- *Health and Safety Code sections 13143 and 18949.2(b), (c)*

*** * ***

(END OF ITEM)

ITEM 8-16
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 9

ITEM 8-17
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 9

ITEM 8-18
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 10

ITEM 8-19
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 10

ITEM 8-20
SFM 05/04
Part 2, Volume 1, Chapter 10 **APPROVED**

1007.5 Group I Occupancies.

Section 1007.5.4 Corridors. Corridors serving any area caring for one or more nonambulatory persons shall not be less than 8 feet (2438 mm) in width.

EXCEPTIONS: 1. Corridors serving surgical areas of Group I, Division 1.2 Occupancies shall not be less than 6 feet (1829 mm) in width.

[For SFM] *2. In Group I, Division 3 Occupancies such as jails, prisons, reformatories and similar buildings with open-barred cells forming corridor walls, the open-barred cell corridor walls or open-barred cell corridor doors need not be fire resistive.*

Any change in elevation in a corridor serving nonambulatory persons shall be by means of a ramp.

Corridors shall comply with the requirements of Section 1004.3.4, except that in hospitals and nursing homes classified as Group I, Division 1.1*, [For SFM] 2, or 3* Occupancies, the following exceptions apply:

1. Nurses' stations, ***[For SFM]*** *protected by automatic sprinklers and smoke detector(s)* including space for doctors' and nurses' charting and communications, constructed as required for corridors need not be separated from corridors.

   1.1 ***[For SFM]*** *Nurse's stations in new and existing facilities are regulated in the California Fire Code and the California Code of Regulations, Title 19.*

   *1.2 [**For SFM]** Smoke detector(s) shall be interconnected to the facility's fire alarm system and shall be placed and installed in accordance with the manufacture's specifications.*

NOTE: *The specific statute authorizing the SFM to propose this amendment to section 1007.5.4 as shown above relating to Group I Occupancies is as follows:*

- *Health and Safety Code section 13143*

*** * ***

(END OF ITEM)

ITEM 8-21
SFM 05/04 **WITHDRAWN BY SFM**
Part 2, Volume 1, Chapter 10

ITEM 8-22
SFM 05/04
Part 2, Volume 1, Chapter 11A - Repeal **APPROVED**

{Department of Housing & Community Development (HCD) has submitted a code change package that clearly indicates that the entire Chapter 11A is being repealed and replaced with a new Chapter 11A. Egress and Area of Evacuation Assistance is under the authority of the SFM. In conjunction with HCD the SFM is submitting Section 1118A as shown below to be included in the new Chapter 11A.}

Chapter 11A
HOUSING ACCESSIBILITY

~~SECTION 1108A [FOR SFM] – EGRESS AND AREAS OF REFUGE~~

~~1108A.1 [For SFM] Means of Egress.~~

~~1108A.1.1 [For SFM] General.~~ *~~All required accessible spaces shall be provided with not less than one accessible means of egress. When more than one exit is required from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance set forth in Chapter 10.~~*

~~Each accessible means of egress shall be continuous from each required accessible occupied area to a public way and shall include accessible routes, ramps, exit stairs, elevators, horizontal exits or smoke barriers.~~

> ***~~EXCEPTIONS:~~*** *~~1. Areas of evacuation assistance are not required in buildings or facilities having a supervised automatic sprinkler system.~~*
>
> *~~2. Areas of evacuation assistance are not required in alterations of existing buildings.~~*
>
> ***~~Note:~~*** *~~This section is also adopted by the Division of the State Architect, Access Compliance, for buildings not regulated by the State Fire Marshal.~~*

[For SFM] SECTION 1118A EGRESS AND AREAS FOR EVACUATION ASSISTANCE

1118A.1 General. *In buildings or portions of buildings required to be accessible, accessible means of egress shall be provided in the same number as required for exits by Chapter 10. When an exit required by Chapter 10 is not accessible, an area for evacuation assistance shall be provided. Areas for evacuation assistance shall comply with the requirements of this code and shall adjoin an accessible route of travel complying with this code.*

> ***EXCEPTIONS:*** *1. Areas of evacuation assistance are not required in buildings or facilities having a supervised automatic sprinkler system.*
>
> *2. In alterations of existing buildings, areas of evacuation assistance are not required.*

1118A.2 Areas for Evacuation Assistance.

1118A.2.1 Location and Construction. *An area for evacuation assistance shall be one of the following:*

1. *A portion of a stairway landing within a smoke proof enclosure, complying with Section 1005.3.3.*
2. *A portion of an exterior exit balcony located immediately adjacent to an exit stairway when the exterior exit balcony complies with Section 1006.3. Openings to the exterior of the building located within 20 feet (6096 mm) of the area for evacuation assistance shall be protected with fire assemblies having a three-fourths-hour fire-protection rating.*
3. *A portion of a one-hour fire-resistive corridor complying with Section 1004.3.4 located immediately adjacent to an exit enclosure.*
4. *A vestibule located immediately adjacent to an exit enclosure and constructed to the same fire resistive standards as required by Section 1004.3.4.*
5. *A portion of a stairway landing within an exit enclosure which is vented to the exterior and is separated from the interior of the building by not less than one-hour fire-resistive door assemblies.*
6. *When approved by the building official, an area or room, which is separated from other portions of the building by a smoke barrier. Smoke barriers shall have a fire-resistive rating of not less than one hour and shall completely enclose the area or room. Doors in the smoke barrier shall be tight fitting smoke-*

and draft-control assemblies having a fire-protection rating of not less than 20 minutes and shall be self-closing or automatic closing. The area or room shall be provided with an exit directly to an exit enclosure. When the room or area exits into an exit enclosure which is required to be of more than one-hour fire-resistive construction, the room or area shall have the same fire-resistive construction, including the same opening protection, as required for the adjacent exit enclosure.

7. An elevator lobby complying with Section 1118A.3.

1118A.2.2 Size. *Each area for evacuation assistance shall provide at least two accessible areas that are not less than 30 inches by 48 inches (762 mm by 1219 mm). The area for evacuation assistance shall not encroach on any required exit width. The total number of such 30-inch by 48-inch (762 mm by 1219 mm) areas per story shall not be less than one for every 200 persons of calculated occupant load served by the area for evacuation assistance.*

EXCEPTION: *The building official may reduce the minimum number of 30-inch by 48-inch (762 mm by 1219 mm) areas to one for each area for evacuation assistance on floors where the occupant load is less than 200.*

1118A.2.3 Adjacent Stairway Width. *Each stairway adjacent to an area for evacuation assistance shall have a minimum clear width of 48 inches (1219 mm) between handrails.*

1118A.2.4 Two-Way Communication.

1118A.2.4.1 Communication and Location. *A telephone with controlled access to a public telephone system or another method of two-way communication shall be provided between each area of refuge and the primary entry. The fire department may approve a location other than the primary entry*

1118A.2.4.2 Visible and Audible Communication method. *A method of two-way communication with both visible and audible communication shall be provided between each area of evacuation assistance and the primary entry. A button in the area of rescue assistance shall activate both a light in the area of rescue assistance indicating that rescue has been requested and a light at the primary entry indicating that rescue is being requested. A button at the primary entry shall activate both a light at the primary entry and a light in the area of rescue assistance indicating that the request has been received.*

1118A.2.5 Identification. *Each area for evacuation assistance shall be identified by a sign with the* ***"International Symbol of Accessibility"*** *and text that clearly reads,* ***"AREA FOR EVACUATION ASSISTANCE."***

This sign shall be illuminated when exit sign illumination is required. In each area for evacuation assistance, instructions on the use of the area under emergency conditions shall be posted adjoining the two-way communication system.

1118A.3 Area for Evacuation Assistance, High Rise Alternative. *Within a building of any height or occupancy constructed in accordance with the requirements of Sections 403.1 through 403.10, an area for evacuation assistance may be located in the elevator lobby when:*

1. The area for evacuation assistance complies with the requirements for size, two-way communication and identification as specified in Section 1118A.2; and

2. Elevator shafts and adjacent lobbies are pressurized as required for smoke-proof enclosures in Section 1005.3.3. Such pressurization system shall be activated by smoke detectors on each floor located in a manner approved by the building official. Pressurization equipment and its ductwork within the building shall be separated from other portions of the building by a minimum two-hour fire-resistive construction.

1118A.4 Emergency Warning Systems/ Accessibility Requirements. *Emergency warning systems as part of the fire-alarm system shall be designed and installed in accordance with NFPA 72 as amended in Chapter 35.*

1118A.5 Emergency Egress*. Accessible routes serving any accessible space or element shall also serve as a means of egress for emergencies or connect to an accessible place of refuge. Such accessible routes and places of refuge shall comply with the requirements established by the enforcement agency.*

NOTE: *The specific statutes authorizing the SFM to propose this amendment to section 1118A as shown above is as follows:*

Health and Safety Code sections 13143 and 18949.2(b), (c)

* * *

(END OF ITEM)

ITEM 8-23
SFM 05/04
Part 2, Volume 1, Chapter 35 **APPROVED**

Chapter 35
UNIFORM BUILDING CODE STANDARDS

SECTION 3504-RECOGNIZED STANDARDS

Part II – UBC Standards

UBC Std. And Sec.	TITLE AND SOURCE

CHAPTER 9

9-1; 307.11.3, 321.1, 403.2, 404.3.1, 405.1.1, 804.1, 902, 904.1.2, 904.1.3, 904.2.6.3, 904.2.7, 904.3.2, 2603.7.1, 2603.8.1

Installation of Sprinkler Systems. Standard for the Installation of Sprinkler Systems, NFPA 13-1991 ***[For SFM]*** *NFPA 13-~~1996~~ 2002, National Fire Protection Association.*

9-2; 902, 904.1.2, 904.5.1

Standpipe Systems. The Standard for Installation of Standpipe Systems and Hose Systems, NFPA 14-1993 ***[For SFM]*** *NFPA 14 -~~1996~~ 2003, National Fire Protection Association.*

9-3; 804.1, 805, 902, 904.1.2, 904.1.3, 2603.7.1, 2603.8.1

Installation of Sprinkler Systems in Group R Occupancies Four Stories or Less. Standard for the Installation of Sprinkler Systems in Residential Occupancies up to Four Stories in Height, NFPA 13R-1989 ***[For SFM]*** *NFPA 13R -~~1996~~ 2002, National Fire Protection Association.*

* * *

(END OF ITEM)

ITEM 8-24
SFM 05/04
Part 2, Volume 1, Chapter 35 **APPROVED**

Part IV – Recognized Standards

Part IV – Recognized Standards

3504.1 [SFM] California Building Code Standards

3504.1.1 [For SFM] Whenever the UBC refers to:

UBC Standard	*It shall be construed to mean:*
9-1	*NFPA 13*
9-2	*NFPA 14*
9-3	*NFPA 13R*

3504.1.2 [For SFM] *California State Fire Marshal ~~(SFM)~~ Standards are found in the California Code of Regulations, Title 24, Part 12.*

SFM 12-3, Releasing Systems for Security Bars in Dwellings
SFM 12-4.1~~00~~, Smoke or Heat Ventilators.
SFM 12-7-1, Fire Tests of Building Construction and Materials
SFM 12-7-2, Fire Dampers
SFM 12-7-3, Fire-testing Furnaces
SFM 12-7A-1, Exterior Wall Siding and Sheathing, Direct Flame Exposure
SFM 12-7A-2, Exterior Window, Direct Flame Exposure
SFM 12-7A-3, Unloaded Deck, Direct Flame Exposure
SFM 12-7A-4, Unloaded Deck, Burning Brand Exposure
SFM 12-7-4, Fire Door Assembly Tests.
SFM 12-8-100, Room Fire Tests for Wall and Ceiling Materials.
SFM 12-8-1A, Calculation of the Total Rate of Heat and Carbon Monoxide or Carbon Dioxide Production
SFM 12-8-1B, Mounting Techniques for Wall and Ceiling Interior Finish Material
SFM 12-10-1, Power Operated Exit Doors
SFM 12-10-2, Single Point Latching or Locking Devices
SFM 12-10-3, Emergency Exit and Panic Hardware
SFM 12-72-1, Protective Signaling Systems
SFM 12-72-2, Single and Multiple Station Fire Alarm Devices
SFM 12-73-3, Smoke Detectors, Combustion Products Type

~~(The California State Fire Marshal standards referred to above are found in the California Code of Regulations, Title 24, Part 12.)~~

3504.1.3 [For SFM] National Standards.

{The SFM is repealing the numbering sequencing of section 3504.1.3 and renumbering as shown below:}

1. *NFPA 11, ~~1998~~ 2002 Edition, Low-Medium-High Expansion Foams*
2. *NFPA 11A, 1999 Edition, Medium- and High-Expansion Foam Systems*
3. *NFPA 12, ~~1998~~ 2000 Edition, Carbon Dioxide Extinguishing Systems*
4. *NFPA 12A, 1997 Edition, Halon 1301 Fire Extinguishing Systems*
5. *NFPA 13, ~~1999~~ 2002 Edition, The Installation of ~~Automatic~~ Sprinkler Systems, as amended.*
6. *NFPA 13D, ~~1999~~ 2002 Edition, Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*
7. *NFPA 13R,~~1999~~ 2002 Edition, Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*
8. *NFPA 14, ~~2000~~ 2003 Edition, Installation of Standpipe~~, Private Hydrant,~~ and Hose Systems*
9. *NFPA 15, ~~1996~~ 2001 Edition, Water Spray Fixed Systems for Fire Protection*
10. *NFPA 16~~-1991~~, 1999 Edition, Installation of Deluge, Foam-Water Sprinkler and Foam-Water Spray Systems*
11. *NFPA 17, ~~1998~~ 2002 Edition, Dry Chemical Extinguishing Systems*
12. *NFPA 17A, ~~1998~~ 2002 Edition, Wet Chemical Extinguishing Systems*
13. *NFPA 20, 1999 Edition, Installation of Stationary Pumps for Fire Protection*
14. *NFPA 22, ~~1998~~ 2003 Edition, Water Tanks for Private Fire Protection*
15. *NFPA 24, ~~1995~~ 2002 Edition, Installation of Private Fire Service Mains and Their Appurtenances*
16. *NFPA 37, ~~1998~~ 2002 Edition, Installation and Use of Stationary Combustion Engines and Gas Turbines*

17. NFPA 50, ~~1996~~ 2001 Edition, Bulk Oxygen Systems at Consumer Sites

18. NFPA 52, 2002 Edition, Compressed Natural Gas (CNG) Vehicular Fuel Systems Code

19. NFPA 57, 2002 Edition, Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code

20. NFPA 54, ~~1996~~ 2002 Edition, National Fuel Gas Code

21. NFPA 58, ~~1998~~ 2001 Edition, Standard for the Storage and Handling of Liquefied Petroleum Gases

22. NFPA 72, 1999 Edition, National Fire Alarm Code, as amended. [The SFM does not adopt NFPA 72®, 1999 Edition, Chapter 8.]

22.1 NFPA 72® ,~~1999~~ 1996 Edition, National Fire Alarm, as amended, Chapter 8, Household Fire Warning Equipment

23. NFPA 92 A, 2000 Edition, Recommended Practice for Smoke-Control Systems

24. NFPA 99, ~~1999~~ 2002 Edition, Health Care Facilities, ~~Chapter 4, Gas and Vacuum Systems~~

~~23. NFPA 99 C, 1999 Edition, Gas and Vacuum Systems. 26. UL13, Power-limited Circuit Cables, Second Edition, 1996~~

25. NFPA 253, ~~1984~~, 2000 Edition, Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source

26. NFPA 2001, 2000 Edition, Clean Agent Fire Extinguishing Systems

27. UL 13, Power-limited Circuit Cables, Second Edition February 29, 1996

28. UL 38, Manually Actuated Signaling Boxes, Seventh Edition, March 26, 1999, with revisions through ~~April 28, 2000~~ June 12, 2001

29. UL 193, Alarm Valves for Fire-Protection Service, ~~Ninth~~ Tenth Edition, ~~March 24, 1993~~ January 12, 2004

30. UL 199, Automatic Sprinklers for Fire Protection Service, Edition

31. UL 199 E Fire Test of sprinklers and Water Spray Nozzles for the Protection of Deep Fat Fryers, May 2004.

32. UL 217, Single- and Multiple-Station Smoke Alarm, ~~as amended,~~ Fifth Edition, February 21, 1997with revisions through June 15, 2004

33. UL 228, Door Closers/Holders, with or without Integral Smoke ~~Alarms~~ Detectors, Fourth Edition, April 29, 1997, with revisions through January 21, 1999

34. UL 260, Dry Pipe and Deluge Valves for Fire Protection Service, ~~Sixth~~ Seventh Edition, ~~May 27, 1994,~~March 17, 2004 ~~with revisions through February 15, 1999~~

35. UL 262, Gate Valves for Fire Protection Service, ~~Seventh~~ Eighth Edition, ~~May 27, 1994, with revisions through January 28, 1998~~ February 26, 2004

36. UL 268, Smoke Detectors for Fire Protective Signaling Systems, ~~as amended,~~ Fourth Edition, December 30, 1996, with revisions through ~~January 4, 1999~~ October 22, 2003

37. UL 268A, Smoke Detectors for Duct Application, ~~as amended,~~ Third Edition, May 15, 1998 with revisions through April 10, 2003

38. UL 312, Check Valves for Fire-Protection Service, ~~Eighth~~ Ninth Edition, ~~June 2, 1993, with revisions through February 17, 1994~~ January 8, 2004

39. UL 346, Waterflow Indicators for Fire Protective Signaling Systems Fourth Edition, May 27, 1994

40. UL 464, Audible Signal Appliances, ~~Seventh~~ Eighth Edition, ~~February 23, 1996,~~ April 28, 2003, with revisions through ~~May 11, 1999~~ October 10, 2003

41. UL 497B, Protectors for Data Communication and Fire Alarm Circuits, ~~Second~~ Fourth Edition, ~~December 28, 1993, with revisions through October 20, 1994~~ June 14, 2004

42. UL 521, Heat Detectors for Fire Protective Signaling Systems, Seventh Edition, February 19, 1999 with revisions through October 3, 2002

43. UL 539, Single- and Multiple-Station Heat Detectors, ~~Fourth~~ Fifth ~~Edition, 1995~~ January 21, 2000

44. UL 632, Electrically Actuated Transmitters ~~Sixth~~ Seventh Edition, ~~1994~~ March 29, 2000

45. UL 753, Alarm Accessories for Automatic Water Supply Valves for Fire Protection Service, ~~Sixth~~ Ninth Edition, ~~1994~~ May 7, 2004

46. UL 813, Commercial Audio Equipment, Seventh Edition, December 13, 1996, with revisions through ~~March, 30, 1999~~ December 7, 1999

47. UL 864, Control Units for Fire Protective Signaling Systems, as amended, ~~Eighth~~ Ninth Edition, ~~November 27, 1996,~~September 30, 2003 with revisions through ~~March 30, 1999~~ October 29, 2003

48. UL 884, Underfloor Electric Raceways and Fittings, ~~Eighth~~ Tenth Edition, 1987 ~~Tenth Edition, 1998~~ November 30, 1998

49. UL 913, Intrinsically Safe Apparatus for Use in Class I, II, and III, Division 1, Hazardous Locations, ~~Fifth~~ Sixth Edition, ~~February 21, 1997, with revisions dated February 24, 1997~~ August 8, 2002

50. UL 916, Energy Management Equipment, Third Edition, December 23, 1998 with revisions through February 10, 2004

51. UL 924, Emergency Lighting and Power Equipment, Eighth Edition, March 29, 1995 with revisions through and including July 11, 2001

52. UL 985, Household Fire Warning System Units, ~~as amended,~~ Fifth Edition, May 26, 2000 with revisions through April29, 2004

53. UL 1091, Butterfly Valves for Fire Protection Service ~~Fifth~~ Sixth Edition, ~~1994~~ June 3, 2004

54. UL 1424, Cables for Power-limited Fire Protective Signaling Circuits, Second Edition, April 29, 1996

55. UL 1480, Speakers for Fire Protective Signaling Systems ~~Fourth~~ Fifth Edition, ~~July 28, 1998~~ January 31, 2003

56. UL 1481, Power Supplies for Fire Protective Signaling Systems, Fourth Edition, April 9, 1999

57. UL 1626 Residential Sprinklers for Fire Protection Service, 1.2 revised September 6, 2000

58. UL 1711, Amplifiers for Fire Protective Signaling Systems, ~~First~~ Third Edition, ~~January 5, 1987, with revisions October 12, 1992~~ February 18, 1999

59. UL 1730, Smoke Detector Monitors and Accessories (annunciators) for Individual Living Units of Multifamily Residences and Hotel/Motel Rooms Third Edition, September 18, 1998, with revisions through May 17, 1999

60. UL 1971, Signaling Devices for the Hearing Impaired ~~Second~~ Third Edition, ~~October 17, 1995~~, November 29, 2002, with revisions through May ~~24, 2000~~ 3, 2004

61. UL 1484, Residential Gas Detectors ~~Third~~ Fourth Edition, ~~November 30, 1994, with revisions dated December 1, 1994~~ December 28, 2000

62. UL 1994, Low Level Path Marking and Lighting Systems, ~~Sixth~~ Third Edition, ~~1994~~ January 30, 2004

63. UL 2034, Single and Multiple Station Carbon Monoxide Alarms, Second Edition, October 29, 1996, with revisions through ~~June 2, 1999~~ June 28, 2002

64. UL 2079, Tests for Fire Resistance of Building Joint Systems, Third Edition, July 31, 1998 as amended

65. FM Class No. 3260, ~~Flame Radiation~~ radiant Energy-Sensing Fire Detectors for Automatic Fire Alarm Signaling, ~~February 1994~~ August 2000 Edition.

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(END OF ITEM)

ITEM 8-25
SFM 05/04
Part 2, Volume 1, Chapter 35 **APPROVED**

SECTION 3505 – AMENDMENTS TO NATIONAL STANDARDS

3505.1 *[For SFM] NFPA 72, ~~1999~~ 2002 Edition*

~~Add a subsection 1-5.2.6 as follows:~~
~~Sec. 1-5.2.6. Secondary Supply Capacity and Sources.~~ *~~The secondary supply shall automatically supply the energy to the system within 30 seconds, and without loss of signals, wherever the primary supply is incapable of providing the minimum voltage required for proper operation. The secondary (standby) power supply shall supply energy to the system in the event of total failure of the primary (main) power supply or when the primary voltage drops to a level insufficient to maintain functionality of the control equipment and system components. Under maximum quiescent load (system functioning in a non-alarm condition), the secondary supply shall have sufficient capacity to operate a protected premises, central station, or proprietary system for 24 hours, or an auxiliary or remote station system for 60 hours; and, at the end of that period, shall be capable of operating all alarm notification appliances used for evacuation or to direct aid to the location of an emergency for 5 minutes. The secondary power supply for emergency voice/alarm communications service shall be capable of operating the system under maximum quiescent load for 24 hours and then shall be capable of operating the system during a fire or other emergency condition for a period of 2 hours. Fifteen minutes of evacuation alarm operation at maximum connected load shall be considered the equivalent of 2 hours of emergency operation. For a combination system, the secondary supply capacity required above shall include the load of any non-fire related equipment, functions or features. The secondary supply shall consist of one of the following:*
~~(a) A storage battery arranged in accordance with 1-5.2.9.~~
~~(b) An automatic starting, engine-driven generator arranged in accordance with 1-5.2.10 and storage batteries with 4 hours of capacity under maximum normal load followed by 5 minutes of alarm/emergency capacity arranged in accordance with 1-5.2.9.~~
~~(c) Multiple engine-driven generators, one of which is arranged for automatic starting, arranged in accordance with 1-5.2.10, and capable of supplying the energy required herein, with the largest generator out of service. The second generator shall be permitted to be started by pushbutton.~~
~~Operation on secondary power shall not affect the required performance of a fire alarm system. The system shall produce the same alarm, supervisory, and trouble signals and indications (excluding the ac power indicator) when operating from the standby power source as are produced when the unit is operating from the primary power source.~~

Amend Section ~~1.5.5.4~~ 4.4.4.4 as follows:
Sec. ~~1.5.5.4~~ 4.4.4.4 Wiring.
The installation of all wiring, cable and equipment shall be in accordance with the California Electrical Code, and specifically with Article 760, Article 770 and Article 800, where applicable. Optical Fiber Cables shall be protected against mechanical injury in accordance with Article 760.

~~Add a subsection 1-7.2.2 as follows:~~

~~(b) Record drawings; and~~
~~(c) Written operating instructions shall be provided at a location approved by the enforcing agency.~~

~~Add a section 1-5.4.7.1 as follows:~~
~~Sec. 1-5.4.7.1. Supplementary Audible Notification Appliances.~~ *~~Every public, private or parochial school building having an occupant load of fifty (50) or more students or more than one classroom shall sound the California uniform fire alarm signal as described in Education Code Sections 32002, 32003 and 32004.~~*

> ***~~EXCEPTION:~~*** *~~When a fire alarm system having a distinctive tone and which is used for no other purpose, is installed, the manner of sounding such alarm shall not be subject to the provisions of Education Code Sections 32002, 32003 and 32004.~~*

~~Add a Section 1-5.4.8 as follows:~~

~~Sec 1-5.4.8 Alarm Signal Deactivation~~~~. A means for turning off activated alarm notification appliances shall be permitted only where it is key-operated, located within a locked cabinet , or arranged to provide equivalent protection against unauthorized use. Such means shall be permitted only if a visible zone alarm indication or the equivalent has been provided as specified in 1-5.7.1, and subsequent actuation of initiating devices on other initiating device circuits or subsequent actuation of addressable initiating devices on signaling line circuits cause the notification appliances to reactivate. A means that is left in the "off" position when there is no alarm shall operate in an audible signal until the means is restored to normal.~~

> ***~~EXCEPTION~~***~~: If permitted by the authority having jurisdiction subsequent actuation of another addressable initiating device of the same type in the same type in the same room or space shall not be required to cause the notification appliance(s) to reactivate.~~

~~Amend existing section 1-5.7.1.2 as follows:~~

~~Sec. 1-5.7.1.2 Zone of Origin.~~ ~~Fire alarm systems serving two or more zones shall identify the zone of origin of the alarm initiation by annunciation or coded signal as required by the authority having jurisdiction.~~

~~Add a Section 1-6.2.2 as follows:~~

~~Sec. 1-6.2.2.~~ ~~Every system shall include the following documentation, whish shall be delivered to the owner or the owner's representative upon final acceptance of the system:~~

~~(1) *An owner's manual and installation instructions covering all system equipment.~~

~~(2) Record drawings~~

~~(3) The owner's manual and the record drawings shall be provided at a location approved by the authority having jurisdiction.~~

Add a Section ~~2-8.1~~ 5.12.4 as follows:

Sec. ~~2-8.1~~ 5.12.4 *Each manual fire alarm box shall be securely mounted. The operable part of each manual fire alarm box shall be not less than 3 ½ ft. (1.1m) and not more than 4ft. (1.22m) above the floor level.*

Add a Section ~~2-8.2.4~~ 5.12.8 as follows:

Sec ~~2-8.2.4~~ 5.12.8 *Additional manual fire alarm boxes shall be provided so that the travel distance to the nearest fire alarm box will not be in excess of 200ft. (61m) measured horizontally on the same floor.*

Amend Section ~~3-2.4~~ 6.4.2.2.2, Exception 4 ~~(b)~~ as follows:

Exception 4 ~~to (b~~): Where the installation wiring is enclosed in a 2-hour-rated cable assembly, enclosed in a 2-hour-rated enclosure, other than a stairwell or installation of listed circuit integrity (C.I.) cable, which meets or exceeds a 2-hour fire-resistance rating.

~~Add a Section 3-4.2.2.2 as follows:~~

~~Sec. 3-4.2.2.2*~~ ~~All styles of Class A circuits using physical conductors (for example, metallic, optical fiber) shall be installed such that the outgoing and return conductors, exiting from and returning to the control unit, respectively, are routed separately. The outgoing and return (redundant) circuit conductors shall not be run in the same cable assembly (that is, multiconductor cable), enclosure or raceway.~~

~~EXCEPTION:~~ ~~The outgoing and return (redundant) circuit conductors shall be permitted to be run in the same cable assembly, enclosure or raceway under any of the following conditions:~~

~~1. For a distance not to exceed 10 ft (3 m) where the outgoing and return conductors enter or exit the initiating device, notification appliance or control unit enclosures.~~

~~2. Where the vertically run conductors are contained in a 2-hour rated cable assembly or enclosed (installed) in a 2-hour rated enclosure or a listed circuit integrity (c.1.) cable, which meets or exceeds a 2-hour fire resistive rating.~~

~~3. Where looped conduit/raceway systems are provided, single conduit/raceway drops to individual devices or appliances shall be permitted.~~

~~4. Where looped conduit/raceway systems are provided, single conduit/raceway drops to multiple devices or appliances installed within a single room not exceeding 1000 ft2 (92.9 m2) in area shall be permitted.~~

Amend Section ~~3-8.2.3~~6.8.5.4 as follows:

(~~c~~ 5)Operation of the patient room smoke detector in Group I, Division 1.1, 1.2 and 2Occupancies shall not include any alarm verification feature

Add a Section ~~3-8.3.2.3.1 (b)~~6.8.5.4.1 (2) as follows:

Sec. ~~3-8.3.2.3.1 (b)~~ 6.8.5.4.1 (2) *A smoke detector continuously subjected to a smoke concentration above alarm threshold magnitude initiates a system alarm within 30 seconds*

~~Add a Section 3-8.4.1.3.3.3 (3) c and amend as follows:~~

~~Sec. 3-8.4.1.3.3.3 (3) c.~~ *~~Installation of listed circuit integrity (C.I.) cable, which meets or exceeds a two-hour fire-resistance rating.~~*

Amend Section ~~4-3.2.1~~ 7.4.2.1 and ~~4-3.3.1~~ 7.4.3.2 as follows:

Amend Section ~~4-4.5~~ 7.5.1.1 as follows:

1.Sec. ~~4-3.2.1~~ 7.5.1.1. *Audible notification appliances intended for operation in the public mode shall have a sound level of not less than 75dBA at 10 feet (3048mm) or more than 110dBA at the minimum hearing distance from the audible appliance.*

Amend Section ~~3-8.4.1.3.5.5.1~~ 6.9.6.1 as follows:

Sec. ~~4-3.3.1~~ 7.4.3.2. *Private Mode Audible signals intended for operation in the private mode shall have a sound level of not less than45dBA at 10 feet (3048mm) or more than 110dBA at the minimum hearing distance from the audible appliance.*

~~Add Section 3505.1.1 [For SFM] NFPA 72, 1996 Edition, Chapter 2, as amended.~~

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~~Chapter 2 Household Fire Warning Equipment~~

~~2-1 Introduction.~~

~~2-1.1* Scope.~~

~~This chapter contains minimum requirements for the selection, installation, operation, and maintenance of fire warning equipment for use within family living units. The requirements of the other chapters shall not apply.~~

~~Exception: Where specifically indicated.~~

~~2-1.2 Purpose.~~

~~2-1.2.1~~ *~~Household fire warning systems shall be designed and installed to provide sufficient warning of a fire to enable occupants to escape. It is recognized that household fire warning systems might not be of material assistance to all occupants, such as persons intimate with the ignition of a fire.~~*

~~2-1.2.2~~ *~~This chapter is primarily concerned with life safety, not with protection of property. It presumes that a family has an exit plan.~~*

~~2-1.3 General.~~

~~2-1.3.1~~ *~~A control and associated equipment, a multiple or single station alarm(s), or any combination thereof shall be permitted to be used as a household fire warning system, provided the requirements of 2-1.3.7 are met.~~*

~~2-1.3.2~~ *~~Detection and alarm systems for use within the protected household are covered by this chapter.~~*

~~2-1.3.3~~ *~~Supplementary functions, including the extension of an alarm beyond the household, shall be permitted and shall not interfere with the performance requirements of this chapter.~~*

~~2-1.3.4~~ *~~Where the authority having jurisdiction requires a household fire warning system to comply with the requirements of Chapter 4 or any other chapters of this code, the requirements of Section 2-2 shall still apply.~~*

~~2-1.3.5~~ *~~The definitions of Section 1-4 shall apply.~~*

~~2-1.3.6~~ *~~This chapter does not exclude the use of fire alarm systems complying with other chapters of this code in household applications, provided all of the requirements of this chapter are met or exceeded.~~*

~~2-1.3.7~~ *~~All devices, combinations of devices, and equipment to be installed in conformity with this chapter shall be approved or listed for the purposes for which they are intended.~~*

~~2-1.3.8~~ *~~A device or system of devices having materials or forms that differ from those detailed in this chapter shall be permitted to be examined and tested according to the intent of the chapter and, if found equivalent, shall be permitted to be approved.~~*

~~**2-1.3.9** Equivalency. Nothing in this code is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this code, provided technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency and the system, method, or device is approved for the intended purpose.~~

~~**2-2 Basic Requirements.**~~

~~**2-2.1 Required Protection.**~~

~~**2-2.1.1*** This code requires the following detectors within the family living unit.~~

~~**2-2.1.1.1** Smoke alarms shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms and on each additional story of the family living unit, including basements and excluding crawl spaces and unfinished attics. In new construction, a smoke alarm also shall be installed in each sleeping room.~~

~~**2-2.1.1.2*** For family living units with one or more split levels (i.e., adjacent levels with less than one full story separation between levels), a smoke alarm required by 2-2.1.1.1 shall be permitted for an adjacent lower level, including basements. (See Figure A-2-2.1.1.2.)~~

~~Exception: Where there is an intervening door between one level and the adjacent lower level, a smoke alarm shall be installed on the lower level.~~

~~**2-2.1.1.3** Automatic sprinkler systems provided in accordance with NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, or NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, shall be interconnected to sound alarm notification appliances throughout the dwelling where a fire warning system is provided.~~

~~**2-2.2* Alarm Notification Appliances.**~~

~~Each automatic alarm-initiating device shall cause the operation of an alarm that shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. The tests of audibility level shall be conducted with all household equipment that might be in operation at night in full operation.~~

~~Examples of such equipment are window air conditioners and room humidifiers. (See A-2-2.2 for additional information.)~~

~~**2-2.2.1** In new construction, where more than one smoke alarm is required by 2-2.1, smoke alarm shall be arranged so that operation of any smoke alarm causes the alarm in all smoke alarms within the dwelling to sound.~~

~~Exception: Configurations that provide equivalent distribution of the alarm signal.~~

~~**2-2.2.2* Standard Signal.** Newly installed alarm notification appliances used with a household fire warning system and single and multiple station smoke alarms shall produce the audible emergency evacuation signal described in ANSI S3.41, Audible Emergency Evacuation Signal. Signals from different notification appliances shall not be required to be synchronized.~~

~~**2-2.3 Alarm Notification Appliances for the Hearing Impaired.**~~

~~In a household occupied by one or more hearing impaired persons, each initiating device shall cause the operation of a visible alarm signal(s) in accordance with 2-4.4.2. Since hearing deficits are often not apparent, the responsibility for advising the appropriate persons shall be that of the hearing impaired party. The responsibility for compliance shall be that of the occupants of the family living unit.~~

~~Exception: A listed tactile signal shall be permitted to be employed.~~

~~**2-3 Power Supplies.**~~

~~**2-3.1 General.**~~

~~**2-3.1.1** All power supplies shall have sufficient capacity to operate the alarm signal(s) for at least 4 continuous minutes.~~

~~**2-3.1.2** There shall be a primary (main) and a secondary (standby) power source. For electrically powered household fire warning equipment, the primary (main) power source shall be ac; the secondary (standby) power source shall be a battery.~~

~~Exception No. 1: Where the primary (main) power source is an emergency circuit or a legally required standby circuit capable of operating the system for at least 24 hours in the normal condition, followed by not less than 4 minutes of alarm, a secondary (standby) source shall not be required.~~

~~Exception No. 2: Where the primary (main) power source is a circuit of an optional standby system capable of operating the system for at least 24 hours, followed by not less than 4 minutes of alarm, that meets the requirements for either an emergency system or a legally required standby system as defined in NFPA 70, National Electrical Code, Articles 700 and 701, respectively, a secondary (standby) supply shall not be required.~~

~~Exception No. 3: Detectors and alarms powered from a monitored dc circuit of a control unit where power for the control unit meets the requirements of Section 2-3 and the circuit remains operable upon loss of primary (main) ac power.~~

~~*Exception No. 4: A detector and a wireless transmitter that serves only that detector shall be permitted to be powered from a monitored battery primary (main) source where part of a listed, monitored low power radio (wireless) system. A secondary (standby) source shall not be required.*~~

~~*Exception No. 5: In existing construction, either an ac primary power source, as described in 2-3.2, or a monitored battery primary (main) power source, as described in 2-3.3, shall be permitted. A secondary (standby) source shall not be required.*~~

~~*Exception No. 6: Visible notification appliances required by 2-4.4.2.*~~

~~*Exception No. 7: Where the primary (main) power source is non-electrical, a secondary (standby) source shall not be required. The requirements of 2-3.5 shall apply.*~~

~~***2-3.2 Primary Power Supply — AC.***~~

~~***2-3.2.1*** *An ac primary (main) power source shall be a dependable commercial light and power supply source. A visible "power on" indicator shall be provided.*~~

~~***2-3.2.2*** *All electrical systems designed to be installed by other than a qualified electrician shall be powered from a source not in excess of 30 volts that meets the requirements for power limited fire alarm circuits as defined in NFPA 70, National Electrical Code, Article 760.*~~

~~***2-3.2.3*** *A restraining means shall be used at the plug-in of any cord-connected installation.*~~

~~***2-3.2.4*** *AC primary (main) power shall be supplied either from a dedicated branch circuit or the unswitched portion of a branch circuit also used for power and lighting. Operation of a switch (other than a circuit breaker) or a ground-fault circuit-interrupter shall not cause loss of primary (main) power.*~~

~~*Exception No. 1: Single or multiple station alarms with a supervised rechargeable standby battery that provides at least 4 months of operation with a fully charged battery.*~~

~~*Exception No. 2: Where a ground-fault circuit-interrupter serves all electrical circuits within the household.*~~

~~***2-3.2.5*** *Neither loss nor restoration of primary (main) power shall cause an alarm signal.*~~

~~*Exception: An alarm signal shall be permitted within the household but shall not exceed 2 seconds.*~~

~~***2-3.2.6*** *Where a secondary (standby) battery is provided, the primary (main) power supply shall be of sufficient capacity to operate the system under all conditions of loading with any secondary (standby) battery disconnected or fully discharged.*~~

~~***2-3.3 Primary Power Supply — Monitored Battery.***~~

~~*Household fire warning equipment shall be permitted to be powered by a battery, provided that the battery is monitored to ensure that the following conditions are met:*~~

~~*(a) All power requirements are met for at least 1 year of battery life, including monthly testing.*~~

~~*(b) A distinctive audible trouble signal sounds before the battery is incapable of operating (from causes such as aging or terminal corrosion) the device(s) for alarm purposes.*~~

~~*(c) For a unit employing a lock-in alarm feature, automatic transfer is provided from alarm to a trouble condition.*~~

~~*(d) The unit is capable of producing an alarm signal for at least 4 minutes at the battery voltage at which a trouble signal is normally obtained, followed by not less than 7 days of trouble signal operation.*~~

~~*(e) The audible trouble signal is produced at least once every minute for 7 consecutive days.*~~

~~*(f) Acceptable replacement batteries are clearly identified by the manufacturer's name and model number on the unit near the battery compartment.*~~

~~*(g) A readily noticeable, visible indication is displayed when a primary battery is removed from the unit.*~~

~~*(h) Any unit that uses a nonrechargeable battery as a primary power supply that is capable of a 10-year or greater service life, including testing, and meets the requirements of 2-3.3(b) through (e) shall not be required to have a replaceable battery.*~~

~~***2-3.4 Secondary (Standby) Power Supply.***~~

~~***2-3.4.1*** *Removal or disconnection of a battery used as a secondary (standby) power source shall cause a distinctive audible or visible trouble signal.*~~

~~***2-3.4.2*** *Acceptable replacement batteries shall be clearly identified by manufacturer's name and model number on the unit near the battery compartment.*~~

~~***2-3.4.3*** *Where required by law for disposal reasons, rechargeable batteries shall be removable.*~~

~~***2-3.4.4 Automatic Recharging.***~~

~~***2-3.4.4.1*** *Automatic recharging shall be provided where a rechargeable battery is used as the secondary (standby) supply. The supply shall be capable of operating the system for at least 24 hours in the normal condition, followed by*~~

~~not less than 4 minutes of alarm. Loss of the secondary (standby) source shall sound an audible trouble signal at least once every minute.~~

~~**2-3.4.4.2** The battery shall be recharged within 4 hours where power is provided from a circuit that can be switched on or off by means other than a circuit breaker, or within 48 hours where power is provided from a circuit that cannot be switched on or off by means other than a circuit breaker.~~

~~**2-3.4.5** Where automatic recharging is not provided, the battery shall be monitored to ensure that the following conditions are met:~~

~~(a) All power requirements are met for at least 1 year of battery life.~~

~~(b) A distinctive audible trouble signal sounds before the battery capacity has been depleted below the level required to produce an alarm signal for 4 minutes.~~

~~**2-3.5 Primary Power — Non-electrical.**~~

~~A suitable spring-wound mechanism shall provide power for the non-electrical portion of a listed single station alarm. A visible indication shall be provided to show that sufficient operating power is not available.~~

~~**2-4 Equipment Performance.**~~

~~**2-4.1 General.**~~

~~The failure of any nonreliable or short-life component that renders the detector inoperable shall be readily apparent to the occupant of the living unit without the need for test.~~

~~**2-4.2 Smoke Alarms and Smoke Detectors.**~~

~~Each smoke alarm and smoke detector shall detect abnormal quantities of smoke that can occur in a dwelling, shall properly operate in the normal environmental conditions of a household, and shall be in compliance with ANS/UL 268, Standard for Safety Smoke Detectors for Fire Protective Signaling Systems, or ANS/UL 217, Standard for Safety Single and Multiple Station Smoke . Alarms.~~

~~**Sec. 2-4.2.1** The alarm verification feature shall not be used for household fire warning equipment. {This text is continued from CBC, Chapter 35}~~

~~**2-4.3* Heat Alarms and Heat Detectors**.~~

~~**2-4.3.1** Each heat detector, including a heat detector integrally mounted on a smoke detector, shall detect abnormally high temperature or rate-of-temperature rise, and all such detectors shall be listed for not less than 50 ft (15 m) spacing.~~

~~**2-4.3.2** Fixed temperature detectors shall have a temperature rating at least 25ºF (14ºC) above the normal ambient temperature and shall not be rated 50ºF (28ºC) higher than the maximum anticipated ambient temperature in the room or space where installed.~~

~~**2-4.4 Alarm Signaling Intensity.**~~

~~**2-4.4.1** All alarm sounding appliances shall have a minimum rating of 85 dBA at 10 ft (3 m).~~

~~Exception: An additional sounding appliance intended for use in the same room as the user, such as a bedroom, may have a sound pressure level as low as 75 dBA at 10 ft (3 m).~~

~~**2-4.4.2** Visible notification appliances used in rooms where a hearing impaired person(s) sleeps shall have a minimum rating of 177 candela for a maximum room size of 14 ft — 16 ft (4.27 m — 4.88 m). For larger rooms, the visible notification appliance shall be located within 16 ft (4.88 m) of the pillow. Visible notification appliances in other areas shall have a minimum rating of 15 candela.~~

~~Exception: Where a visible notification appliance in a sleeping room is mounted more than 24 in. (610 mm) below the ceiling, a minimum rating of 110 candela shall be permitted.~~

~~**2-4.5 Control Equipment.**~~

~~**2-4.5.1** The control equipment shall be automatically restoring upon restoration of electrical power.~~

~~**2-4.5.2** The control equipment shall be of a type that "locks in" on an alarm condition. Smoke detection circuits shall not be required to lock in.~~

~~**2-4.5.3** If a reset switch is provided, it shall be of a self-restoring type.~~

~~**2-4.5.4** An alarm silencing switch or an audible trouble-silencing switch shall not be required to be provided.~~

~~Exception: Where the switch's silenced position is indicated by a readily apparent signal.~~

~~**2-4.5.5** Each electrical fire warning system and each single station smoke detector shall have an integral test means to allow the householder to check the system and the sensitivity of the detector(s).~~

~~**2-4.6 Monitoring Integrity of Installation Conductors.**~~

~~All means of interconnecting initiating devices or notification appliances shall be monitored for the integrity of the~~

~~*interconnecting pathways up to the connections to the device or appliance so that the occurrence of a single open or single ground fault, which prevents normal operation of the system, is indicated by a distinctive trouble signal.*~~

~~*Exception No. 1: Conductors connecting multiple station alarms, provided a single fault on the wiring cannot prevent single station operation of any of the interconnected detectors.*~~

~~*Exception No. 2: Circuits extending from single or multiple station alarms to required remote notification appliances, provided operation of the test feature on any detector causes all connected appliances to activate.*~~

~~***2-4.7 Combination System.***~~

~~***2-4.7.1*** *Where common wiring is employed for a combination system, the equipment for other than the fire warning signaling system shall be connected to the common wiring of the system so that short circuits, open circuits, grounds, or any fault in this equipment or interconnection between this equipment and the fire warning system wiring does not interfere with the supervision of the fire warning system or prevent alarm or trouble signal operation.*~~

~~***2-4.7.2*** *In a fire-burglar system, the operation shall be as follows:*~~

~~*(a) A fire alarm signal shall take precedence or be clearly recognizable over any other signal even when the non-fire alarm signal is initiated first.*~~

~~*(b) Distinctive alarm signals shall be used so that fire alarms can be distinguished from other functions such as burglar alarms. The use of a common sounding appliance for fire and burglar alarms shall be permitted where distinctive signals are used. (See 2-2.2.2.)*~~

~~***2-4.8 Low Power Wireless Systems.***~~

~~*Household fire warning systems utilizing low power wireless transmission of signals within the protected household shall comply with the requirements of Section 3-13.*~~

~~*Exception: Paragraph 3-13.4.5 shall not apply.*~~

~~***2-4.9 Supervising Station Systems.***~~

~~***2-4.9.1*** *Any communications method described in Section 4-5 shall be permitted for transmission of signals from household fire warning equipment to a supervising station. All of the provisions of Section 4-5 shall apply, as appropriate.*~~

~~*Exception No. 1: Only one telephone line shall be required for one- and two-family residences.*~~

~~*Exception No. 2: Each DACT shall be required to be programmed to call a single DACR number only.*~~

~~*Exception No. 3: Each DACT serving a one- or two-family residence shall transmit a test signal to its associated receiver at least monthly.*~~

~~***2-4.9.2**** *On receipt of an alarm signal from household fire warning equipment, the supervising station shall immediately (within 90 seconds) retransmit the alarm to the public fire communications center.*~~

~~*Exception: The supervising station shall be permitted to contact the residence for verification of an alarm condition and, where acceptable assurance is provided within 90 seconds that the fire service is not needed, retransmission of an alarm to the public service fire communications center shall not be required.*~~

~~***2-5 Installation.***~~

~~***2-5.1 General.***~~

~~***2-5.1.1 General Provisions.***~~

~~***2-5.1.1.1**** *All equipment shall be installed in a workmanlike manner.*~~

~~***2-5.1.1.2*** *All devices shall be so located and mounted that accidental operation is not caused by jarring or vibration.*~~

~~***2-5.1.1.3*** *All installed household fire warning equipment shall be mounted so as to be supported independently of its attachment to wires.*~~

~~***2-5.1.1.4*** *All equipment shall be restored to normal as promptly as possible after each alarm or test.*~~

~~***2-5.1.1.5*** *The supplier or installing contractor shall provide the owner with:*~~

~~*(a) An instruction booklet illustrating typical installation layouts.*~~

~~*(b) Instruction charts describing the operation, method and frequency of testing, and proper maintenance of household fire warning equipment.*~~

~~*(c) Printed information for establishing a household emergency evacuation plan.*~~

~~*(d) Printed information to inform owners where they can obtain repair or replacement service, and where and how parts requiring regular replacement (such as batteries or bulbs) can be obtained within 2 weeks.*~~

~~***2-5.1.2 Interconnection of Detectors or Multiple Station Alarms.***~~

~~*(a) Where the interconnected wiring is unsupervised, no more than 18 multiple station alarms shall be interconnected*~~

~~*in a multiple station configuration.*~~

~~*(b) Where the interconnecting wiring is supervised, the number of interconnected detectors shall be limited to 64.*~~

~~***2-5.1.2.1*** *Interconnection that causes other alarms to sound shall be limited to an individual family living unit. Remote annunciation from single or multiple station alarms shall be permitted.*~~

~~***2-5.1.2.2*** *No more than 12 smoke alarms shall be interconnected in a multiple station connection. The remainder of the alarms shall be permitted to be of other types.*~~

~~***2-5.2* Alarm and Detector Location and Spacing.***~~

~~***2-5.2.1 Smoke Alarms and Smoke Detectors.***~~

~~***2-5.2.1.1*** *Smoke alarms and smoke detectors in rooms with ceiling slopes greater than 1 ft in 8 ft (1 m in 8 m) horizontally shall be located at the high side of the room.*~~

~~***2-5.2.1.2-A*** *Smoke alarms and smoke detector installed in a stairwell shall be so located as to ensure that smoke rising in the stairwell cannot be prevented from reaching the detector by an intervening door or obstruction.*~~

~~***2-5.2.1.3-A*** *Smoke alarms and smoke detector installed to detect a fire in the basement shall be located in close proximity to the stairway leading to the floor above.*~~

~~***2-5.2.1.4*** *The Smoke alarms and smoke detector installed to comply with 2-2.1.1.1 on a story without a separate sleeping area shall be located in close proximity to the stairway leading to the floor above.*~~

~~***2-5.2.1.5*** *Smoke alarms and smoke detectors shall be mounted on the ceiling at least 4 in. (102 mm) from a wall or on a wall with the top of the detector not less than 4 in. (102 mm) nor more than 12 in. (305 mm) below the ceiling.*~~

~~*Exception: Where the mounting surface might become considerably warmer or cooler than the room, such as a poorly insulated ceiling below an unfinished attic or an exterior wall, the detectors shall be mounted on an inside wall.*~~

~~***2-5.2.1.6*** *Smoke alarms and smoke detectors shall not be located within kitchens or garages, or in other spaces where temperatures can fall below 40ºF (4ºC) or exceed 100ºF (38ºC). Smoke detectors shall not be located closer than 3 ft (0.9 m) horizontally from:*~~

~~*(a) The door to a kitchen.*~~

~~*(b) The door to a bathroom containing a tub or shower.*~~

~~*(c) The supply registers of a forced air heating or cooling system, and outside of the airflow from those registers.*~~

~~*Exception: Detectors specifically listed for the application.*~~

~~***2-5.2.2* Heat Detectors Heat Alarms.***~~

~~***2-5.2.2.1*** *On smooth ceilings, heat detectors shall be installed within the strict limitations of their listed spacing.*~~

~~***2-5.2.2.2*** *For sloped ceilings having a rise greater than 1 ft in 8 ft (1 m in 8 m) horizontally, the detector shall be located on or near the ceiling at or within 3 ft (0.9 m) of the peak. The spacing of additional detectors, if any, shall be based on a horizontal distance measurement, not on a measurement along the slope of the ceiling.*~~

~~***2-5.2.2.3*** *Heat detectors and heat alarms shall be mounted on the ceiling at least 4 in. (102 mm) from a wall or on a wall with the top of the detector not less than 4 in. (102 mm) nor more than 12 in. (305 mm) below the ceiling.*~~

~~*Exception: Where the mounting surface might become considerably warmer or cooler than the room, such as a poorly insulated ceiling below an unfinished attic or an exterior wall, the detectors shall be mounted on an inside wall.*~~

~~***2-5.2.2.4*** *In rooms with open joists or beams, all ceiling-mounted detectors shall be located on the bottom of such joists or beams.*~~

~~***2-5.2.2.5*** *Detectors installed on an open joisted ceiling shall have their smooth ceiling spacing reduced where this spacing is measured at right angles to solid joists; in the case of heat detectors, this spacing shall not exceed 1/2 of the listed spacing.*~~

~~***2-5.3 Wiring and Equipment.***~~

~~*The installation of wiring and equipment shall be in accordance with the requirements of NFPA 70, National Electrical Code, Article 760.*~~

~~***2-6 Maintenance and Tests.***~~

~~***2-6.1* Maintenance.***~~

~~*Where batteries are used as a source of energy, they shall be replaced in accordance with the recommendations of the alarm equipment manufacturer.*~~

~~*Exception: Batteries described in 2-3.3(h).*~~

~~***2-6.2* Tests.***~~

~~***2-6.2.1 Single and Multiple Station Smoke Alarms.*** *Homeowners shall inspect and test smoke alarms and all connected appliances in accordance with the manufacturer's instructions at least monthly.*~~

~~***2-6.2.2 Fire Alarm Systems****. Homeowners shall test systems in accordance with the manufacturer's instructions and shall have every household fire alarm system having a control panel tested by a qualified service technician at least every 3 years. This test shall be conducted according to the methods of Chapter 7.*~~

~~***2-7 Markings and Instructions.***~~

~~*All household fire warning equipment or systems shall be plainly marked with the following information on the unit:*~~

~~*(a) Manufacturer's or listee's name, address, and model number;*~~

~~*(b) A mark or certification that the unit has been approved or listed by a testing laboratory;*~~

~~*(c) Electrical rating (where applicable);*~~

~~*(d) Temperature rating (where applicable);*~~

~~*(e) Spacing rating (where applicable);*~~

~~*(f) Operating instructions;*~~

~~*(g) Test instructions;*~~

~~*(h) Maintenance instructions;*~~

~~*(i) Replacement and service instructions.*~~
~~*Exception: Where space limitations prohibit inclusion of 2-7(g), (h), and (i), a label or plaque suitable for permanent attachment within the living unit, or a manufacturer's manual, shall be provided with the equipment and referenced on the equipment. In the case of a household fire warning system, the required information shall be prominently displayed at the control panel.*~~

~~**Existing SFM Amendment, Section 3-12.6.5.1 of NFPA 72, 1996 to be renumbered as Section 3-8.4.1.3.5.5.1**~~
~~***Add to Section 3-8.4.1.3.5.5.1 as follows:***~~

~~***3.8.4.1.3.5.5.1.*** *Special fire alarm provisions for occupancies having floors used for human occupancy located more than 75 feet (22860mm) above the lowest levelof the fire department vehicle access, are found in Title 24, Part 2, Chapter 4, of the California Building Code. Those provisions include providing a central control station. The requirements provided for, in a fire command center, may be included within the central control station.*~~

~~***3505.3 [For SFM] UL 217, 1997 Edition***~~

~~*Add a Chapter 6A.1 as follows:*~~
~~*Sec. 6A.1. Each single-and multiple-station smoke alarm may be provided with an automatically resettable alarm silencing means that has a fixed or variable time setting and that silences the smoke alarm for a maximum of 15 minutes. Alarm silencing shall not disable the smoke alarm. It may reduce the sensitivity to no more than 4 percent obscuration (0.0177 O.D. per foot). Each device shall operate a distinctive audible trouble signal while in the silence mode. This may be done with a short beep similar to the low battery signal or by visible indication. Following the silenced period, the smoke alarm shall restore automatically to its intended operation. Silencing of one smoke alarm of a multiple-station system shall not prevent an alarm operation from the other smoke alarm in the system. See paragraphs 33.10 and 33.11*~~

~~***3505.4 [For SFM] UL 268, 1996 Edition.***~~

~~***F.*** *A circuit for supplementary signal annunciator, signal sounding appliance, motor controller, or similar appliance, provided that a break, short or ground fault in no way affects the operation of the detector other than to cause the omission of the supplementary feature.*~~

~~***3505.5 [For SFM] UL 268A, 1998 Edition.***~~

~~***Amend section 27.1, exception F, as follows:***~~

~~***F.*** *A circuit for supplementary signal annunciator, signal sounding appliance, motor controller, or similar appliance, provided that a break, short or ground fault in no way affects the operation of the air duct smoke detector, except for omission of the supplementary feature.*~~

3505.~~6~~ 2 [For SFM] UL 864, ~~1996~~ 2003 Edition amend as follows:

Amend Figure No. ~~3-1~~ 55.1 on page ~~7~~ 129 as follows:

RETARD-RESET-RESTART PERIOD – MAXIMUM 30 SECONDS - *No alarm obtained from control unit. Maximum permissible time is ~~60~~ 30 seconds.*

Amend Section ~~6.2~~ 55.2.2 on page 128 as follows:

~~If~~ Where an alarm verification feature is provided, the maximum retard-reset-restart period before an alarm signal can be confirmed and indicated at the control unit, including any control unit reset time and the power-up time for the detector to become operational for alarm, shall not exceed 30 seconds. ***(The balance ~~to~~ the section text is to remain unchanged).***

~~Delete exception to Section 6.5.~~

Add a Section ~~6.7~~ 55.2.9 as follows:

Smoke detectors connected to an alarm verification feature shall not be used as releasing devices.

Exception: *Smoke detectors which operate their releasing function immediately upon alarm actuation independent of alarm verification feature.*

~~Amend Section 21.22 as follows:~~

~~The maximum retard-reset-restart period of alarm verification to a system control unit, including any time delay due to system reset and power-up time of the smoke detector to become operational for alarm, shall not exceed 30 seconds.~~ ***(The balance ~~to~~ the section text is to remain unchanged).***

Amend Section ~~49.1.14~~ 89.1.10 as follows:

The existing text of this section is to remain as printed with one editorial amendment as follows:

THE TOTAL DELAY (CONTROL UNIT PLUS SMOKE DETECTORS) SHALL NOT EXCEED 30 SECONDS. ***(The balance ~~to~~ the section text is to remain unchanged).***

~~3505.7 Reserved.~~

~~3505.8 Reserved.~~

~~3505.9 Reserved.~~

3505.~~10~~ 3 [For SFM] NFPA 13, ~~1999~~ 2002 Edition

~~i. 6-4.5.8~~

9.3.5.8.3
Add a sentence after the section numbers before the first sentence as follows:
Where pipe is used for sway bracing, it shall have a wall thick-ness of not less than Schedule 40.

~~Also:~~
~~Table 6-4.5.8 delete all references to Schedule 10~~.

~~Add a Section 6-4.5.8 as follows:~~

~~Sec. 6-4.5.8 Sway bracing shall be tight. For individual braces, the slenderness ratio (l/r) shall not exceed 300 where l is the length of the brace and r is the least radius of gyration. Where threaded pipe is used as part of a sway brace assembly, it shall not be less than Schedule 30. All parts and fittings of a brace shall lie in a straight line to avoid eccentric loadings on fittings and fasteners. For longitudinal braces only, the brace shall be permitted to be connected to a tab welded to the pipe in conformance with 3-6.2. For individual braces, the slenderness ratio, l/r, shall not exceed 300 where l is the length of the brace and r is the least radius of gyration. For tension-only braces, two tension-only brace components opposing each other must be installed at each lateral or longitudinal brace location. For all braces, whether or not listed, the maximum allowable horizontal load shall be based on the weakest~~*

~~*component of the brace with safety factors. The loads determined in 6-4.5.6 shall not exceed the lesser of the maximum allowable loads provided in Table 6-4.5.8 or the manufacturer's certified maximum allowable horizontal loads for 30- to 44-degree, 45- to 59-degree, 60- to 89-degree, and 90-degree brace angles. These certified allowable horizontal loads must include a minimum safety factor of 1.5 against the ultimate break strength of the brace components and then be further reduced according to the brace angles.*~~

~~*EXCEPTION: Materials other than pipe, not specifically included in Table 6-4.5.8 shall be permitted to be used if certified by a registered professional engineer to support the loads determined in accordance with the above criteria. Calculations shall be submitted where required by the authority having jurisdiction.*~~

Amend Section 9.3.5.8.11 to read:

Section 9.3.5.8.11 ~~Other pipe schedules and~~ ~~m~~ Materials *other than pipe* not specifically included in Table 9.3.5.8.9(a), 9.3.5.8.9(b) and 9.3.5.8.9(c) shall be permitted to be used if certified by a registered professional engineer to support the loads determined in accordance with the above criteria. Calculations shall be submitted where required by the authority having jurisdiction

~~6-4.7.3 & 6-4.7.4~~
~~Revise as follows:~~
~~Lag screws or power-driven fasteners shall not be used to attach braces to the building structure.~~

Section 9.3.5.9.4 is not adopted by the SFM - lag screws are not permitted.

~~***Add Sections 6-4.7.3 and 6-4.7.4 as follows:***~~

~~*Sec. 6-4.7.3 Powder-driven fasteners shall not be used to attach braces to the building structure.*~~
~~*EXCEPTION: Powder-driven fasteners shall be permitted where they are specifically listed for service in resisting lateral loads in areas subject to earthquakes.*~~
~~*Sec. 6-4.7.4 Powder-driven fasteners shall not be used to attach hangers to the building structure where the systems are required to be protected against earthquakes using a horizontal force factor exceeding 0.50 Wpr where Wp is the weight of the water-filled pipe.*~~
~~*Also, delete the Exception.*~~

~~*Also, delete the portion of Table 6-4.5.9 related to lag screws.*~~

~~*Delete the portion of Table 9.3.5.9.1 related to lag screws*~~

~~*iii. A-4- 6.4.3.5.1*~~
~~*The following forms (see attached ASSIGNED LOAD TABLE*~~

~~METHOD FORM) are provided to assist in the design, plan review, installation, and inspection of seismic braces. This form is not required to be used for every brace. A worst case brace calculation is considered acceptable.~~

NOTE: *The specific statutes authorizing the SFM to propose this amendment to Chapter 35 as shown above is as follows:*

- *Health and Safety Code sections 13143 and 18949.2(b), (c)*

*** * ***

(END OF ITEM)

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