Building Codes by State

An Online Continuing Education Course for Engineers

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Mark Ludwigson, P.E., PMP

Introduction

Engineers must produce designs that conform to regulatory requirements, including state and local building codes. Small differences in the codes can change the design requirements, chosen alternatives, and aspects of the final design. So is critical for engineers to know which building codes are to be utilized for design.

Each state takes a unique approach to adopting and amending building codes. Some states adopt model codes with very few amendments, while others have developed their own codes. Some states allow local cities and counties to make amendments. Other states have no state building codes and leave it up to local cities and counties to adopt or develop their own codes.

To tackle this dilemma, this course first reviews the most common model codes that are adopted by states. Then, the various state and local approaches are reviewed. Finally, a summary table is provided showing the code approach in each state.

Model Building Codes

Model building codes (model codes) are sets of detailed design and construction requirements that independent standards organizations maintain. Model codes are meant to promote safety, health, and welfare through consistent requirements in the design, construction, and upkeep of infrastructure, especially buildings.

Model codes are not legally binding on their own. A state or local government must officially adopt them. Typically, the local building department enforces the code through plan reviews, building permits, inspections, and permit close-out procedures.

The term “building code” has two definitions:

1. Overall collection of codes with comprehensive construction requirements
    - For example: ICC set of 15 volumes
2. A subset of code that deals with the construction of new buildings
    - For example: 2024 IBC

In this course, the term building code is meant to include the overall collection of codes (number 1 above). Model building codes are straight from standard organizations, which are not of themselves enforceable, while state or local building codes are adopted and enforceable.

Note that residential codes are not covered in this course, as a professional engineer is often not required for typical residential construction.

ICC Codes

The International Code Council (ICC) is an independent organization that publishes a collection of model building codes. The full collection of (15) ICC volumes includes the following:

- International Building Code (IBC)
- International Residential Code without Energy (IRC)
- International Fire Code (IFC)
- International Plumbing Code (IPC)
- International Mechanical Code (IMC)
- International Fuel Gas Code (IFGC)
- International Existing Building Code (IEBC)
- International Property Maintenance Code (IPMC)
- International Zoning Code (IZC)
- International Swimming Pool and Spa Code (ISPSC)
- International Private Sewage Disposal Code (IPSDC)
- International Wildland Urban Interface Code (IWUIC)
- ICC Performance Code for Buildings and Facilities (ICCPC)
- International Green Construction Code (IgCC)
- International Energy Conservation Code (IECC)

All codes are available online at this ICC website, although a subscription is required to be able to select and copy-paste the code text: https://www.iccsafe.org/about/2024-i-code-upd

The covers of the (15) ICC volumes/books are shown in Figure 1.

Figure 1: Covers of the full collection of 2024 ICC volumes/books, with the IMC volume addressed in this course circled in red.
Source: https://codes.iccsafe.org/codes/i-codes/2024-icodes

ICC codes are updated every three years (2018, 2021, 2024, 2027, 2030, etc.) just like the International Building Code (IBC).

International Building Code (IBC)

The International Building Code (IBC) by the ICC is a detailed set of regulations that are used to govern construction and design standards for capital improvements. The main objective of the IBC code is to protect public health, welfare, and safety by establishing minimum quality standards for building improvements. The code has a significant focus on the structural and life safety designs of new buildings.

When the IBC was formed in 2000, it was a merging of the following codes, which are now discontinued:

- Uniform Building Code (UBC)
- BOCA National Building Code (BOCA/NBC)
- Standard Building Code (SBC)

The IBC is the most widely adopted model code in the U.S. The IBC is being used in all 50 states, either at the state or local level, in some form. It is also adopted in Mexico and several other countries. Engineers of all disciplines need to have some knowledge of the IBC.

The IBC is updated every three years (2018, 2021, 2024, 2027, 2030, etc.) just like other ICC codes. Often, it takes a few years for the latest IBC to be officially adopted by a state.

International Existing Building Code (IEBC)

The International Existing Building Code (IEBC) by the ICC is a detailed set of regulations that are used to govern construction and design standards for improvements to existing buildings. The main objective of the IEBC code is to protect public health, welfare, and safety for work done on existing buildings.

The IEBC covers repairs, alterations, additions, and changes of occupancy for existing buildings. Special attention is given to work on historic buildings.

The IEBC defines three “alteration levels” based on the extent of the renovation. The levels are summarized here:

- Level 1: Minor alterations such as coatings or replacing existing materials.
- Level 2: Alterations with significant reconfiguration, which may trigger requirements for fire alarm upgrades.
- Level 3: Extensive alterations and upgrade area exceeding half of the building's total area. Requires a fire protection system upgrade, new means of egress, and compliance with structural design requirements.

The IEBC is updated every three years (2018, 2021, 2024, 2027, 2030, etc.) just like other ICC codes.

International Plumbing Code (IPC)

The International Plumbing Code (IPC) by ICC is a model code for the design and installation of plumbing systems and fixtures. The IPC is the most widely used plumbing code in the United States and is adopted by many states and local entities.

The main objective of the IPC is to establish minimum safety standards for the design and installation of water, sewer, and drainage piping systems in buildings. The IPC normally applies within a distance of 10 feet of a building exterior. Other codes normally address yard piping for utilities.

The IPC covers the following main topics:

- Water supply and distribution piping
- Sanitary drainage and venting
- Storm drainage
- Fixtures & fittings
- Backflow prevention
- Water heaters
- Traps, grease interceptors & separators

The IPC was formed in 1995 as a merging of the following codes, which are now discontinued:

- ICBO Plumbing Code
- BOCA National Plumbing Code (BOCA/NPC)
- Standard Plumbing Code (SBCCI/SPC)

The IPC is updated every three years (2018, 2021, 2024, 2027, 2030, etc.) just like other ICC codes.

International Mechanical Code (IMC)

The International Mechanical Code (IMC) by ICC is a model code for the design, installation, and maintenance of mechanical systems and appliances. The IMC is the most widely used mechanical code in the United States and is adopted by many states and local entities.

The main objective of the IMC is to establish minimum safety standards for the design and installation of mechanical systems to protect life and property from potential dangers associated with their operation, while also safeguarding the personnel who install, maintain, and service these systems.

The IMC covers the following main topics:

- Heating, ventilation, and air conditioning systems
- Fuel-burning appliances
- Cooling systems
- Appliance venting
- Location and protection of appliances
- Solar systems

The IMC was first published in 1996. The IMC is updated every three years (2018, 2021, 2024, 2027, 2030, etc.) just like other ICC codes.

International Energy Conservation Code (IECC)

The International Energy Conservation Code (IECC) addresses energy efficiency on several fronts, including cost, energy usage, use of natural resources, and the impact of energy usage on the environment. Most of the code addresses energy efficiency requirements for building systems such as heating, cooling, insulation, water heaters, electrical power supply, interior lighting, and exterior lighting.

The IECC is updated every three years (2018, 2021, 2024, 2027, 2030, etc.) just like other ICC codes.

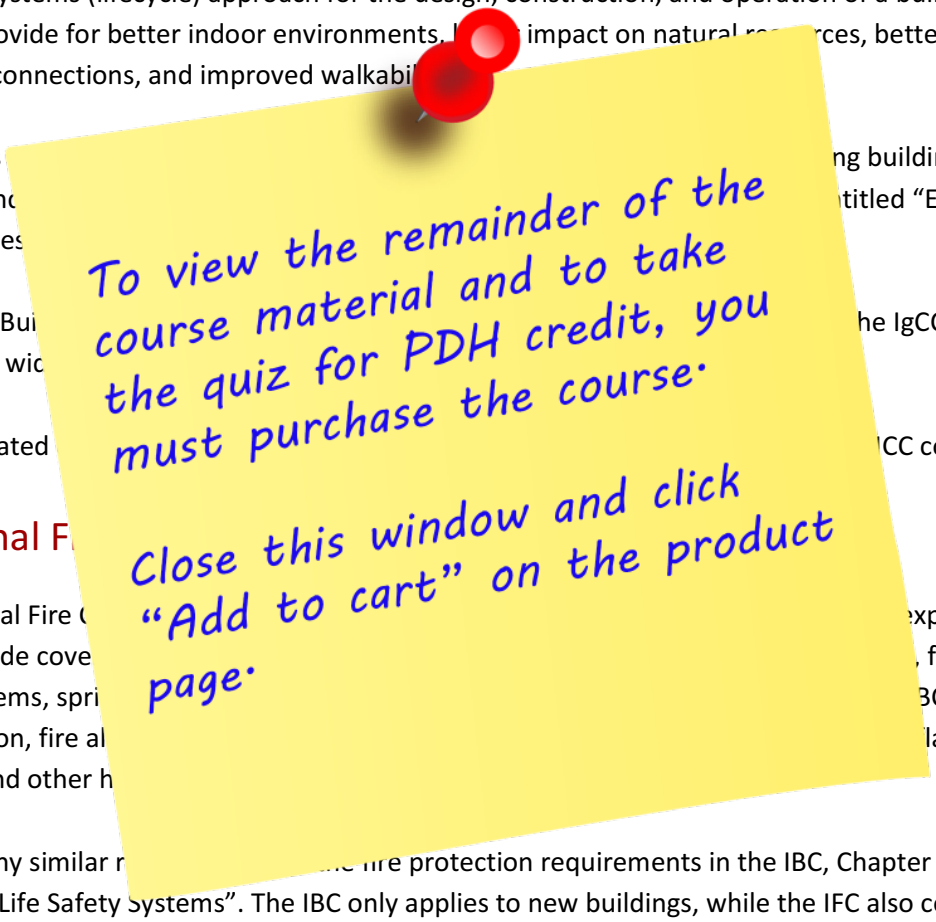
International Green Construction Code (IgCC)

The International Green Construction Code (IgCC) includes standards for green, sustainable buildings. It takes a whole systems (lifecycle) approach for the design, construction, and operation of a building. The IgCC aims to provide for better indoor environments, l[illegible] impact on natural r[illegible]rces, better neighborhood connections, and improved walkabi[illegible]

The IgCC makes [illegible]ng building energy consumption an[illegible]titled “Energy Standard for Sites[illegible]

The U.S. Green Bui[illegible]he IgCC and encourages the wid[illegible]

The IgCC is updated [illegible]CC codes.



International F[illegible]

The International Fire C[illegible]xplosion hazards. The code cove[illegible], fire protection systems, spri[illegible]BC, BC), smoke protection, fire al[illegible]lammable, combustible, and other h[illegible]

The IFC has many similar r[illegible]e fire protection requirements in the IBC, Chapter 9 “Fire Protection and Life Safety Systems”. The IBC only applies to new buildings, while the IFC also covers existing buildings and non-building fire protection applications.

The IFC also has similarities to NFPA codes, which are covered in the next section.