

# 2001 California Building Code

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An introduction to the codes and standards process was provided in this space in the last issue of the PCI JOURNAL.<sup>1</sup> This article discusses the newly published 2001 California Building Code<sup>2</sup> and attempts to provide a glimpse into the current building code situation in California. The situation obviously has a major impact on building construction in a state that boasts the seventh largest economy in the world.

## INTRODUCTION

The 2001 California Building Code<sup>2</sup> (California Code of Regulations Title 24, Part 2, Volume 2) has been published by the Building Standards Commission of California and has an effective date of November 1, 2002.

The Building Standards Commission has the charge of producing a California Building Standards Code to be published in its entirety every three years, with supplements in the intervening years.

The California Building Standards

Code applies to all occupancies throughout the state of California. City, county, or city and county may establish more restrictive building standards reasonably necessary because of local climatic, geological, or topographic conditions.

The California Building Standards Code has the following eleven parts (Part 11 does not exist):

- Part 1 – California Building Standards Administrative Code
- Part 2 – California Building Code
- Part 3 – California Electrical Code
- Part 4 – California Mechanical Code
- Part 5 – California Plumbing Code
- Part 6 – California Energy Code
- Part 7 – California Elevator Safety Construction Code
- Part 8 – California Historical Building Code
- Part 9 – California Fire Code
- Part 10 – California Code for Building Conservation
- Part 12 – California Reference Standards Code
- Part 2 – California Building Code (CBC) contains building design and

construction requirements relating to fire and life safety, structural safety and disabled access. It incorporates by adoption the 1997 edition of the Uniform Building Code (UBC) with necessary California amendments.

Volume 1 of the CBC contains administrative, fire and life safety, disabled access and field inspection provisions, including all non-structural provisions and those structural provisions necessary for field inspections. It is integrated with the 1997 UBC Volume 1.<sup>3</sup>

Volume 2 of the CBC contains provisions for structural engineering design and is integrated with the 1997 UBC Volume 2.<sup>3</sup>

It should be noted from the above that, contrary to popular belief, the Uniform Building Code is not directly adopted (with amendments) by local jurisdictions in California. It is adopted into the CBC which regulates all construction in California. The local jurisdictions may make more restrictive amendments to the CBC; however, amendments that are less restrictive are not allowed.

## Structure of the CBC and Applicability of its Parts

In California, a state agency called Division of the State Architect (DSA) regulates:

- Community colleges
- Public schools
- Essential services buildings (state-owned or state-leased)

Another state agency called Office of Statewide Health Planning and Development (OSHPD) regulates:

- Hospitals
- Skilled nursing facilities
- Intermediate-care facilities
- Correctional treatment centers

The OSHPD-regulated buildings are classified into the following categories:

**OSHPD 1** – General acute-care hospitals and skilled nursing and/or intermediate-care facilities

**OSHPD 2** – Single-story skilled nursing and/or intermediate-care facilities utilizing Type V wood or light steel-frame construction

**OSHPD 3** – Licensed clinics

**OSHPD 4** – Correctional treatment centers

The 2001 CBC contains two sets of parallel chapters:

Chapters 16, 16A – Structural Forces

Chapters 17, 17A – Structural Tests and Inspections

Chapters 18, 18A – Foundations and Retaining Walls

Chapters 19, 19A – Concrete

Chapters 20, 20A – Lightweight Metals

Chapters 21, 21A – Masonry

Chapters 22, 22A – Steel

Chapters 23, 23A – Wood

CBC Chapters 16-23 are applicable to buildings not regulated by DSA or OSHPD and to OSHPD 2 buildings. CBC Chapters 16-23 section, equation, table and figure numbers are the same as those of the 1997 UBC.

CBC Chapters 16A-23A apply to buildings regulated by the DSA and to OSHPD 1 and OSHPD 4 buildings (OSHPD has only operational criteria for OSHPD 3 facilities). CBC Chapters 16A-23A section, equation, table and figure numbers are the same as those of the 1997 UBC, except that 16 is always replaced by 16A, 17 by 17A, and so forth.

## California Amendments

There are very few amendments to the 1997 UBC in Chapters 16-23 of the CBC. Two of these amendments, both in the seismic design load combinations, were promoted by the concrete industry<sup>4,5</sup> and are beneficial. One deletes the 1.1 factor by which design loads given by the seismic design load combinations of the 1997 UBC must be multiplied in the design of concrete and masonry structures. The second amendment minimizes the impact of the consideration of vertical earthquake ground motion in seismic design, which in extreme cases under 1997 UBC would require 56 percent of the design dead load effects to counteract the effects of strength-level horizontal earthquake forces.

Amendments to the 1997 UBC in Chapters 16A-23A of the CBC are significant in number. One of the more important ones updates the reference in the steel chapter from AISC Seismic 1992<sup>6</sup> to AISC Seismic 1997, including Supplement No. 1 dated 1999.<sup>6</sup>

## Local Amendments

The local jurisdictions have formed groups in four parts of the state to consider code amendments, as reported in this space in the March-April 2002 issue of the PCI JOURNAL.<sup>7</sup> The most important of these groups are the Los Angeles Regional Uniform Code Program, including the City and the County of Los Angeles; and the Tri-Chapters Uniform Code Program, including the East Bay, Peninsula and the entire San Francisco Bay Area, but importantly excluding the City of San Francisco. The other two groups are the Sacramento Valley Uniform Code Program and the Redwood Chapter Code Committee.

The amendments agreed to by these groups may or may not be adopted by the local jurisdictions belonging to these groups. The amendment packages being considered by the four groups are not necessarily coordinated with the State or among the groups. Thus, in the near-term future, it is more than likely that various local jurisdictions within California will have

adopted variously amended versions of the 1997 UBC. The smaller jurisdictions will typically not have made any amendments at all.

As reported in Reference 7, the Los Angeles Regional Uniform Code Program was at one time considering allowing alternative usage of ACI 318-99,<sup>8</sup> whereas ACI 318-95<sup>8</sup> is the reference standard in the 1997 UBC. Unfortunately, this is not being considered any more.

## Observations and Concluding Remarks

In the normal course of things, the 2001 California Building Code would have been based on the 2000 edition of the Uniform Building Code (UBC). However, the International Conference of Building Officials (ICBO), the publisher of the UBC, declared a long time ago that the 1997 edition was the last edition of the UBC. Code change cycles, in fact, were discontinued beyond 1996, so that it has not been possible to make any more changes to the 1997 UBC since its publication, although several errata have been issued by ICBO.

The 2000 International Building Code (IBC)<sup>9</sup> is the successor code to the 1997 UBC. It has, obviously, not formed the basis of the 2001 CBC. The basis continues to be the 1997 UBC, thus extending the life of that code beyond the length foreseen by anyone. The fact that the parent document has not been modified since 1996 is a major disadvantage.

The reference standards are badly outdated. The reference standard in the concrete chapter is ACI 318-95<sup>8</sup>. It is almost a certainty now that ACI 318-99,<sup>8</sup> the reference standard for concrete in the 2000 IBC, will never be used in California. The masonry chapter has evolved from earlier editions of the UBC, and is not based on a particular reference standard. The masonry chapter of the 2000 IBC is based on the 1999 edition of the MSJC standard.<sup>10</sup>

Allowable stress design (ASD) of steel is based on AISC ASD Specifications, 1989,<sup>11</sup> and seismic provisions for ASD contained in Division V, Chapter 22 of the 1997 UBC itself.

Load and resistance factor design (LRFD) of steel is based on AISC LRFD Specifications, 1993<sup>12</sup> and AISC Seismic 1992.<sup>6</sup> The seismic provisions are no longer relevant, particularly in view of the Northridge earthquake of 1994.

CBC Chapter 22A has been updated to AISC Seismic 1997 and supplement No. 1 dated 1999.<sup>6</sup> However, Chapter 22 has not been so updated. The reference standard in the wood

chapter is NDS 1991,<sup>13</sup> which is not available for purchase any more either from the American Forest and Paper Association or from ICBO. The reference standard for wood in the 2000 IBC is NDS 1997.<sup>13</sup>

In view of this situation, Dowty and Ghosh<sup>14</sup> have pointed out that building officials in local California jurisdictions can invoke 1997 UBC Section 104.2.8, which gives them the authority to approve alternate designs and

can be implemented on a case-by-case basis to accept structural designs that are in accordance with the 2000 IBC.

When the CBC is next updated for its 2004 edition, it is a virtual certainty that the 1997 UBC will no longer be the basis. The 2003 edition of the International Building Code as well as the 2002 edition of the NFPA 5000 Building Code<sup>15</sup> will be available by then. It remains to be seen which of these codes will be adopted.

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