Fundamentals of Codes

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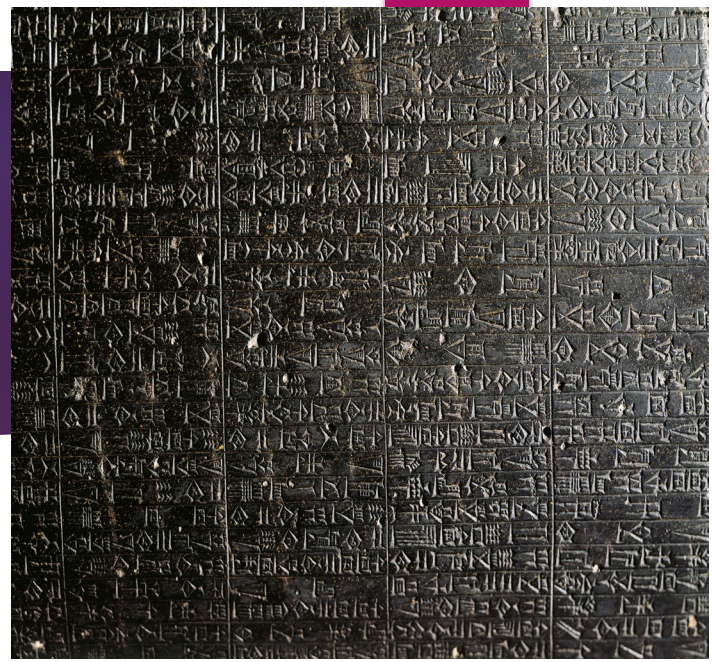
Historic Basis for Building Codes

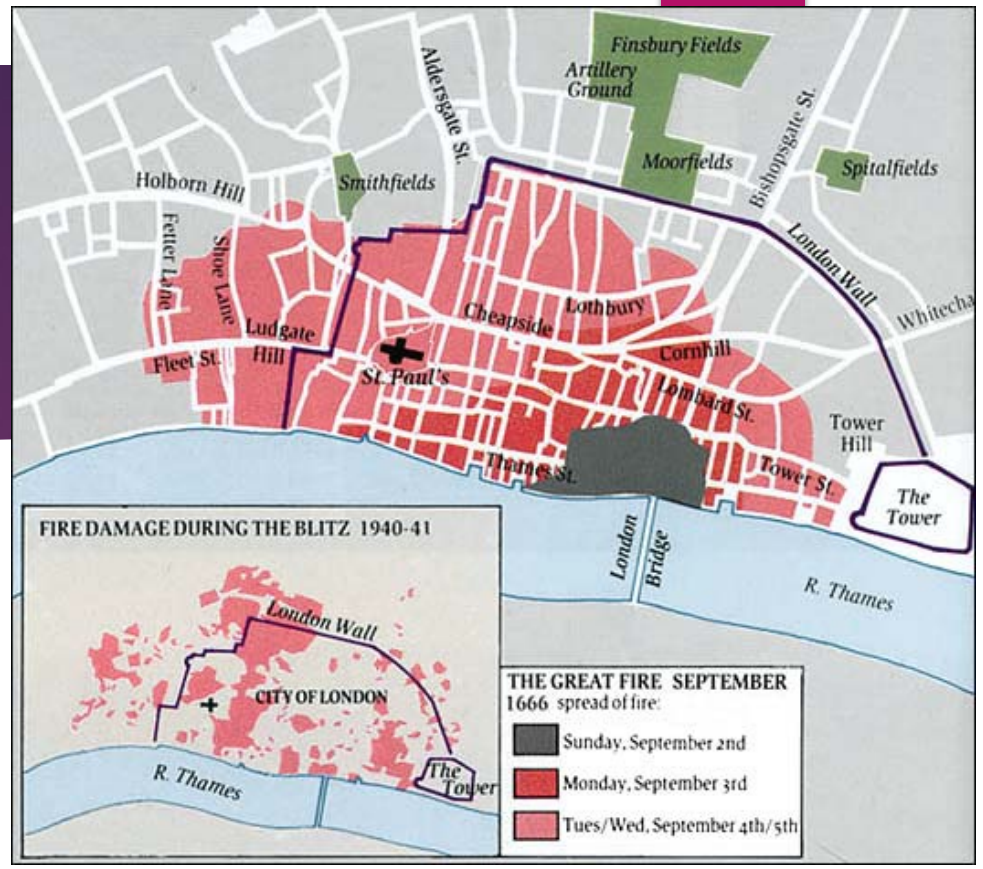
Code of Hammurabi, 1772 BC (282 Laws)



- Earliest known written building code
- If a builder build a house for someone and complete it, he shall give him a fee of two shekels in money for each sar of surface.
- If a builder build a house for some one, and does not construct it properly, and the house which he built fall in and kill its owner, then that builder shall be put to death.
- If it kill the son of the owner the son of that builder shall be put to death.
- If it kill a slave of the owner, then he shall pay slave for slave to the owner of the house.
- If it ruin goods, he shall make compensation for all that has been ruined, and inasmuch as he did not construct properly this house which he built and it fell, he shall re-erect the house from his own means.
- If a builder build a house for some one, even though he has not yet completed it; if then the walls seem toppling, the builder must make the walls solid from his own means.

1666 Great Fire of London

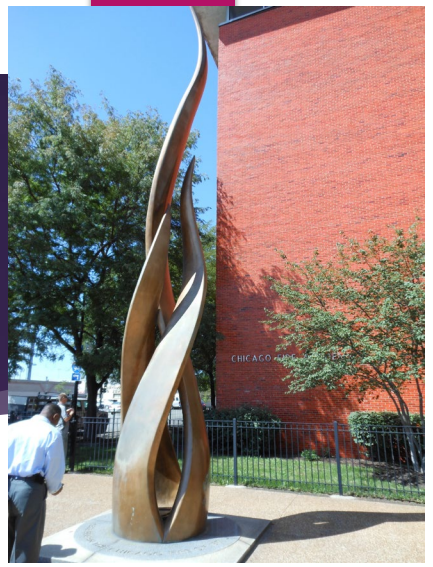
- Fire started in a bakery
- Small distance between buildings, the combustible material used, and several hindrances of the fire fighting caused major damage.
- Fire unofficially killed only 6 people, however, this number is in dispute as it is believed the poor and middle class deaths were not recorded.
- 13,200 homes, 87 churches, and most of the City Authority Buildings (approximately 80% of the city)



First American Building Code
Boston, MA

- 1631, John Winthrop, Governor of Boston, outlawed the building of wooden chimneys and thatched roofs of homes as each of these were found to cause more fires and dangerous fires throughout the community.

Great Chicago Fire, October 9, 1871



- America's fastest growing city in 1871 was Chicago.
- Rapid growing populations meant construction of city mainly was wood and other combustible material.
- The city had been facing a drought that brought high winds along with it.
- Fire started in O'Leary Barn - Legend states the fire was started by Mrs. O'Leary's cow knocking a lantern over onto hay, however this has never been proven.
- 3 Fire Departments responded to the call. (Chicago FD, Milwaukee FD, and Cincinnati FD)
- Present day location of the Chicago fire academy

THE GREAT CHICAGO FIRE

Conflagration that began on Sunday, October 8, 1871, and burned until early October 10, devastating an expansive swath of the city of Chicago. After the smoke cleared, the extent of the disaster revealed itself: the fire had burned thousands of acres, killing hundreds of people and causing millions of dollars in damage. The city rebuilt quickly, its population increasing from 324,000 in 1871 to 500,000 by 1880.

$200 MILLION IN DAMAGE

300 FATALITIES (estimated)

17,450 BUILDINGS DESTROYED

100,000 PEOPLE LEFT HOMELESS

STARTED BY (THEORIES)

- vandals
- milk thieves
- spontaneous combustion
- drunken neighbor
- the O'Learys' legendary cow

FUELED BY

- months without rain
- strong southwest wind
- congested poor neighborhoods
- wooden buildings, streets, sidewalks
- technical and human errors in alarm system

STOPPED BY

- rainfall
- Lake Michigan
- stretches of unbuilt lots
- gunpowder explosions

The 2nd star from the left on the Chicago flag represents the Great Chicago Fire.

A Where the great fire began: De Koven St. barn of Patrick and Catherine O'Leary. Current location of the Chicago Fire Department training academy.

B Area burned by the October 7 fire, which had exhausted firefighters and damaged equipment.

REBUILT BY

talented architects who were drawn by postfire rebuilding opportunities:

Louis Sullivan
Dankmar Adler
John Wellborn Root
Daniel H. Burnham
William Holabird
William Le Baron Jenney

1872 Great Boston Fire

- Nov 9, 1872 – Nov 10, 1872
- Started in the basement of a commercial building
- Fire was contained 12 hours later
- Consumed about 65 acres (26 ha) of Boston's downtown, 776 buildings and much of the financial district, and caused $73.5 million in damage (equivalent to $1.436 billion in 2019)

1903 Iroquois Theatre Fire

- December 30, 1903
- Chicago, Illinois
- Deadliest theater fire and the deadliest single-building fire in U.S. history, resulting in at least 602 deaths
- Sparks from an arc light ignited a muslin curtain
- The stage manager tried to lower the asbestos fire curtain, but it snagged
- Hidden fire exits, bascule locks, Staff refused to open doors, Iron gates

Boyertown Opera House Fire

- Rhoads Opera House
- Monday evening, January 13, 1908 in Boyertown, Pennsylvania
- 400 People present, 171 perished
- It was a three-story commercial brick building which contained a hardware store and a bank on its first floor, an auditorium (the "opera house") and offices on its second floor, and several meeting rooms and offices on its third floor.
- The fire started when a kerosene lamp being used for stage lighting was knocked over, starting a fire on the stage. In short order, the spreading fire ignited a mixture of lighting gas and oxygen from a malfunctioning stereopticon machine being used to present a magic lantern show at intermission. Audience members waited for the fire to be extinguished by theatre personnel, wasting the precious minutes they needed to escape safely.
- auditorium was located on the second floor and the few emergency exits available were either unmarked or blocked. Two fire escapes were available but were only accessible through latched windows whose sills were located 31⁄2 feet above the floor.

1911 Triangle Shirtwaist Fire

- March 25, 1911
- New York City
- 146 Garment workers were killed
- Doors and exits were locked

1942 Cocoanut Grove Fire

- November 28, 1942
- Boston, Massachusetts
- Deadliest nightclub fire in history, and second-deadliest single-building fire in American history, claiming 492 lives
- Some exit-doors had been locked to prevent unauthorized entry, and the elaborate palm-tree décor contained flammable materials
- The air-conditioning also used flammable gas, because Freon was in short supply

1946 Winecoff Hotel Fire

- December 7, 1946
- Atlanta, Georgia
- Deadliest hotel fire in United States history, killing 119 hotel occupants, including the hotel's original owners
- Was advertised as "absolutely fireproof". While the hotel's steel structure was indeed protected against the effects of fire, the hotel's interior finishes were combustible
- Building's exit arrangements consisted of a single stairway serving all fifteen floors. All of the hotel's occupants above the fire's origin on the third floor were trapped

1958 Our Lady of the Angels School Fire

- December 1, 1958
- Chicago, Illinois
- A total of 92 pupils and 3 nuns ultimately died when smoke, heat, fire, and toxic gases cut off their normal means of egress through corridors and stairways.
- Due to a grandfather clause that did not require schools to retrofit to a new standard if they already met previous regulations, the school legally complied with the State of Illinois and City of Chicago fire codes of 1958 and was generally clean and well-maintained; nonetheless, several fire hazards existed. Each classroom door had a glass transom above it, which provided ventilation into the corridor but also permitted flames and smoke to enter once heat broke the glass. The school had one fire escape. The building had no automatic fire alarm, no rate-of-rise heat detectors, no direct alarm connection to the fire department, no fire-resistant stairwells, and no heavy-duty fire doors from the stairwells to the second-floor corridor. At the time, fire sprinklers were primarily found in factories or in new school construction, and modern smoke detectors did not become commercially available until 1969.

1977 Beverly Hills Super Club Fire

- May 28, 1977
- Southgate, Kentucky
- A total of 165 people died and more than 200 were injured
- Overcrowding. normally held between 614 and 756 people, estimated occupancy on the date in question to be well over 925.
- Inadequate fire exits. Full occupancy of the entire complex was estimated to be roughly 2,750, which under Kentucky law would require 27.5 exits. The club had fewer than 17 exits, many of which were not clearly marked nor easily reached.
- Faulty wiring.
- Lack of firewalls. This allowed the fire to spread, and in addition allowed it to draw oxygen from other areas of the complex.
- Poor construction practices. The club had been built piecemeal with inadequate roof support, no common ceiling space, and highly flammable components.
- Extreme safety code violations. There was no sprinkler system and no audible automatic fire alarm.

1980 MGM Grand Fire

- November 21, 1980
- killed 85 people, most through smoke inhalation
- fire began in a restaurant known as The Deli. The fire was discovered during an inspection of the restaurant by a tile crew. A crew supervisor noticed a flickering light, which turned out to be a wall of flames.
- The fire spread to the lobby, fed by wallpaper, PVC piping, glue, and plastic mirrors, racing west through the casino floor at a speed of 15–19 ft/s (10–13 mph) until a massive fireball blew out the main entrance, facing the Las Vegas Strip. From the time the fire was noticed, it took six minutes for the entire casino floor to be fully engulfed.
- The fire was limited to the first floor,[15] although the burning material created toxic fumes and smoke, which ascended throughout the hotel tower via vertical shafts (elevators and stairwells) and seismic joints, causing the majority of the deaths.

Happy Land Social Club Fire

- The club was ordered to close for building code violations in November of 1988. Violations included lack of fire exits, alarms or sprinkler system
- March 25, 1990 West Farms, Bronx, New York
- 87 Killed
- The evening of the fire, González had argued with his former girlfriend, Feliciano, who was a coat check worker at the club, urging her to quit. She said that she had had enough of him and did not want anything to do with him anymore. He was ejected by the bouncer around 3:00 a.m.
- González went to an Amoco gas station, then returned to the establishment with a plastic container with $1.00 worth of gasoline.[2][4] He spread the fuel at the base of a staircase, the only access into the club, and then ignited the gasoline

2003 Station Night Club Fire

- February 20, 2003
- West Warwick, Rhode Island
- killing 100 people and injuring 230
- The fire was caused by pyrotechnics set off by the tour manager of the evening's headlining band, Great White, which ignited flammable acoustic foam in the walls and ceilings surrounding the stage.

2007 Charleston Sofa Super Store Fire

- June 18, 2007
- Charleston, South Carolina
- 9 Firefighters were killed
- Believed to have started in some discarded furniture in the loading dock area, and though the source of ignition remains undetermined, there is reason to believe it may have been a discarded cigarette
- 42,000 ft² single-story steel trussed showroom building with a 17,000 ft² warehouse building located behind the retail space

So, you think that you would like a building code in your municipality

Zoning

Zoning refers to municipal or local laws or regulations that govern how real property can and cannot be used in certain geographic areas. For example, zoning laws can limit commercial or industrial use of land to prevent oil, manufacturing, or other types of businesses from building in residential neighborhoods.

Building Code

- A set of rules that specify the minimum requirements to construct a building/structure. The main purpose of building codes is to protect public health, safety and general welfare as they relate to the construction and occupancy of buildings and structures.

- Building codes are generally intended to be applied by architects, engineers, interior designers, constructors and regulators but are also used for various purposes by safety inspectors, environmental scientists, real estate developers, subcontractors, manufacturers of building products and materials, insurance companies, facility managers, tenants, and others.

“Where do we start??”

Write or Buy?

Locally Written Code

- High cost
- Complex
- Locally adapted
- Time consuming
- Expertise?
- Untested

Model Code

- Lower cost
- Tested
- Easier
- Quicker
- May not fit local issues

Law

The building code becomes law of a particular jurisdiction when formally enacted/adopted by the appropriate governmental or private authority.

“

Let’s focus on a model code….

”

Code Basics

Historic Codes a Timeline

- 1866 National Board of Fire Underwriters (NBFU) (Insurance Industry)
  - 1905 Published National Building Code (NBC)
- 1896 National Fire Protection Association (NFPA)
- 1915 Building Officials and Codes Administrators, International (BOCA)
  - Oldest model code group
  - 1950 Published the Basic Building Code (BBC)
  - BBC becomes the NBC

Historic Codes a Timeline

- 1927 International Conference of Building Officials (ICBO)
  - 1927 Publishes the Uniform Building Code (UBC)
- 1940 Southern Building Code Congress (SBCC)
  - 1946 Published the Southern Standard Building Code (SBC) (Southern dropped as of 1973)

Historic Codes a Timeline

- 1972 American Building Officials (CABO)
  - Formed from the three model code organizations
  - 1974 Publish the One and Two Family Dwelling Code and Model Energy Code
- 1994 International Code Council (ICC)
  - 2000 International; Codes are published
  - 2002 BOCA< ICBO< & SBCCI formally merge

MODEL BUILDING CODES

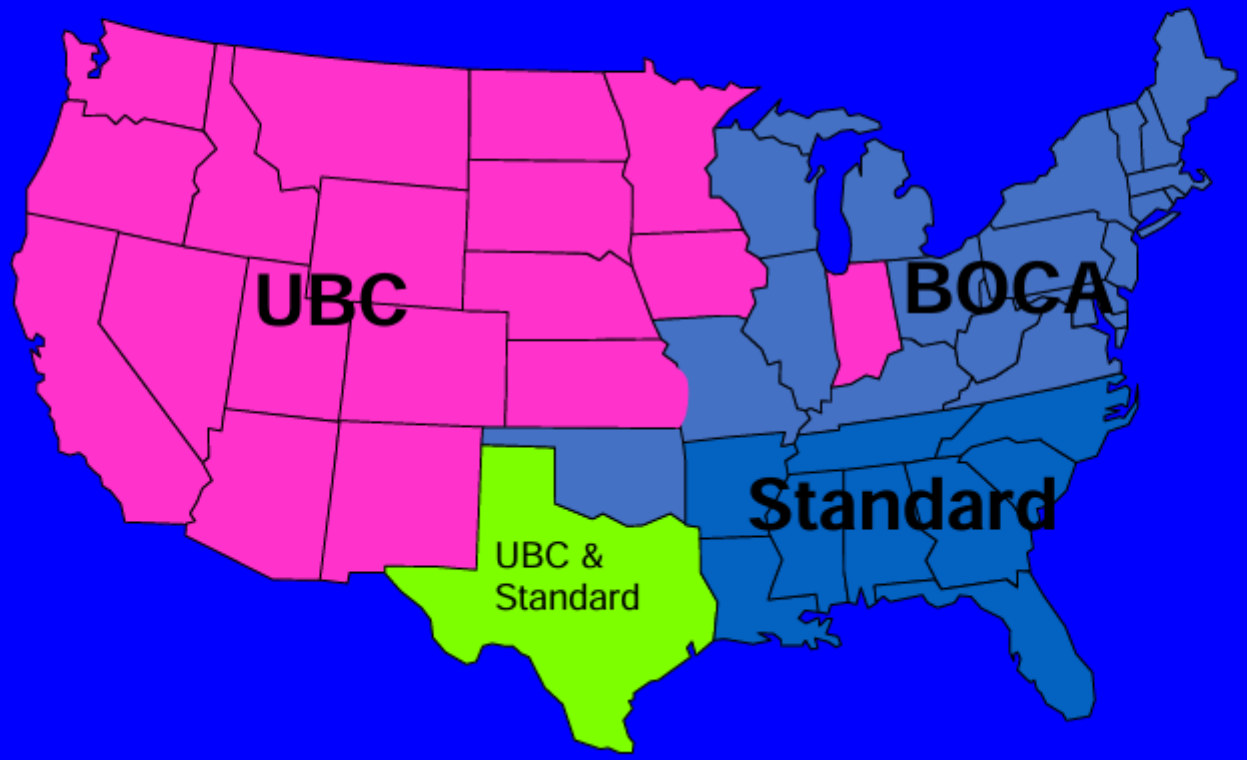


Table A.4.1.1 Cross-Reference of Building Construction Types

NFPA 5000	I(442)	I(332)	II(222)	II(111)	II(000)	III(211)	III(200)	IV(2HH)	V(111)	V(000)
UBC	—	I FR	II FR	II 1 hr	II N	III 1 hr	III N	IV HT	V 1 hr	V N
B/NBC	1A	1B	2A	2B	2C	3A	3B	4	5A	5B
SBC	I	II	—	IV 1 hr	IV UNP	V 1 hr	V UNP	III	VI 1 hr	VI UNP
IBC	—	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB

UBC: *Uniform Building Code*.

FR: Fire rated.

N: Nonsprinklered.

HT: Heavy timber.

B/NBC: *National Building Code*.

SBC: *Standard Building Code*.

IBC: *International Building Code*.

UNP: Unprotected.

Performance v. Prescriptive

Performance codes

- Also known as outcome-based codes, these codes set standards based on a building's actual performance, such as its energy use. Performance codes allow for flexibility in design and can be useful for designing unique structures.

Prescriptive Codes

- This approach requires that each element has a minimum acceptable standard. A prescriptive-based code uses current and accepted building materials and requires established techniques to achieve the goal. Typically this involves picking design information form a table based on the configuration.

Example

- 8’ High concrete foundation wall
- Retaining 8’ of soil
- Sand-silt clay mix with plastic fines (SM-SC)
- Wood floor system

DESCRIPTION OF BACKFILL MATERIAL[c]	UNIFIED SOIL CLASSIFICATION	DESIGN LATERAL SOIL LOAD[a] (pound per square foot per foot of depth)	
		Active pressure	At-rest pressure
Well-graded, clean gravels; gravel-sand mixes	GW	30	60
Poorly graded clean gravels; gravel-sand mixes	GP	30	60
Silty gravels, poorly graded gravel-sand mixes	GM	40	60
Clayey gravels, poorly graded gravel-and-clay mixes	GC	45	60
Well-graded, clean sands; gravelly sand mixes	SW	30	60
Poorly graded clean sands; sand-gravel mixes	SP	30	60
Silty sands, poorly graded sand-silt mixes	SM	45	60
Sand-silt clay mix with plastic fines	SM-SC	45	100
Clayey sands, poorly graded sand-clay mixes	SC	60	100
Inorganic silts and clayey silts	ML	45	100
Mixture of inorganic silt and clay	ML-CL	60	100
Inorganic clays of low to medium plasticity	CL	60	100
Organic silts and silt clays, low plasticity	OL	Note b	Note b
Inorganic clayey silts, elastic silts	MH	Note b	Note b
Inorganic clays of high plasticity	CH	Note b	Note b
Organic clays and silty clays	OH	Note b	Note b

MAXIMUM WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[e] (feet)	MINIMUM VERTICAL REINFORCEMENT-BAR SIZE AND SPACING (inches)								
		Design lateral soil load[a] (psf per foot of depth)								
		30[d]			45[d]			60		
		Minimum wall thickness (inches)								
		7.5	9.5	11.5	7.5	9.5	11.5	7.5	9.5	11.5
5	4	PC	PC	PC	PC	PC	PC	PC	PC	PC
	5	PC	PC	PC	PC	PC	PC	PC	PC	PC
6	4	PC	PC	PC	PC	PC	PC	PC	PC	PC
	5	PC	PC	PC	PC	PC	PC	PC	PC	PC
	6	PC	PC	PC	PC	PC	PC	PC	PC	PC
7	4	PC	PC	PC	PC	PC	PC	PC	PC	PC
	5	PC	PC	PC	PC	PC	PC	PC	PC	PC
	6	PC	PC	PC	PC	PC	PC	#5 at 48	PC	PC
	7	PC	PC	PC	#5 at 46	PC	PC	#6 at 48	PC	PC
8	4	PC	PC	PC	PC	PC	PC	PC	PC	PC
	5	PC	PC	PC	PC	PC	PC	PC	PC	PC
	6	PC	PC	PC	PC	PC	PC	#5 at 43	PC	PC
	7	PC	PC	PC	#5 at 41	PC	PC	#6 at 43	PC	PC
	8	#5 at 47	PC	PC	#6 at 43	PC	PC	#6 at 32	#6 at 44	PC
9	4	PC	PC	PC	PC	PC	PC	PC	PC	PC
	5	PC	PC	PC	PC	PC	PC	PC	PC	PC
	6	PC	PC	PC	PC	PC	PC	#5 at 39	PC	PC
	7	PC	PC	PC	#5 at 37	PC	PC	#6 at 38	#5 at 37	PC
	8	#5 at 41	PC	PC	#6 at 38	#5 at 37	PC	#7 at 39	#6 at 39	#4 at 48
	9[d]	#6 at 46	PC	PC	#7 at 41	#6 at 41	PC	#7 at 31	#7 at 41	#6 at 39
10	4	PC	PC	PC	PC	PC	PC	PC	PC	PC
	5	PC	PC	PC	PC	PC	PC	PC	PC	PC
	6	PC	PC	PC	PC	PC	PC	#5 at 37	PC	PC
	7	PC	PC	PC	#6 at 48	PC	PC	#6 at 35	#6 at 48	PC
	8	#5 at 38	PC	PC	#7 at 47	#6 at 47	PC	#7 at 35	#7 at 47	#6 at 45
	9[d]	#6 at 41	#4 at 48	PC	#7 at 37	#7 at 48	#4 at 48	#6 at 22	#7 at 37	#7 at 47
	10[d]	#7 at 45	#6 at 45	PC	#7 at 31	#7 at 40	#6 at 38	#6 at 22	#7 at 30	#7 at 38

Code v. Standard

- Codes are generally accepted sets of rules that tell you what you need to do.

- Standards provide the “how to” of executing codes.

Model Building Code

A model building code is a building code that is developed (written) and maintained by a standards organization independent of the jurisdiction responsible for enacting the building code. A local government can choose to adopt a model building code as its own. This saves local governments the expense and trouble of developing their own codes. Many smaller governments lack the expertise to do so.

Scope

The provisions of this code shall apply to the construction, alteration, relocation, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.

Intent

The purpose of this code is to establish the minimum requirements to provide a reasonable level of safety, public health and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire, explosion and other hazards, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

Conflict within the code

Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

Referenced Standards

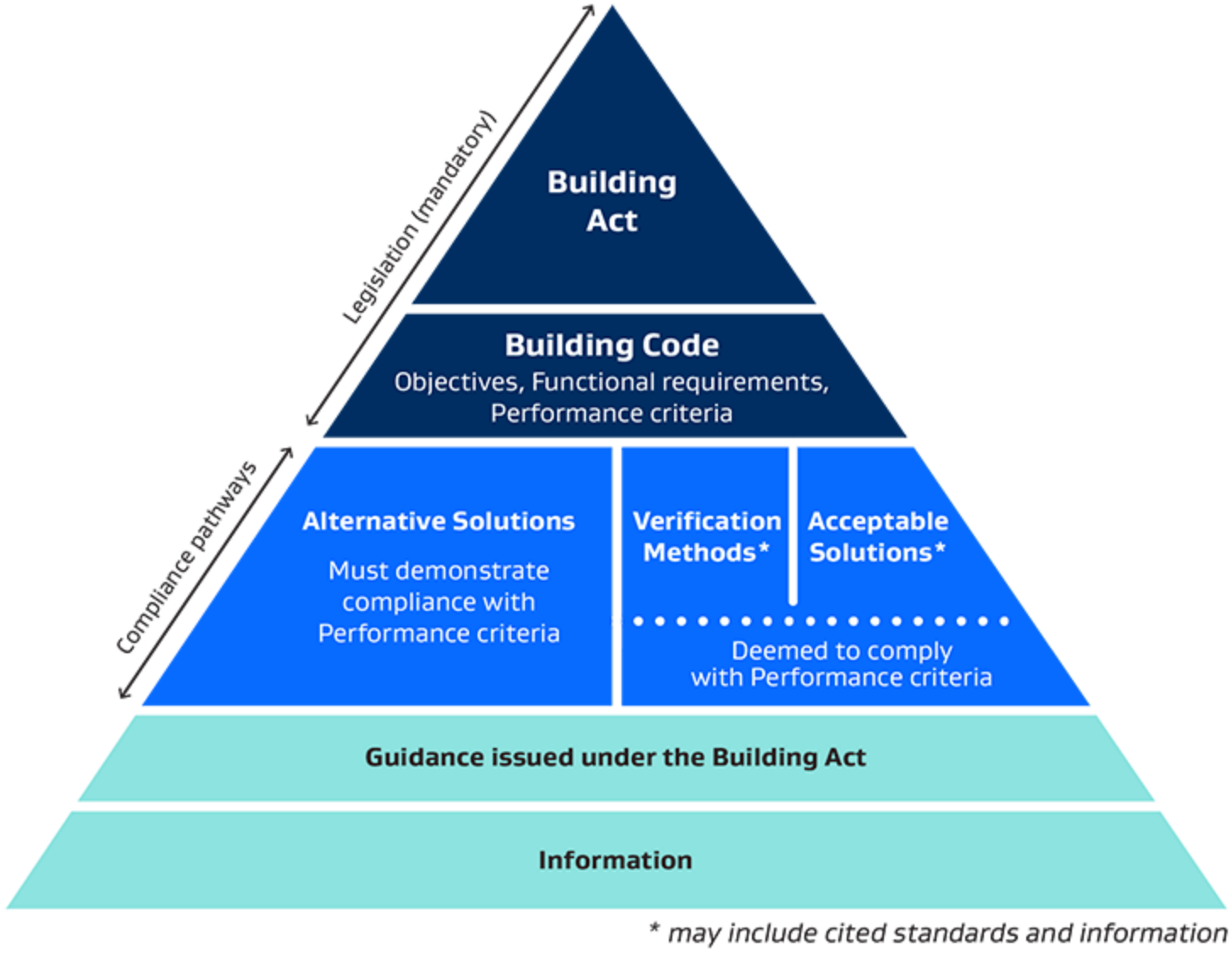
The codes and standards referenced in this code shall be considered to be part of the requirements of this code to the prescribed extent of each such reference and as further regulated

Referenced Standards

Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

Referenced Standards

Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code as applicable, shall take precedence over the provisions in the referenced code or standard.


Legislation (mandatory)
Building Act
Building Code
Objectives, Functional requirements, Performance criteria
Compliance pathways
Alternative Solutions
Must demonstrate compliance with Performance criteria
Verification Methods*
Acceptable Solutions*
Deemed to comply with Performance criteria
Guidance issued under the Building Act
Information
* may include cited standards and information

“Grandfather Clause”

- A grandfather clause (or grandfather policy or grandfathering) is a provision in which an old rule continues to apply to some existing situations while a new rule will apply to all future cases. Those exempt from the new rule are said to have grandfather rights or acquired rights, or to have been grandfathered in. Frequently, the exemption is limited; it may extend for a set time, or it may be lost under certain circumstances.

- The term originated in late nineteenth-century legislation and constitutional amendments passed by a number of U.S. Southern states, which created new requirements for literacy tests, payment of poll taxes, and/or residency and property restrictions to register to vote. States in some cases exempted those whose ancestors (grandfathers) had the right to vote before the American Civil War, or as of a particular date, from such requirements. The intent and effect of such rules was to prevent African-American former slaves and their descendants from voting, but without denying poor and illiterate whites the right to vote.

Accessibility

- The American National Standard Institute (ANSI) developed the first private sector model for accessible design in 1961.
- Architectural Barriers Act (ABA) was passed in 1968 - Requires that facilities designed, constructed, altered, or leased with certain federal funds be accessible to persons with disabilities
- First disability civil rights law was Section 504 of the Rehabilitation Act of 1973 – prohibits discrimination against disability when there is federal funding, federal programs, or federal contractors.

Accessibility

- 1984 Uniform Federal Accessibility Standards (UFAS)—Contains accessibility scoping and technical requirements implementing the Architectural Barriers Act of 1968.
- 1988 Fair Housing Amendments Act (FHAA)—Requires adaptable features in certain covered multi-family dwellings with 4 or more units.
- Pennsylvania Act 166 of 1988 – the Universal Accessibility Act – set standards in Pennsylvania for new and remodeled buildings to meet a standard for accessibility by people with physical disabilities.

Accessibility

- July 26, 1990, the ADA was signed into law, shortly thereafter, ADA Accessibility Guidelines (ADAAG) were published.
  - ADAAG was derived in large part from the A117.1 standard.
- Title III – Public Accommodations and Commercial Facilities
  - Title III prohibits discrimination on the basis of disability in the activities of places of public accommodations
    - Businesses that are generally open to the public, such a:
    - Restaurants
    - Schools / Day care facilities
    - Recreation facilities
    - Factories / Warehouses
    - Office buildings

Accessibility

- 2004: ADA and ABA Accessibility Guidelines for Buildings and Facilities—Updated and last published in the Federal Register on May 7, 2014.
- 2010: U.S. Department of Justice (DOJ) 2010 ADA Standards for Accessible Design—Contains accessibility scoping and technical requirements implementing the Americans with Disabilities Act of 1990 for all ADA covered1 facilities except transportation facilities.
- 2017: The U.S. Access Board issued new accessibility standards for medical diagnostic equipment (MDE) under section 510 of the Rehabilitation Act.
  - Also, the Board developed the standards in consultation with the Food and Drug Administration. The Department of Transportation issued regulations mandating accessible public transit vehicles and facilities.

Accessibility

- Act 45 of 1999 went into effect on April 9, 2004.
- The International Codes became the regulations for design, construction, and alteration of structures, with a couple of amendments.
- The PA UCC points us to the International Existing Building Code, the International Building Code, the International Plumbing Code, and ICC A117.1.

ICC Codes Basics

I-Codes Basics

- Chapter 1 – Scope & Administration
- Chapter 2 – Definitions (Whole document)
- Section XX2 – Definitions for that chapter only if any
- Last numbered chapter – Referenced Standards

I-Codes Basics

- Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the previous edition.
- Deletion indicators in the form of an arrow (→) are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or a table has been deleted.
- A single asterisk [*] placed in the margin indicates that text or a table has been relocated within the code.
- A double asterisk [**] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code.
- Selected words and terms defined in Chapter 2, Definitions, are italicized where they appear in code text and the Chapter 2 definition applies. Where such words and terms are not italicized, commonuse definitions apply. The words and terms selected have code-specific definitions that the user should read carefully to facilitate better understanding of the code.
- Note: In Sections 1903 through 1905, italics indicate provisions that differ from ACI 318.

2006 IBC

[F] 903.2.6 Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy

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2009 IBC

[F] 903.2.7 Group M. An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy whe

1. A Group
(1115 m²)
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4. A Group
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2012 IBC

[F] 903.2.7 Group M. An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. A Group M *fire area* exceeds 12,000 square feet (1115 m²).
2. A Group M *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group M *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).
4. A Group M occupancy used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m²).

[F] TABLE 903.2.11.6
ADDITIONAL REQUIRED SUPPRESSION SYSTEMS

SECTION	SUBJECT
402.5, 402.6.2	Covered and open mall buildings
403.3	High-rise buildings
404.3	Atriums
405.3	Underground structures
407.6	Group I-2
410.7	Stages
411.4	Special amusement buildings
412.3.6	Airport traffic control towers
412.4.6, 412.4.6.1, 412.6.5	Aircraft hangars
415.11.11	Group H-5 HPM exhaust ducts
416.5	Flammable finishes
417.4	Drying rooms
419.5	*Live/work units*
424.3	Children's play structures
427	Buildings containing laboratory suites
507	Unlimited area buildings
509.4	Incidental uses
1029.6.2.3	Smoke-protected assembly seating
IFC	Sprinkler system requirements as set forth in Section 903.2.11.6 of the *International Fire Code*

[F] 903.3.1.1.1 Exempt locations. Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from a room merely because it is damp, of fire-resistance-rated construction or contains electrical equipment.

1. A room where the application of water, or flame and water, constitutes a serious life or fire hazard.
2. A room or space where sprinklers are considered undesirable because of the nature of the contents, where *approved* by the fire code official.
3. Generator and transformer rooms separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a *fire-resistance rating* of not less than 2 hours.
4. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.
5. Fire service access elevator machine rooms and machinery spaces.
6. Machine rooms, machinery spaces, control rooms and control spaces associated with occupant evacuation elevators designed in accordance with Section 3008.

[F] 903.3.1.1.2 Bathrooms. In Group R occupancies sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m^2) in area and are located within individual *dwelling units* or *sleeping units*, provided that walls and ceilings, including the walls and ceilings behind a shower enclosure or tub, are of noncombustible or limited-combustible materials with a 15-minute thermal barrier rating.

[F] 903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies up to and including four stories in height in buildings not exceeding 60 feet (18 288 mm) in height above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from the horizontal assembly creating separate buildings.

[F] 903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of *dwelling units* and *sleeping units* where either of the following conditions exists:

1. The building is of Type V construction, provided that there is a roof or deck above.
2. Exterior balconies, decks and ground floor patios of dwelling units and sleeping units are constructed in accordance with Section 705.2.3.1, Exception 3.

Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

[F] 903.3.1.2.2 Open-ended corridors. Sprinkler protection shall be provided in *open-ended corridors* and associated *exterior stairways* and *ramps* as specified in Section 1027.6, Exception 3.

[F] 903.3.1.2.3 Attics. Attic protection shall be provided as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by an *automatic sprinkler system*.
2. Where fuel-fired equipment is installed in an unsprinklered attic, not fewer than one quick-response intermediate temperature sprinkler shall be installed above the equipment.
3. Where located in a building of Type III, Type IV or Type V construction designed in accordance with Section 510.2 or 510.4, attics not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet (16 764

rials with a 15-minute thermal barrier rating.

[F] 903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies up to and including four stories in height in buildings not exceeding 60 feet (18 288 mm) in height above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from the horizontal assembly creating separate buildings.

[F] 903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies,

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

10—18: Standard for Portable Fire Extinguishers
906.2, 906.3.2, 906.3.4, Table 906.3(1), Table 906.3(2)

11—16: Standard for Low Expansion Foam
904.7

12—15: Standard on Carbon Dioxide Extinguishing Systems
904.8, 904.12

12A—15: Standard on Halon 1301 Fire Extinguishing Systems
904.9

13—16: Standard for Installation of Sprinkler Systems
712.1.3.1, 903.3.1.1, 903.3.2, 903.3.8.2, 903.3.8.5, 904.12, 905.3.4, 907.6.4, 1019.3

13D—16: Standard for the Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes
903.3.1.3

13R—16: Standard for the Installation of Sprinkler Systems in Low-rise Residential Occupancies
903.3.1.2, 903.3.5.2, 903.4

14—16: Standard for the Installation of Standpipe and Hose System
905.2, 905.3.4, 905.4.2, 905.6.2, 905.8

Pennsylvania Codes

Fire & Panic

- FIRE AND PANIC ACT Cl. 35 Act of Apr. 27, 1927

PA UCC

- **The Pennsylvania Construction Code Act** (**Act 45 of 1999**) established the basic requirements for the Uniform Construction Code. It has been altered thirteen times since becoming law by:
- **Act 43 of 2001:** An act establishing electrical exemption (for residential construction based on religious beliefs).
- **Act 13 of 2004:** An act establishing the 1992 CABO One and Two Family Dwelling Code stairway tread and riser requirements as the UCC standards for residential stairways, and mandating a $2.00 surcharge for each building permit issued by a municipality or third party agency.
- **Act 92 of 2004**: An act amending several residential code requirements of the Uniform Construction Code.

PA UCC

- **Act 230 of 2004**: An act providing for the use of municipal lateral standards, mandating the use of the latest ANSI standards for ski lift operations and repealing section 405.11(e) of the elevator and other lifting devices regulation.
- **Act 95 of 2005**: An act providing requirements to be imposed on uncertified buildings by the Department (uncertified commercial buildings in opt-out municipalities and state-owned buildings) and by municipalities that have opted to enforce the Uniform Construction Code (uncertified buildings in their jurisdiction).
- **Act 108 of 2006**: An act excluding from UCC requirements, the installation of aluminum or vinyl siding on existing residential and commercial buildings; allowing a code administrator to act in place of a lumber grading and inspection agency for lumber used in residential buildings; extending the religious exemption to include lumber or wood provisions applicable to single family homes and one-room school houses; and, relieving coal-fired residential boilers from the requirement that they carry an ASME stamp.
- **Act 157 of 2006**: An act exempting mushroom growing houses; establishing additional requirements for appeals boards; establishing additional requirements pertaining to residential building permit applications and inspections; exempting work on equipment owned by public service agencies; establishing requirements related to code interpretations; creating additional requirements for municipal UCC change ordinances; allowing a code administrator to act in place of a lumber grading agency (for residential construction); establishing a religious exemption for plumbing requirements; and, increasing the building permit surcharge to $4.00, of which $2.00 will be utilized for contractor training.

PA UCC

- **Act 9 of 2007**: An act specifying that residential concrete and masonry foundation walls shall be constructed in accordance with: All provisions of section R404 of the 2006 International Residential Code and its successor codes except Section R404.1 and Tables R404.1(1), R404.1(2) and R404.1(3); ACI 318, ACI 332, NCMA TR68-A or ACI 530/ASCE 5/TMS 402; or Other approved structural standards.
- **Act 39 of 2007**: An act excluding from UCC requirements temporary structures that are erected for fairs, flea markets, arts and craft festivals or other public celebrations; are less than 1,600 feet in size; are erected for less than 30 days; and, are not a swimming pool, spa or hot tub. Municipalities may, however, elect to regulate these via a section 503(a) administrative change, but compliance must be limited to flame propagation criteria, electrical and fire extinguisher requirements. The act also exempts pole barns from all UCC requirements, except for electrical requirements, if constructed on agricultural fairgrounds and used for agricultural and public display purposes.

PA UCC

- **Act 106 of 2008**: An act establishing the Uniform Construction Code Review and Advisory Council. This 19-member council will advise the General Assembly (on UCC issues and proposed statutory changes) and the Department (as to whether the latest triennial International Codes should be adopted as published or with changes). See especially the new section 7210.107, the changes to sections 7210.304(a)(1)-(2), and the new section 7210.304(d). Act 1 of 2011: An act altering the triennial code adoption process and amending the duties and responsibilities of the UCC Review and Advisory Council; repealing the automatic sprinkler requirement for one- and two-family dwellings; establishing special energy conservation requirements for log homes; replacing the wall bracing requirements in the International Residential Code (IRC) 2009 with those found in the IRC 2006; and, specifying that industrialized housing will not be subject to any code provisions that have been omitted from adoption under the UCC. Click on the links below to access the amendments contained in the acts listed above.

PA UCC

- Act 1 of 2011: An Act requiring The Uniform Construction Code Review and Advisory Council, in its review of the triennial ICC Codes (beginning with the publication of the 2012 ICC Codes), to: hold three public hearings: one in Harrisburg, one in the eastern region of the Commonwealth, and one in the western region of the Commonwealth issue a report to the Secretary of the Department of Labor and Industry within 12 months of the publication of the ICC Codes indicating the portions specified for adoption as Pennsylvania's Uniform Construction Code which includes the impact that a provision may have upon the health, safety and welfare of the public. The economic and financial impact of the provision, as well as the technical feasibility of the provision must also be provided. The Department of Labor and Industry must, within three months of receiving the Council's report under section 107 (b.1), promulgate final-omitted regulations under the act of June 25, 1982, to adopt the triennial ICC Codes specified by the report as Pennsylvania's Uniform Construction Code. The Department has no discretion to vary from the Council's report in the drafting of the regulations. The Department shall promulgate regulations updating accessibility standards under Chapter 3 by adopting Chapter 11 and Appendix E of the International Building Code of2015, and the 2015 International Existing Building Code, or its successor, by December 31 of the year of issuance of the new code. Additionally, Act 1 of 2011 creates new statutory exemptions from the ICC Codes for specific building features such as log walls in residential buildings, automatic fire sprinkler systems in one- and two-family dwellings, and fire protection of certain floors, and wall bracings.

- Act 1 of 2011's statutory exemptions as to automatic fire sprinkler systems and fire protection of certain floors apply retroactively to January 1, 2010.

PA UCC

- Act 35 of 2017: An act providing an exclusion for structures less than 1,000 square feet that are used to process maple sap, for seasonal farm stands and for structures used to load, unload, or sort livestock at a livestock auction facility.

- Act 36 of 2017: An act requiring the re-review of the 2015 International Code Council (ICC) building codes; amending the make-up of the UCC Review and Advisory Council, the triennial review process and it's timeline; permitting Philadelphia to pass an ordinance adopting the 2018 commercial ICC codes; raising the building permit fee from $4.00 to $4.50; creating a UCC Review and Advisory Council administrative account to pay for Council expenses; and providing for a local board of appeals to be created according to the UCC and municipal code officials to use Labor & Industry's requirements for uncertified buildings without passing an ordinance; and establishing a six month statute of limitations for permit application submissions after regulations adopting updated building codes go into effect.

Regulations

- CHAPTER 401. UNIFORM CONSTRUCTION CODE TRAINING AND CERTIFICATION OF CODE ADMINISTRATORS

401

- 401.1. Definitions.
- 401.2. Department fees.
- 401.2a. Municipal and third-party agency fees.
- 401.3. Certification required.
- 401.4. Application and identification.
- 401.5. Waivers.
- 401.6. Certification categories and testing.
- 401.7. Certification category specifications.
- 401.8. Certification renewal.
- 401.9. Continuing education.
- 401.10. Department-approved providers.
- 401.11. Certification of third-party agency.
- 401.12. Liability insurance.
- 401.13. List of code administrators.
- 401.14. Decertification or refusal to certify.
- 401.15. Registration of current code administrators.
- 401.16. Change of address or employer.

Regulations

- CHAPTER 403. ADMINISTRATION

403

- 403.1. Scope.
- 403.2. Other statutes or ordinances.
- 403.3. Building code official delegation.

403

- 403.21. Uniform Construction Code.
- 403.22. Health care facilities.
- 403.23. Child day care facilities.
- 403.24. Historic buildings, structures and sites.
- 403.25. Manufactured and industrialized housing.
- 403.26. Swimming pools.
- 403.27. Applicability and use of standards.
- 403.28. Uncertified buildings.

403

- 403.41. Commercial construction.
- 403.42. Permit requirements and exemptions.
- 403.42a. Permit application.
- 403.43. Grant, denial and effect of permits.
- 403.44. Alternative construction materials and methods.
- 403.45. Inspections.
- 403.46. Certificate of occupancy.
- 403.47. Public utility connections.
- 403.48. Boilers.

403

- 403.61. Residential buildings.
- 403.62. Permit requirements and exemptions.
- 403.62a. Permit application.
- 403.63. Grant, denial and effect of permits.
- 403.64. Inspections.
- 403.65. Certificate of occupancy.
- 403.66. Public utility connections.

403

- 403.81. Stop work order.
- 403.82. Notice of violations.
- 403.83. Order to show cause/order to vacate.
- 403.84. Unsafe building, structure or equipment.
- 403.85. Release, retention and sharing of commercial construction records.
- 403.86. Right of entry to inspect.

403

- 403.101. Effective date.
- 403.102. Municipalities electing to enforce the Uniform Construction Code.
- 403.103. Municipalities electing not to enforce the Uniform Construction Code.
- 403.104. Department review.

403

- 403.121. Board of appeals.
- 403.122. Appeals, variances and extensions of time.

403

- 403.141. Enforcement by the Department.
- 403.142. Accessibility Advisory Board

Review and Advisory Council (RAC)

- The Uniform Construction Code (UCC) Review and Advisory Council were established by the Pennsylvania Construction Code Act (PCCA). The Council consists of 21 members, with appointments made by the Governor and the General Assembly.
- The members represent industry sectors that participate in the various aspects relating to building - including building component design, construction, building code enforcement and local government representation.

Review and Advisory Council (RAC)

- The Council is charged with making recommendations to the Governor, the General Assembly and Labor & Industry regarding proposed changes to the PCCA.
- The Council is also charged with reviewing the most recent triennial building code updates published by the International Code Council (ICC).

Codes

- International Building Code (IBC)
- International Energy Conservation Code (IECC)
- International Existing Building Code (IEBC)
- International Fire Code (IFC) (By reference only!)
- International Fuel Gas Code (IFGC)
- International Mechanical Code (IMC)
- ICC Performance Code for Buildings and Facilities (ICCPC)
- International Plumbing Code (IPC)
- International Residential Code for One- and Two-Family Dwellings (IRC)
- International Wildland-Urban Interface Code (IWUIC)
- International Swimming Pool and Spa Code (ISPSC)

QUESTIONS