

Significant Changes/Issues 2007 California Codes

NEW CODES AND STANDARDS.

The State of California has lagged the rest of the nation when it comes to the adoption of state of the art construction standards uniformly applied on a state wide basis. This trend was recently reversed and will result in the Board reviewing the adoption of a new set of State mandated construction standards and advising on the suitability of newly proposed local amendments to those standards.

The California Building Standards Commission at its January 31, 2007 meeting adopted the following codes. These codes, as well as others not listed, are adopted into California Code of Regulations, Title 24, also referred to as the California Building Standards Code.

- a. **Building Code (Part 2 of Title 24)** The 2006 International Building Code was adopted as a basis of the 2007 California Building Code.
- California jurisdictions will be transitioning from the 2001 California Building Code that continued to use the 1997 Uniform Building Code as a basis for adoption and amendment.
 - While published in two volumes, the 2007 CBC is a one volume code however the amount of State amendments necessitated publication in the manner it was done.
 - The 2007 CBC relies heavily on adoption by reference on hundreds of national standards. The standards volume 3 does not exist under the I family of codes.
 - The Office of the State Fire Marshal extensively amended the construction, fire protection and panic safety regulations in the 2007 CBC to better align them with the higher level of protection required by the 97 UBC and 2001 CBC.
 - The Department of Housing and Community Development has amended the 2007 CBC with various construction items as an interim measure prior to reviewing the International Residential Code for California adoption.
 - Accessibility requirements polished in Chapter 11A and 11B were last updated in October of 2006 and have been reformatted to fit the 2006 IBC.
 - Attempts to integrate the IBC with the UMC and UPC were not complete and require local correlatory amendments.
 - Ventilation requirements traditionally in chapter 12 of the UBC were relocated to the International Mechanical Code which was not adopted. The 2006 UMC does not address all the items addressed by the UBC.

- Plumbing fixture requirements are now included in chapter 29 of the IBC and are generally duplicative of the UPC table 4-1 and do not include requirements for urinals.
- b. **Fire Code (Part 9, Title 24).** The 2006 International Fire Code was adopted as a basis of the 2007 California Fire Code.
 - California jurisdictions will be transitioning from the 2001 California Fire Code that used the 2000 Uniform Fire Code as a basis for adoption and amendment. The UFC is basically the 1997 UFC, that was not longer in publication, and included limited changes proposed by the Western Fire Chiefs Association.
 - The Office of the State Fire Marshal carried forward existing amendments and amended the CFC to correlate with the 2007 CBC and to better align the two codes.
- c. **Electrical Code(Part 3, Title 24).** The 2005 National Electrical Code was adopted as a basis of the 2007 California Electrical Code.
 - California jurisdictions will be transitioning from the 2004 California Electrical Code that used the 2002 National Electrical Code as a basis for adoption and amendment.
 - Unlike the Building, Fire, Mechanical and Plumbing Codes, the State of California chose to adopt the latest edition of the Electrical code during the past three triennial code cycles.
- d. **Plumbing Code (Part 5, Title 24).** . The 2006 Uniform Plumbing Code was adopted as a basis of the 2007 California Plumbing Code.
 - California jurisdictions will be transitioning from the 2001 California Plumbing Code that used the 2000 Uniform Plumbing Code as a basis for adoption and amendment.
 - The State of California chose to skip an edition of the UPC and as a result changes resulting from two triennial code change cycles will be adopted at once.
 - Issues relating to piping materials persist including limitations on the use of ABS and PVC drain, waste and vent piping as well as not adopting PEX piping as a code permitted material for potable water distribution. These limits apply exclusively to residential occupancies.
 - CPVC is permitted for potable water distribution without findings of local corrosive soil or water conditions. Worker safety controls remain in place.
 - The use of waterless urinals is permitted without limitation.
 - Requirements for recycled water systems have been moved into the body of the code from an appendix chapter.
- e. **Mechanical Code (Part 4, Title 24).**.. The 2006 Uniform Mechanical Code was adopted as a basis of the 2007 California Mechanical Code.

- California jurisdictions will be transitioning from the 2001 California Mechanical Code that used the 2000 Uniform Mechanical Code as a basis for adoption and amendment.
 - The State of California chose to skip an edition of the UMC and as a result changes resulting from two triennial code change cycles will be adopted at once.
 - The CMC conflicts with the IBC for open parking garage ventilation, does not recognize modulated ventilation through the use of sensors and is not clear on what constitutes a private garage.
- f. **Existing Buildings Code. (Part 10, Title 24).** The 2006 International Existing Building Code was adopted partially into the 2007 California Existing Building Code Appendix chapter 1 for Unreinforced Masonry Buildings.
- The 2006 IEBC replaces the 1997 Uniform Code for Building Conservation that is adopted by the City of San Diego as referenced design and construction standard for the seismic strengthening of Unreinforced Masonry Buildings.
 - The IEBC appendix chapter 1 is integrated with the 2006 IBC chapter 16 and unlike the UCBC that was not correlated with the 1997 UBC, the 2006 IEBC includes design values for archaic materials developed for ultimate strength design, the default method of the 2006 IBC.
 - The IEBC limits the scope of the IEBC to exclude occupancy Category III and IV buildings as determined from referenced standard ASCE 7-05 Table 1-1. The UCBC specifically excludes essential services buildings and hazardous essential services, and hazardous occupancies included in Category III and IV respectively. Category however now includes buildings with rooms used for public assembly by more than 300 people. Therefore URM churches need to be strengthened to comply with the regular code the 2007 CBC.
- g. **California Historical Building Code (Part 8, Title 24)..** The 2007 California Historical Building Code has been completely revised to align with the 2006 IBC and was last revised in 1998. while not required to be adopted locally, its is the Statewide prevailing code for Historical Buildings.
- h. **California Referenced Standards Code (Part 12, Title 24).** This code is not adopted locally but is used on a statewide basis since it includes amendments to national standards, as well as unique California Standards, for products and materials regulated by the Office of the State Fire Marshal as well as other State agencies.
- i. **The California Elevator Code (Title 8) .** While not enforced at the local level, the California accessibility regulations frequently reference sections in the elevator code. The Elevator code has been relocated to Title 8 from Part 7, Title 24.

CRITICAL CODE ISSUES IN THE NEW STATE CONSTRUCTION CODES.

Development of the International Building Code:

The 2006 International Building Code is substantially different than the 1997 Uniform Building Code and was developed by including the least restrictive requirements from any of the three legacy model codes that included:

- a. The Uniform Building Code UBC published by the International Council of Building Officials.
- b. The Standard Building Code SBC published by the Southern Building Code Congress.
- c. The National Building Code published by the Building Officials and Code Administrators International Association BOCA.

It was intended that enforcement of the international Building Code would not result in existing buildings not conforming to the new code.

As a performance objective the IBC also includes the protection of forest responders in addition to protection of occupants.

While an excellent goal, the reality is different. While it is true that the IBC is substantially less restrictive than the UBC in many areas, it is not in other areas.

Life safety and property conservation. The 2006 IBC intends to provide for balance fire protection where a truly “holistic” approach to health and life-safety protection has been taken.

- **Active fire protection and notification.** The IBC relies heavily on sprinkler protection as a balance to a reduction in fire resistive construction and for allowing the use of larger and taller buildings of combustible construction. More occupancies and buildings will be required to have alarm and notification systems as well as many more buildings and occupancies will require sprinkler protection.
 1. The office of the State Fire Marshall has limited the use of sprinklers for tradeoffs to fire resistive construction notably for multistory buildings and for buildings housing A, E, I, L, R and H. As a result a different set of standards would apply for building housing Group B, M, S, F and U occupancies and buildings housing both SFM regulated occupancies and non-regulated occupancies will have to satisfy both requirements.
 2. Townhouses classified as R-r occupancies as well as R-3 occupancies are not required to be sprinklered. The Office of the State Fire Marshall amended to the 2006 IBC to not require sprinkler protection throughout R occupancies.
 3. Townhouses satisfying criteria and limits in the International Residential Code, which were codified into CBC chapter 4 by HCD, can be classified

as R-3 occupancies and sprinkler protection is not required nor is fire alarm protection.

4. Office buildings with more than 500 occupants, or 10 occupants per floor, require a fire alarm.
5. The Office of the State Fire Marshal amended chapter 9 of the IBC to require smoke control in hi-rise buildings. Hi-rise building requirements are no longer limited to buildings housing B and R occupancies.
6. Smoke and heat vent requirements in the IBC permit the use of mechanical venting systems in lieu of smoke and heat vents.
7. Sprinkler protection is required in drinking or dining establishments with 100 or more occupants. The UBC required sprinklers in drinking and dining establishments thereby exempting establishments not serving alcohol. The limit was 5,000 sq ft.

While not intended to be an exhaustive list, the list above does point to some significant differences between the UBC and IBC.

- **Means of egress and escape:** The IBC is more restrictive than the UBC when applied to the means of egress in multi-story buildings and employs a different philosophy where requiring access to more than one means of egress.
 1. The IBC requires exit enclosures for stairways serving one adjacent above in buildings not protected throughout with sprinkler systems and where a second stairway is not enclosed. The UBC requires exit enclosures for interior stairways serving the third floor or higher.
 2. The IBC requires exterior stairways to be separated from the interior of the building with construction that is the same as that for interior exit enclosure. This is substantially more restrictive than the UBC in buildings four to six stories high where a two-hour separation is required and not the current one-hour.
 3. The IBC does not permit the use of exterior exit stairways in hi-rise buildings. The UBC is silent on this issue.
 4. The IBC requires protection of an exit enclosure based on the number of levels served, and not the number of floors. So an interior connecting a basement level to the third floor is required to be protected with two-hour construction in lieu of one hour under the UBC where the basement is not a floor served.
 5. Horizontal exits under the IBC used to separate a building into two compartments shall extend from the foundation to the roof unless the floor above and below the floor in question is two-hour protected. The UBC required the wall creating the horizontal exit to be supported on two-hour construction.
 6. Common path of travel with distances ranging from 75 ft to 125, depending on occupancy and sprinkler protection, triggers the need for a second means of egress. In other words you have to have access to two distinct paths of egress from any point in a building or a second exit is required.

7. The Office of the State Fire Marshal amended chapters 4, 9 and 10 of the IBC to require smoke proof enclosures in hi-rise buildings regardless of the floor level served by the exit enclosure. The IBC limits the protection to enclosures serving floor levels used for human occupancy located more than 75 feet above the lowest floor level having building access.
8. The Office of the State Fire Marshal amended chapter 10 of the IBC to require that emergency escape and rescue openings be provided from sleeping rooms in buildings protected throughout with sprinklers. The IBC exempts such buildings from emergency escape and rescue requirements.

Again not an exhaustive list, the list above seeks to point out that the IBC has put more emphasis on protecting the means of egress even though it does not require rated corridors in several occupancies.

- **Construction requirements:** In similar fashion to the UBC, the 2006 IBC regulates the fire resistance and combustibility of building materials in buildings based on the occupancy, the number of stories, building height and floor area per floor and the total floor area.

The 2006 IBC employs tabular floor areas that are larger than those in the UBC and allows for the use of sprinklers to increase both the tabular area and tabular height and number of stories. The UBC did not allow this so called double dip. The result is that a design based on the IBC will result in a substantially lesser number of fire-walls (area separation walls under the UBC) and potentially larger office buildings constructed of sprinklered non-combustible unprotected construction. This on the surface would appear to be a less restrictive code than the UBC.

1. The office of the State Fire Marshall has limited the use of sprinklers for tradeoffs to fire resistive construction notably for multistory buildings and for buildings housing A, E, I, L, R and H. As a result a different set of standards would apply for building housing Group B, M, S, F and U occupancies and buildings housing both SFM regulated occupancies and non-regulated occupancies will have to satisfy both requirements.
2. The Office of the State Fire Marshal significantly limited the use of sprinkle trade offs for construction and while the resulting size of a multi-story building is larger than one complying with the UBC it will be much smaller than that permitted under the IBC.
3. The IBC allows for design flexibility and allows for dissimilar occupancies to be separated or non-separated uses. Either approach will have a different impact on the height, allowable area and type of construction determination. As a result of this design flexibility the IBC will require substantially more documentation of the basis of design on the approved plans.
4. Shaft requirements for multi-story buildings require protection based on the number of levels, including basements served by the shaft. The UBC

required the fire resistance based on the type of construction of a building. As a result a shaft connecting a basement to the third floor of a building serves four levels and requires two-hour protection.

5. Fire-walls are now required to be structurally stable which was presumed when the UBC required area-separation walls. The IBC is more explicit on this issue.
6. The IBC allows a common Party Wall between two buildings that is located at the property line if it is constructed as a fire-wall. The UBC always required two independent walls and a seismic building separation to a property line. It is no clear how the building separation requirements of ASCE 7-05 can be satisfied when a common party wall is employed. This concept originates in the east which less seismically active and therefore issues such as seismic separation are not considered.
7. A basement is considered a floor when determining the allowable floor area. This is significantly different than the UBC.
8. The method of determining building height under the IBC is based on grade plane and not finished grade on a sloping site.

So while for some items are less restrictive than the UBC, the 2007 CBC will offer design options that can result in more economical buildings from a construction standpoint.

It is expected that certain non-sprinkler protected commercial buildings undergoing alterations may be subjected to more restrictive construction requirements especially if the alteration involves floor area additions and/or changes to the occupancy.

Structural Requirements. The 2006 IBC adopts many structural standards by reference. This issue introduces certain complications at the local level since standards typically referenced for construction with various materials was limited and the UBC modified the standards by transcription into the UBC.

1. The earthquake design regulations in IBC chapter 16 and corresponding detailed regulations in the ASCE 7-05 referenced standard will result in lower seismic requirements for certain locations and building systems. Seismic zonation is replaced by acceleration maps used to ascertain site seismicity and thereby determine a seismic design category based on the use of the building. The seismic design category will drive the level of detailing required for seismic resistance. The default seismic design category is assumed to be Seismic design category D.
2. The IBC is more specific on alterations to existing buildings and will include explicit seismic design requirements that can be more restrictive than the way the UBC has been applied. This will require a reexamination of BNL 23-4 Seismic Requirements for Existing Buildings that has been withheld pending revisions since it was last published under the 1988 UBC.

3. The design of structures for wind loads is dramatically different under the IBC and will require more effort to enforce and to demonstrate compliance.
4. The IBC has been amended by HCD to extend the scope of conventional construction to be comparable to that under the UBC.
5. The IBC requires substantially more special inspection than the UBC. All masonry construction requires special inspection, which will not be practical for non-engineered masonry structures such as masonry fences and retaining walls.
6. Chapter 18 includes more clear language on setting buildings back from ascending or descending slopes.

It is expected that structural alterations to existing buildings will pose challenges. The IBC considers a modern building occupied December 31, 2007 and designed to comply with the 2001 CBC to be an existing building and may result in a structural upgrade due to a change of occupancy or substantial structural addition.

Electrical, Plumbing and Mechanical Code. While not a part of the I Code family of integrate and correlated codes, the 2005 NEC, and 2006 UPC and UMC have been determined by the California Building Standards Commission to be substantially compatible with the 2006 IBC. A local review based on a review of the model codes determined that certain limited areas may require local review and modification due to correlation issues.

Uniform Mechanical Code Issues:

The mechanical code provides design and installation standards for various exhaust and ventilation systems and has typically been developed as a stand alone document when ICBO stopped publishing the UPC after the 1991 edition. The 2006 UPC is published by the International Association of Plumbing and Mechanical Officials. ICC does publish the International Mechanical Code but the State of California chose to continue past practice of adopting the UPC.

- a. Table 4-4 of the UMC provides ventilation requirements for various occupancies including parking garages. The IBC does not include ventilation requirements as was typical in chapter 12 of the UBC. The IBC assumed that IMC section 404.1 and 404.2 would be used in conjunction with the IBC.
- b. Table 4-4 uses the term parking garage that is not defined and does not exclude small U occupancies that are considered private garages under the IBC in Section 406. The IBC does not define parking garage. The UBC never intended U occupancies from being ventilated.
- c. Footnote 3 to Table 4-4 of the UMC does not require ventilation for open parking garages with two sides that are 50% or more open. The IBC in Section 406.3.3.1 considers natural ventilation to occur when

uniformly distributed openings occur on two or more sides, shall be at least 20% of the total perimeter of each tier and the aggregate length shall be 40 % of the perimeter of the tier. So the UMC would require ventilation for an open parking garage.

- d. The UMC does not allow for other than continuous ventilation of parking garages as did Section 1202.2.7 of the UBC. ASHREA standard 62-91 provides standards and will be adopted by reference.

Uniform Plumbing Code Issues.

The plumbing code provides design, installation and material standards for plumbing systems such as drain waste and vent piping for transporting discharge as well as piping for the distribution of potable water, natural gas and other materials. The code also regulates the types of plumbing materials that may be used. The code is concerned with the proper functioning of waste delivery systems to reduce the health impacts of waste discharge due to backups as well as sewer odor discharge due to a loss of the “trap seal”. The design of potable water distribution is to control discharge at plumbing fixtures and to limit velocities and therefore limit score of pipe walls that can cause premature failures.

- a. The Department of Housing and Community Development has continued past practice of amending the UPC in chapters 7, 8, 9 and 11 to limit the use of ABS and CPVC DWV piping to two story residential buildings.
- b. The Department of Housing and Community Development has continued past practice of amending the UPC in chapters 6 to limit the use of alternative non-metallic piping materials such as crosslinked polyethylene pipe PEX. The State is currently producing an environmental impact report and estimates that the limitation on the use of PEX and similar materials might be resolved in the next two years and that the 2010 CPC might allow the material.
- c. Chapter 4 now includes an occupant load factor Table A that is comparable to a policy developed by the City of San Diego to reconcile the reality that occupant load factors developed in the building code were developed for life safety and egress purposes and may not be appropriate for cases where determining the number of plumbing fixtures.
- d. Table 4-4 is more comprehensive than Table 2902.1 of the 2006 IBC. Furthermore, comparable language to the language in IBC chapter 29 is provided in chapter 4 of the UPC. Table 4-1 includes urinal fixture unit requirements whereas the IBC table does not. The IBC includes requirements for service sinks and the UPC table does not.

- e. No state agency adopts chapter 29 and the Building Standards Commission added a footnote 19 in an amendment to Table 4-1 in the 2007 CPC which allows local jurisdictions to use alternative fixture tables to that in the UPC.
- f. Combined waste and vent Sovent systems sre still not recognized in the UPC. The IPC does however recognize the combined waste and vent system with limitations.

National Electrical Code Issues.

The electrical code provides design, installation and material standards for electrical systems. The electrical code seeks to limit the hazards of electrocution by minimizing the need for the use of extension cords, requiring wiring methods that protect electrical wiring from damage and requires the design of distribution systems to minimize the risk of overload. The code also intends to protect users of electrical outlets from over-current hazards as well as ground fault interruption at wet locations of use.

There are currently no identified issues with the electrical code and it is not expected that additional local amendments will be necessary. The Electrical Newsletters are used as the local areas resource to clarify electrical ode interpretations as well as utility electrical installation requirements.

International Existing Building Code Issues.

The State of California has not adopted the IEBC in it's entirety, rather only adopted the appendix Chapter 1A requirements applicable to Unreinforced Masonry Buildings inoth the 2007 California Existing Building s Code..

The IEBC is dramatically different from the UCBC and includes a different hazard ranking table. TABLE 912.4 is referenced in Section 907.3.1. The table can change the relative hazard ranking triggering compliance for occupancies previously exempt.

An issue has arisen with regards to the Scoping requirements of Section A102.2. The when adopting the UCBC the city of San Diego did not adopt the scoping 102 of Appendix Chapter 1 of the UCBC since Section 145.0405 item subsection (f) specifically scoped out essential services buildings and hazardous occupancies.

Similarly to the UCBC, the IEBC limits applicability to buildings other than those in occupancy Category III and IV. The new Table 1604.5 or Table 1-1 in ASCE 7-05 differs greatly from Table 16-K in the 1997 UBC that is referenced in the UCBC.

Category 2 in Table 16-K of the UBC included hazardous occupancies only and category 1 included essential services buildings. A2.1 occupancies, buildings with rooms housing 300 or more occupants are assigned to category 3 special occupancy structures. The IBC however puts both the hazardous occupancies and buildings with 300 or more persons in a common room in a Category III building that is equivalent to the old category 2. occupancy

