
Chapter 1

Building Codes

"One of the toughest things to learn is the ability to make yourself do the thing you have to do, when it ought to be done, whether you like it or not."

Thomas Henry
Huxley

Regardless of your specialty, whether you are a general contractor, a plumbing contractor, plasterer, painter, or any other subcontractor, there exists regulations pertaining to your trade in the construction industry. Some dictate aspects such as licensing, registration, and insurance requirements. Other regulations establish minimum design and workmanship standards, as well as specifications regarding materials and devices used in construction projects. Such regulations, which control the design, construction, and material used in structures, are called building codes.

History and Purpose

The regulation of building construction can be traced back 4,000 years to cultures such as the Chinese, Greek and Roman empires. Building regulations arose from the attempts of our ancestors to establish ways to control or avoid devastation from building fires and construction failure. George Washington and Thomas Jefferson tried to establish some of the earliest design and construction regulations in America for the purpose of protecting public health and safety.

Today most states have established regulations governing all types of construction. Such codes are intended to establish minimum standards for fire and structural safety, health, handicapped accessibility, and energy conservation.

Benefits to Society

The purpose for adopting and enforcing building codes extends beyond safety factors. It also includes the safeguarding of the public welfare and the improvement of the quality of life. By establishing standards of construction, the quality of public and private buildings becomes elevated. A heightened quality in building construction has contributed to the public welfare by decreasing some of the conditions that give rise to slums and other undesirable conditions of neighborhood development.

The need to protect the public welfare regarding construction standards has been made tragically apparent on numerous occasions. For example, when Hurricane Andrew blasted southern Florida in August of 1992, huge sections of the Miami-area suburbs were wiped out. Thousands of homes and other structures were destroyed.

On investigation it was noted that the homes in that area exhibited a lack of strong building codes for structural frame-to-foundation attachment, roof-to-frame attachment, and second-level-framing attachment. When these homes were compared with similar structures in Hawaii, where Hurricane Iniki hit, it was determined that less damage was realized because of the more demanding nature of the Hawaiian Building Code.

Hard lessons are learned from such events as hurricanes and earthquakes. The translation of such experience into a system of construction guidelines, for the purpose of minimizing such tragedy, is one of the fundamental goals of building code development.

Watch out for and care for the little things in your business. The big ones will then take care of themselves.

Benefits to Individuals

Properly designed codes, when adequately enforced, provide benefits to individuals, as well as to society. Many individuals are affected by construction projects. Owners, architects, engineers, general contractors, subcontractors, manufacturers, and suppliers of building materials all have a stake in the project.

Beginning with the process of plan reviews and inspections for the purpose of determining if a structure complies with code, a higher quality project is assured:

- Owners are guaranteed that basic health and safety factors have been addressed.
- Those associated with the construction of the project can feel confident that their work meets tried-and-true methods.
- Future owners of the project can be assured that the structure being purchased complies with an approved standard.

Each of us rely on the safety of the structures around us, such as homes, apartments, schools, shops, places of entertainment, and public buildings of all types. Modern building codes are designed to protect all of us from the dangers of poorly erected structures.

Accountability

As contractors and tradespeople you are expected to know all federal, state, and local building codes, as well as other regulations that pertain to the project on which they are working.

A powerful illustration of a contractor's responsibility (and liability) regarding code compliance is found in the situation arising in south Florida. Shortly after the hurricane, a grand jury investigation began to uncover additional facts indicating that construction methods, not in compliance with existing code, were to blame for some of the damage sustained from Hurricane Andrew. Existing evidence suggests that at least one prominent contractor may have violated Florida code. Complaints have ranged from the use of defective roof trusses to the use of ungalvanized nails.

You may not know all the answers, but you probably won't be asked all the questions either.

Information is not available about why such code violations were not detected during the construction phase of the buildings. However, it is the contractor who is being held accountable for the violations. Whether it be in Florida or any other state, the contractor is the one ultimately responsible for making certain that all work performed is in compliance with state building code.

International Conference of Building Officials

For building codes to be effective, there needs to be a consistency of standards and techniques that are readily acceptable to communities in general. Minimum standards can be established while using uniformity as the foundation.

In the early 1900s, officials from various communities recognized that establishing widely acceptable, minimum standards, was a prerequisite for a workable system of building construction regulations. Model codes were needed that states could adopt, customize, and implement to serve the needs of their locality.

In 1922, the International Conference of Building Officials (ICBO) was founded for the purpose of developing model building codes. To accomplish this task, the conference adopted several objectives into its bylaws:

- To research and develop standards that promote safety in the construction, occupancy, and location of buildings and structures
- To develop uniform regulations and legislation pertaining to all phases of building construction, and to promote the enforcement of these regulations
- To develop, maintain, and promote the adoption of the *Uniform Building Code (UBC)* and other uniform codes and related documents. These documents are to be designed to advance the cause of uniformity in regulations
- To make recommendations and help in the administration of building laws and ordinances, and in the development of management and enforcement programs
- To compose and publish educational matter relating to uniform building construction procedures and practices

To err is human, to remain in error is stupid.

The creation of the ICBO represented a collective undertaking that shared the cost and responsibility of code development and implementation. Originally consisting of only a part-time volunteer staff having no office, the ICBO has grown to a staff of more than 100 at its 34,000-square-foot headquarters located in Whittier, California. It remains a nonprofit corporation that is owned and controlled by numerous government agencies, which compose its voting membership.

In addition to its headquarters office, ICBO has five regional offices, each fully staffed to provide services to its members in code evaluation and education, plan checking, code consultation, and code interpretation.



Note

For a list of the regional offices along with their addresses and that of the headquarters see Exhibit 1 at the end of this chapter.

Membership

All segments of the construction industry are eligible for membership in the conference. ICBO membership has grown tremendously since its formation. The conference now has 76 chartered chapters throughout the United States. Membership ranges from individuals to government agencies. All members are encouraged to be active in the code development process and other

related activities of the organization. However, the voting franchise within the organization is limited to Class A members only.

Class A members are government agencies engaged in the administration and formulation of building codes. Each of these government agencies appoint a representative to the conference. These representatives compose the voting membership of ICBO.

ICBO Publications

ICBO meets annually for the purpose of establishing policies, examining reports from various code development committees, and implementing any bylaw changes. The primary function of ICBO is the publication of the *Uniform Building Code* and other related volumes.

The following are brief descriptions of ICBO code publications:

- *Uniform Building Code*. This publication represents the most widely accepted model building code in the United States and the world. Most states' codes are built on this model. (We will examine this publication in further detail later in this chapter.)
- *Uniform Building Code Standards*. This is a separate volume of performance specifications required for the types of materials used in the construction industry and referred to in the *UBC*.
- *Uniform Mechanical Code*. This is a jointly sponsored publication by ICBO and the International Association of Plumbing and Mechanical Officials (IAPMO). It provides the regulatory basis for heating, ventilating, air conditioning and refrigeration equipment within buildings and related structures. Like all of the publications put forth by the ICBO and its affiliates, this code is designed to be compatible with the *Uniform Building Code*.
- *Uniform Plumbing Code*. This publication contains the code that covers all aspects of plumbing within the construction industry. It too is a joint effort by the ICBO and the IAPMO.
- *Uniform Fire Code*. This code deals with the aspect of fire prevention in building design and construction. Again, it is designed to be compatible with all the other codes published by the ICBO and its affiliates. This code is

The fact that nobody wants to believe something doesn't keep it from being true.

sponsored jointly by the Western Fire Chiefs Association and ICBO.

- *Dwelling Construction Under the Uniform Building Code.* This code focuses on residential construction of one and two stories in height.
- *One and Two Family Dwelling Code.* Similar to the *Dwelling Construction Under the Uniform Building Code*, this code focuses on residential construction. It is jointly sponsored by ICBO and other model building code organizations with the intention of eliminating conflicts and duplications among the model codes to achieve national uniformity. Incorporated into this code are mechanical and plumbing requirements for applicable structures.

If you can't state a problem in a couple of minutes, you don't understand the problem yourself.



Note

This One and Two Family Dwelling Code publication is better known as the CABO (Council of American Building Officials) code that many states have adopted as its parent code for applicable residential structures. We will examine the development and use of this code in greater detail later in Chapter 3.

Other code publications of ICBO and affiliates include:

- *Uniform Housing Code*
- *Uniform Administrative Code*
- *Model Energy Code*
- *Uniform Disaster Mitigation Plan*
- *Uniform Code for Solar Energy Installations*
- *Uniform Code for Energy Conservation*
- *Uniform Sign Code*
- *Uniform Building Security Code*
- *Uniform Code for the Abatement of Dangerous Buildings*

A building code is a minimum standard to protect life, limb, health, property and the public welfare by regulating and controlling the design, construction, use, type of material, location, and integrity of buildings. You can build to a higher standard and negotiate a variation of a standard as long as the minimum standard is upheld.

Code Development

The code development process associated with ICBO is, initially,

open to anyone. Any interested party is free to submit a code change proposal and have it presented for public review and analysis.

The intent of having such an open policy is to develop and maintain documents that have resulted from input from the entire spectrum of the building industry.

All proposals are published and submitted to code development committees for initial review. These hearings are open to the public. The committee formulates a report regarding the proposals and any subsequent challenges to the proposals. These reports are further debated at the annual conference meeting. After such debates, final action will be taken by the Class A members of the conference. All accepted code change proposals are then published in a code supplement, or in a new edition of the code, that is revised every third year.

State and Local Building Codes

Although most states are not noted for Florida-type hurricanes or California-type earthquakes, they have had natural events of great magnitude. For this and other reasons, such as fire safety and conservation, states implement statewide building codes. Specific guidelines for the research, development, and administration of building codes are set forth in state laws and statutes.

Statutes and laws are established by state legislative assemblies. The state becomes authorized and obligated to issue a state building code to govern the construction, reconstruction, alteration, and repair of buildings and other structures. The state also will govern the installation of mechanical devices and equipment to be used in buildings. Under these statutes, the state is required to ensure that standards are established that will provide adequate safeguards for the health, safety, welfare, comfort, and security of the residents of the state who occupy and use buildings and other structures.

The statutes may also require that modern methods, devices, materials, and techniques be used to provide practical maximum energy conservation as well.

When state codes were first adopted, there were three primary organizations involved in code writing. These organizations were:

Today's preparation determines tomorrow's achievement.

- Building Officials and Code Administrators International, Inc. (BOCA)
- Southern Building Code Congress International, Inc. (SBCCI)
- International Conference of Building Officials (ICBO)

**Note**

States do not set up their own code. They choose a "model" of an existing code and usually make amendments to it.

Most states chose the uniform codes (building, plumbing, mechanical, and fire) produced by ICBO as model or parent codes from which to establish its state code. As mentioned, ICBO publishes a new edition of its codes every three years and publishes supplements during the intervening years. However, these are not necessarily the same codes that govern the construction work performed in any given state.

Each state has an agency in charge of adopting and amending ICBO's uniform codes or the model code chosen by that state.

State Building Codes Agency

Each state has an agency that is equivalent to the ICBO. A building codes agency is established by the state and is in charge of:

- Examining and amending the uniform and national codes into state specialty codes. The building codes agency works closely with the ICBO in an effort to maintain compatibility between ICBO's model codes and the versions amended by that state. The building codes agency also needs to maintain compliance with all applicable state statutes relating to structures.
- Certifying individual counties, cities, and other local jurisdictions to become code administering agencies. This maintains the true customizing process of building codes. Local jurisdictions may establish code requirements beyond the minimum standards set forth in state codes.

Ignorance of the law is what keeps lawyers and courts busy.

**Note**

No local jurisdiction is permitted to lessen the standards as set forth in state codes or mandated by statute. States usually require that all variances to any state code need to be approved by the state building code agency administrator.

The building code, like other sources of knowledge and facts, doesn't give you information, it just shows you where it is.

- Training and certifying licensed inspectors throughout the state

The building codes agency may be composed of various boards such as:

- Structural Code Advisory Board
- Energy Conservation Board
- State Plumbing Board
- Electrical Board
- Certification and Training Advisory Board
- Manufactured Structures and Parks Advisory Board
- Elevator Safety Board
- Board of Boiler Rules

Members of these boards or subdivisions are appointed by the state building code agency administrator, who in most cases is appointed and supervised by the governor. The composition of the boards, in terms of what kinds of specialists are to be appointed, is specifically outlined by state statutes.

For example, a structural code advisory board would be mandated by state statute to have a membership broadly representative of the industries and professions involved in the development and construction of buildings including representation from building code enforcement agencies, architectural and engineering associations, building construction trades, the contracting and manufacturing industries, governing bodies of local government, fire protection agencies, and the general public.

These boards will also supervise the code revision process in the state building codes agency.

Many manufacturers bring out new building products that will comply with the code. They have to go through testing processes to prove their product will work as intended; there are many variations. Ask about how products fit into the code so you can talk to your inspector, if necessary.

Code Adoption and Development

Each state has its own code adoption and development process. This process is normally supervised by the building codes agency as prescribed by state statutes. The process basically begins by using all the ICBO's uniform codes as models for developing state wide specialty codes. In brief, the following takes place:

- The *Uniform Building Code* becomes *The State's Structural Specialty Code*
- The *Uniform Mechanical Code* becomes *The State's Mechanical Specialty Code*
- The *Uniform Plumbing Code* becomes *The State's Plumbing Specialty Code*

The process continues with all of the uniform codes, such as the *Uniform Fire Code* and others. Basically, the same holds true for electrical codes except that the word uniform is not used. The *National Electrical Code* is usually customized into *The State's Electrical Specialty Code*.



Tip

Whenever you see the word "specialty" in connection with a code, you can know that the code is one that has been both amended and adopted by a state.

Code development in most states, like ICBO, is a continuous and public process. The building codes agency's various boards have regularly scheduled meetings to discuss administrative and other matters concerning code development. Each of the boards or subdivisions is authorized to form committees to conduct research and development activities pertaining to building code subjects. These committees meet, as necessary, with those individuals and/or organizations having expertise in the code subject for which a committee is responsible.

For example, an energy conservation board and its committees may work closely with the state department of energy and the utility

There are few people who are fast enough to keep up with their good intentions.

Neither people nor construction will improve without a good model.

companies when formulating new energy-related codes. A structural code advisory board and its committees may work closely with the state department of justice and the state disability commission to incorporate federal accessibility guidelines for the disabled into the state code.



Note

In most cases, formal meetings of boards and subdivisions or their committees are considered public meetings. Anyone interested in attending these meetings or providing input can acquire schedules by contacting the state building codes agency.

Before any code change can be implemented it will usually go through a review process that is open to the public. At these meetings, the particular board will make a final recommendation regarding a code change to the state building code administrator. The administrator, with the approval of that board, may adopt or modify the proposed code amendment. On adoption, a copy of each amendment is distributed to the governing bodies of all municipalities affected. However, the effective date of a code amendment may not take place until a new edition of the appropriate state specialty code is issued.

Like the uniform codes developed by the International Conference of Building Officials, a state's specialty codes are usually published every three years.

International Building Codes

As of April 1998, all of the regional model code organizations have agreed to work together to produce one national code for each model code area. Plumbing and mechanical will have codes available as they are already national. The electrical code will continue as is.

For most contractors, the new national building code and dwelling codes will take effect after April of 2000, as these new national model codes are adopted. For now, this course will cover the use of codes as you find them used by your building department. Watch for new codes after 2000.

New international building codes model codes will be as follows:

- International Building Code (IBC) Structural Code model
- International Residential Code (IRC) Dwelling Code model
- International Plumbing Code (IPC) Plumbing Code model
- International Mechanical Code (IMC) Mechanical Code model
- International Fire Code (IFC) Fire Code model
- International Private Sewage Disposal Code (IPSDC)
The model code for individual sewage disposal systems
- International Fuel Gas Code (IFGC) Fuel Gas model code
- International Zoning Code (IZC)
- International Property Maintenance Code (IPMC)
- International Energy Conservation Code (IECC)

*If you don't know,
simply say so.
People can then
help you find out.*

Exhibit 1: ICBO Regional Offices**ICBO Regional Offices****ICBO Headquarters**

5360 Workman Mill Road
Whittier, CA 90601-2298

Phone: (310) 699-0541
Fax: (310) 692-3853
or (800) 423-6587

Kansas City Regional Office

6738 N.W. Tower Drive
Kansas City, MO 64151

Phone: (816) 741-2241
Fax: (816) 741-9475

Austin Regional Office

9300 Jollyville Road, Suite 101
Austin, TX 78759-7455

Phone: (512) 794-8700
Fax: (512) 343-9116

Northern California Regional Office

6130 Stoneridge Mall Road, Suite 120
Pleasanton, CA 94588

Phone: (510) 734-3080
Fax: (510) 463-3295

Indianapolis Regional Office

7998 Georgetown Road, Suite 900
Indianapolis, IN 46268

Phone: (317) 879-1677
Fax: (317) 879-0966

Seattle Regional Office

2122-112th Avenue, N.E., Suite B-300
Bellevue, WA 98004

Phone: (206) 451-9541
Fax: (206) 637-8939

