

**INITIAL STATEMENT OF REASONS
OF THE
OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT**

**REGARDING PROPOSED CHANGES TO THE
CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE
AND
CALIFORNIA BUILDING CODE
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PARTS 1 & 2**

The Administrative Procedure Act (APA) requires that an Initial Statement of Reasons be available to the public upon request when rulemaking action is being undertaken. The following information required by the APA pertains to this particular rulemaking action:

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE: The Office of Statewide Health Planning and Development (OSHPD) is proposing to:

- Amend 2007 CBC by adopting the American Society of Civil Engineers' (ASCE) ASCE 41-06, *Seismic Rehabilitation of Existing Buildings* as a referenced standard.
- Amend Title 24, Part 1, 2007 California Building Standard Administrative Code (CAC) Chapters 6 & 7 to facilitate compliance with seismic safety requirements and making them consistent with Title 24, Part 2, 2007 California Building Code (CBC).
- Update 2007 CAC earthquake repair provisions in Chapter 7, Article 20 for consistency with the 2007 CBC.
- Amend 2007 CBC by repealing the Federal Emergency Management Agency's (FEMA) FEMA 356, *Prestandard and Commentary for the Seismic Rehabilitation of Buildings* as a reference standard.
- Relocate existing & necessary amendments of FEMA 356 into the ASCE 41-06.
- Amend 2007 CBC by adopting the Post-Tensioning Institute (PTI) PTI-2004, *Recommendations for Prestressed Rock and Soil Anchors (4th Edition)* for design of seismic tie-down anchors.
- Amend 2007 CBC to require Steel Eccentric Brace Frame (EBF) and Special Concentric Braced Frame (SCBF) based on Hollow Structural Sections (HSS) advisory issued by the American Institute of Steel Construction (AISC).

ASCE 41-06 is a consensus national standard for seismic rehabilitation of existing buildings. This standard will be adopted as a reference standard in the 2007 CBC and will replace FEMA 356, a prestandard that served as a starting point for the development of the ASCE 41-06. ASCE 41-06 is a valuable tool for structural engineers and the public for improving seismic performance of existing buildings. The completion of the new standard represents a considerable advancement for the engineering community. ASCE 41-06 will require less seismic base shear or target displacements, compared to FEMA 356, in some areas of California. Also, non-structural component design provision will be relaxed similar to changes from the 2001 CBC to 2007 CBC. Since both ASCE 7-05 and ASCE 41-06 non-structural provisions are based on 2003 NEHRP Provisions (FEMA 450, Parts 1 & 2), there will be uniformity in requirements for new and existing buildings. This adoption will substantially reduce the number of project specific design criteria, prepared by engineers and approved by OSHPD, for seismic evaluation and retrofit of hospital buildings.

FEMA 356 was adopted by OSHPD in the 2007 CBC during the California Building Standards Commission's 2006 Triennial Code Adoption Cycle because ASCE 41-06 was not yet published and therefore, not available for public review / comment. A draft copy of the ASCE 41-06, however, was made available to OSHPD during code adoption cycle but the standard was substantially incomplete with a number of tables and figures missing. Amending a partially complete standard to achieve OSHPD's statutory goal of operational / immediate occupancy for hospital buildings was not feasible.

ASCE 41-06 became officially available in May 2007 and OSHPD is taking immediate steps for its adoption so that requirements for seismic rehabilitation of existing buildings, including hospitals and skilled nursing facilities, will align more closely with the new building code provisions in the 2007 CBC. OSHPD's adoption of ASCE 41-06 is consistent with the standards adopted by Division of State Architect – Structural Safety (DSA-SS), California universities and

other state buildings. Additionally, practicing engineers will need to learn only one standard, ASCE 41-06, for seismic rehabilitation of existing buildings instead of learning two separate standards, FEMA 356 and ASCE 41-06.

Title 24, Part 1

Chapter 6 - Seismic Evaluation Procedures for Hospital Buildings

Administrative regulations in Title 24, Part 1, Chapter 6 regarding SB 1953 (Chapter 740, Statutes of 1994) seismic safety requirements are being amended to be consistent with the 2007 CBC. These revisions will not affect any existing Structural Performance Category (SPC) or Nonstructural Performance Category (NPC) rating of existing hospital buildings.

Section 1.2 Definitions – “Alternate Analysis” is being amended to “Alternative Analysis” for consistency with Section 2.7.

Section 1.4.5.1 – CBC chapter reference in this section is being amended for consistency with the 2007 CBC.

Section 1.4.5.1.1 – CBC chapter reference in this section is being amended for consistency with the 2007 CBC.

Section 1.5.2 – The California Division of Mines and Geology is being amended because the division has been renamed to the California Geological Survey pursuant to SB 668 (Chapter 869, Statutes of 2006). Also, the 1998 CBC section reference is being revised for accuracy.

Section 2.1.1 – Specific reference to the 1995 CBC will provide consistency and will permit continued use of existing engineering geologic reports developed pursuant to SB 1953 requirements.

Section 2.4.9.2 – Specific reference to the National Earthquake Hazards Program’s (NEHRP) 1994 NEHRP Recommended Provisions’ for steel in Chapter 5 will provide consistency.

Section 2.4.9.4 – Specific reference to 1994 NEHRP, Recommended Provisions for masonry in Chapter 8 will provide consistency.

Section 2.4.10.1 – Specific reference to the 1995 CBC will provide consistency and will permit continued use of existing ground motion data developed pursuant to SB 1953 requirements.

Section 2.7 – CBC section reference is being revised to be consistent with the 2007 CBC. Revisions in this section will eliminate the need for Alternate Means of Compliance (AMC) / Design Criteria (DC) for Linear Static Procedure (LSP), Linear Dynamic Procedure (LDP) and Non-Linear Static Procedure (NSP).

Section 4.1.1 – This section is amended to provide clarification for uniform enforcement.

Section 4.2.10 – Specific reference to the 1995 CBC will provide consistency. This will permit continued use of existing requirements pursuant to SB 1953 requirements.

Section 6.1.6 – Specific reference to the 1995 CBC will provide consistency. This will permit continued use of the provisions in 1995 CBC pursuant to SB 1953 requirements.

Section 6.1.7 – Specific reference to the 1995 CBC will provide consistency. This will permit continued use of the provisions in the 1995 CBC pursuant to SB 1953 requirements.

Section 11.2.2 – Specific reference to the 1995 CBC will provide consistency. This will permit continued use of the provisions in the 1995 CBC pursuant to SB 1953 requirements.

Section 11.3.1 – Specific reference to the 1998 CBC will provide consistency. This will permit continued use of the provisions in the 1998 CBC pursuant to SB 1953 requirements.

Section 11.3.2 – Specific reference to the 1998 CBC will provide consistency. This will permit continued use of the provisions in the 1998 CBC pursuant to SB 1953 requirements.

Section 11.3.5 – Specific reference to the 1998 CBC will provide consistency. This will permit continued use of the provisions in the 1998 CBC pursuant to SB 1953 requirements.

Table 11.1 – Specific reference to the 2001 CBC in Table 11.1, Footnote 1 will provide consistency. This will permit continued use of the provisions in the 2001 CBC pursuant to SB 1953 requirements.

Title 24, Part 1

Chapter 7 - Safety Standards for Health Facilities

Administrative provisions in Title 24, Part 1, Chapter 7 are being revised for consistency with the 2007 CBC. The amendments will facilitate compliance with SB 1953 seismic safety regulations. In addition, earthquake damage repair provisions in Article 20 of this chapter are being updated so that if hospital buildings are repaired they can retain their SPC and NPC ratings.

Section 1.2 Definitions –

“Addition” is being revised to be consistent with ASCE 7-05 Section 11.2. ASCE 7-05 is the primary basis for structural design in the 2007 CBC.

“Maximum Probable Earthquake” definition is being deleted because it is not used in the 2007 CBC.

“Primary Gravity Load Resisting System” and **“Seismic Force Resisting System”** definitions are being added for clarity because these terms are used in Section 7-125 and in the 2007 CBC .

“Upper Bound Earthquake” is being deleted because it is not used in the 2007 CBC.

Section 7-117 - Site data requirement in this section is being revised to be consistent with the 2007 CBC, Section 1802A.6.

Section 7-125 -This section clarifies current OSHPD requirement of not permitting primary vertical or lateral load resisting systems and stirs to be deferred per the 2007 CAC Section 7-125 (c)(3)(D).

Section 7-302- Pre-1973 structures repair requirement for hospital buildings in this section are being revised to be consistent with the 2007 CBC, Section 3403A.

Section 7-303 - Post-1973 structures repair requirements for hospital buildings in this section are being revised to be consistent with the 2007 CBC, Section 3403A.

Section 7-304 - Type V Single Story Skilled Nursing Facilities (SNF) and Intermediate Care Facilities (ICF) repair requirements in this section are being revised to be consistent with the 2007 CBC, Section 3403.

Title 24, Part 2, Volume 2

Chapter 16A - Structural Design

Structural design provisions in this chapter are being revised on the basis of American Institute of Steel Construction (AISC) Hollow Structural Sections (HSS) advisory and an amendment approved for the International Building Code (IBC) in the 2006 / 2007 code cycle. The revisions will ensure that any Structural Performance Category (SPC) upgrade using steel Eccentrically Braced Frames (EBF) will achieve the target performance level required by SB 1953 regulations.

Section 1607A.7.1.3 – The stress increase that is currently required by this section is no longer appropriate given the latest editions of the referenced standards that properly coordinate Allowable Strength Design (ASD) with Load and Resistance Factor Design (LRFD) through a unified design process. Since the structural safety of handrails and

guards are predominantly governed by strength, the continued use of the one-third stress increase for handrails could lead to unconservative design. This repeals a provision in the model code per an amendment to 2006 International Building (IBC) approved by the International Code Council-Structural (ICC-S) committee for the 2006 / 2007 code cycle.

Section 1614.1.3 – This section is amended to require steel EBF to have moment resisting connections at columns away from the links. Recent research regarding steel Special Concentrically braced Frame (SCBF) at the University of California, Berkeley has indicated that SCBF columns develop fracture at drifts of 2% at the gusseted beam-column connection. Nominally pinned connections (i.e., connections not designed or detailed as moment connections) acted as rigid connections because of the presence of the gusset plate, and transferred moment between the beam and the column. The American Institute of Steel Construction Inc. (AISC) recommended providing a connection that can resist a moment equal to the lesser of the available flexural strength of the beam or the column. Since EBF's will have drift comparable to SCBF, recommendation for SCBF is also applicable to EBF.

Title 24, Part 2, Volume 2

Chapter 17A -Structural Tests and Special Inspections

Special inspection provisions in this chapter are being revised to require special inspection of cast-in-place anchor bolts. This will ensure that any SPC or NPC upgrade, where cast-in place anchor bolts are used will achieve the target performance level required by SB 1953 regulations.

Table 1704A.4 – This table is being amended to clarify special inspection requirements for cast-in-place anchor bolts. Design of anchor bolts, pursuant to ACI 318-05 Appendix D, is based on the assumption (ACI 318-05, Section 1.3) that they will receive special inspection. Clarification is needed to ensure that design assumption is followed.

Title 24, Part 2, Volume 2

Chapter 18A - Soils and Foundations

Rock and soil foundation anchors design provisions are being added to expedite design approval and to ensure uniformity in compliance with the SPC upgrade requirements pursuant to SB 1953 program.

Section 1813A – This section is amended to add requirements regarding the use of PTI-2004, *Recommendations for Prestressed Rock and Soil Anchors (4th Edition)* for design of seismic tie-down anchors. Currently, rock and soil foundation seismic anchor design requires submittal of Alternate Means of Compliance / Design Criteria for each project to be pre-approved by OSHPD. Having a well defined procedure in the 2007 CBC will ensure uniformity in compliance while reducing time required for plan approval.

Title 24, Part 2, Volume 2

Chapter 22A - Steel

Structural design provisions in this chapter are revised on the basis of AISC HSS advisory. This will ensure that any SPC upgrade using steel SCBF will achieve the target performance level required by SB 1953 regulations.

Section 2205A.4.1.5.2 – Revision in this section will require steel Special Concentrically Braced Frame (SCBF) to have moment resisting connections at columns. Recent research regarding steel SCBF at the University of California, Berkeley has indicated that SCBF columns develop fracture at drifts of 2% at the gusseted beam-column connection. Nominally pinned connections (i.e., connections not designed or detailed as moment connections) acted as rigid connections because of the presence of the gusset plate and transferred moment between the beam and the column. AISC recommended providing a connection that can resist a moment equal to the lesser of the available flexural strength of the beam or the column.

Title 24, Part 2, Volume 2
Chapter 34 - Existing Structures

Design provisions for existing structures are being revised by adopting ASCE 41-06 and repealing FEMA 356. This will ensure that the reference standards for skilled nursing facilities (Type V, single story, wood frame or light-steel frame) in Chapter 34 are consistent with Chapter 34A standards for hospital buildings.

Section 3403.2.3.3 – This section is being amended to adopt ASCE 41-06, which is a consensus national standard, and repeal FEMA 356, which is a prestandard and basis for ASCE 41-06. Rehabilitation objectives are clarified to be consistent with ASCE 41.

Title 24, Part 2, Volume 2
Chapter 34A - Existing Structures

Design provisions for existing structures are revised by adopting ASCE 41-06 and repealing FEMA 356. This will ensure that building upgraded pursuant to SB 1953 regulations will comply with a consensus national standard instead of FEMA-356, which is a prestandard and basis for the ASCE 41-06.

ASCE 41-06, *Seismic Rehabilitation of Existing Buildings*, is the latest generation of performance-based seismic rehabilitation methodology. This new national consensus standard was developed from the FEMA 356, *Prestandard and Commentary for the Seismic Rehabilitation of Buildings*, which served as a starting point for the formal standard development process. ASCE 41-06 represents state-of-the-art knowledge in earthquake engineering and is a valuable tool for the structural engineering profession to improve building performance in future earthquakes. It includes significant improvements in current understanding of building behavior in earthquakes, such as:

- Improved C-coefficients (these coefficients convert ground seismic spectral accelerations to base shear coefficient) for calculation of the pseudo-lateral force and target displacement based on recommendations in FEMA 440, Improvement of Nonlinear Static Seismic Analysis Procedures.
- Comprehensive soil-structure interaction provisions including kinematic effects and foundation damping effects.
- Revised acceptance criteria for steel moment frames to reflect final conclusions of the SAC (A partnership of Structural Engineers Association of California (SEAOC), Applied Technology Council (ATC) and California Universities for Research in Earthquake Engineering (CUREE)) Joint Venture research.
- Expanded acceptance criteria for concentrically braced frames defined as a function of brace slenderness, compactness and level of connection detailing.
- Updated nonstructural provisions to be consistent with current NEHRP provisions for new buildings, which are the basis for the 2007 CBC.

Section 3402A – Definitions in this section are being revised to be consistent with the ASCE 41-06.

Section 3403A.2.3.3 – This section is being revised to adopt ASCE 41-06, which is a consensus national standard, and repeal FEMA 356, which is a prestandard and basis for ASCE 41-06. Rehabilitation objectives are also clarified to be consistent with the ASCE 41-06.

Section 3403A.2.3.4 – This section correlates structural and non-structural performance levels defined in the Title 24, Part 1, 2007 CAC, Chapter 6 to those defined in ASCE 41-06. This section also will ensure that the current SPC or NPC rating of hospital buildings will not be affected by the adoption of the 2007 CBC. This change will allow the hospitals to comply with SPC / NPC requirements by using 2007 CAC and 2007 CBC only.

Section 3403A.2.3.5 – This section adds reference to earthquake damage repair requirements in the 2007 CAC.

Section 3411A – Section references are being revised to be consistent with section number changes resulting from the adoption of ASCE 41-06 standards.

Section 3412A – This section is being repealed in its entirety, since all the requirements that were covered in this section are included in ASCE 41-06.

Section 3413A – This section addresses modification to ASCE 41-06 to achieve statutory performance objectives for seismic evaluation and retrofit of existing hospital buildings including those required by SB 1953.

Section 3413A.1 – This section retains existing FEMA 356 amendments in the 2007 CBC which are relevant to ASCE 41-06. However, amendments to FEMA 356 that are not relevant to ASCE 41-06 are being repealed. Also, new amendments are being added to make ASCE 41-06 consistent with SB 1953 regulations in the 2007 CAC, Chapter 6.

Section 3413A.1.1 – This section requires seismic evaluation of buildings, pursuant to ASCE 41, except when mandated otherwise by SB 1953 regulations in 2007 CAC, Chapter 6.

Section 3413A.1.2 – Seismic hazard requirements are amended to be compatible with the 2007 CBC requirements.

Section 3413A.1.3 – This section retains the data collection requirement in the 2007 CBC.

Section 3413A.1.4 – This section retains limitations on use of linear procedures in the 2007 CBC.

Section 3413A.1.5 – This section retains the requirement for using non-linear dynamic analysis procedure when higher mode effects are significant in immediate occupancy buildings.

Section 3413A.1.6 – This section retains the requirements for expected material properties to be obtained by test for immediate occupancy buildings.

Section 3413A.1.7 – This section retains the requirements for addressing the inconsistencies between Equations 3.4 and 3.5.

Section 3413A.1.8 – This section retains the prohibition on use of unreinforced masonry in moderate to high seismic regions.

Section 3413A.1.9 – This section prohibits the use of simplified non-linear static procedure for hospital buildings. Partial modeling of structures is considered inappropriate for hospital buildings, which are required for immediate occupancy.

Section 3413A.1.10 – This section retains the drift limitation for linear procedure consistent with new building construction.

Section 3413A.1.11 – This section retains the requirements that primary components for immediate occupancy buildings shall satisfy primary component acceptance criteria.

Section 3413A.1.12 – This section retains the foundation strength and stiffness requirements.

Section 3413A.1.13 – This section retains the prohibition on use of presumptive capacities.

Section 3413A.1.14 – This section retains the prohibition on prescriptive expected capacities.

Section 3413A.1.15 – This section retains the requirements for flexible base assumptions to be based upon soil strength evaluation.

Section 3413A.1.16 – This section retains the requirements for considering seismic earth pressure when appropriate.

Section 3413A.1.17 – This section retains appropriate part of clarification for the acceptance criteria for non-linear structural steel components.

Section 3413A.1.18 – This section retains the requirement for heavily loaded wall piers to be considered in design.

Section 3413A.1.19 – This section retains the prohibition of unreinforced masonry.

Section 3413A.1.20 – This section retains the prohibition of unreinforced masonry.

Section 3413A.1.21 – This section retains the minimum shear reinforcement requirements in masonry wall.

Section 3413A.1.22 – This section retains the requirement for using non-linear dynamic analysis to verify analysis for base isolated structure.

Section 3413A.1.23 – This section retains the requirement for using non-linear dynamic analysis to verify analysis for base isolated structure.

Section 3413A.1.24 – This section retains the requirement for enforcement agency approval for production testing.

Section 3413A.1.25 – This section retains the requirement for enforcement agency approval for testing exemption.

Section 3413A.1.26 and 3413A.27 – These sections retain the requirement for using non-linear dynamic analysis to verify analysis for structures with dampers.

Section 3413A.1.28 – This section retains the requirement for enforcement agency approval for production testing.

Section 3413A.1.29 – This section retains the prohibition on simplified rehabilitation procedure.

Section 3413A.1.30 – This section defines the operational performance requirements consistent with 2007 CAC, Chapter 6, Table 11.1.

Section 3413A.1.31 – This section defines the ceiling performance requirements which will ensure displacement compatibility and performance goal for hospitals.

Section 3413A.1.32 – This section retains the requirements of SB 1953 regulations for general acute care hospitals.

Title 24, Part 2, Volume 2

Chapter 35 - Referenced Standards

References in this chapter are revised for consistency with amendments to the 2007 CBC Chapters 18A, 34 & 34A.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS:

There are no technical, theoretical or empirical studies, report of similar documents.

CONSIDERATION OF REASONABLE ALTERNATIVES

The alternative to these proposed regulations would be to leave regulations as they are. The alternative was rejected, since state of the art design is desired for hospital buildings in California. Also, consistency between various parts of the Title 24 is paramount for safe design.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

There will be no adverse impact on small business.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

The regulations proposed will have no significant adverse impact on business.

- 1) For some buildings, seismic base shear will be less than what is currently adopted in the 2007 CBC because of improved C-coefficient for calculation of the pseudo-lateral force and target displacement based on FEMA 440, *Improvement of Nonlinear Static Seismic Analysis Procedure*. Also, acceptance criteria for some materials have been improved based on latest research, which may have a positive or negative cost impact based on the lateral load resisting system.
- 2) Component design forces will be smaller at higher elevations in some buildings and will be consistent with new code provisions in the 2007CBC, since both are based on current NEHRP provisions for new buildings. This will not have any cost impact, since 2007 CBC permit new building provisions to be used for all existing buildings.
- 3) Comprehensive soil-structure interaction provisions in the ASCE 41-06 including kinematic effects and foundation damping effects will permit reduction in base shear with proper modeling. This will add to the modeling / analysis cost, while reducing the construction cost.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS

These regulations do not duplicate or conflict with federal regulations.

EFFECTIVE DATE OF REGULATIONS

These regulations will amend the 2007 California Building Code which will become effective January 1, 2008. In order to coordinate with the new code these proposed regulations shall also be effective on January 1, 2008.