

# An Introduction to Building Codes for Property Owners

FEMA Building Science Branch – Building Disaster  
Resilient Communities



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# Goals and Outcomes

To inform and equip property owners about:

- Value of building codes in increasing your safety and disaster resilience.\*
- Building codes stakeholders, adoption process and implementation.
- Available tools to support proper construction and rebuilding.

\*[The Presidential Policy Directive/PPD-8: National Preparedness](#) defines the term “resilience” as the ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies.



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# Topics

- The History of Building Codes
- What are Building Codes?
- Why are Building Codes Important?
- Who's Involved?
- What are the Available Tools?



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# HISTORY OF BUILDING CODES



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# Building Codes- BC

## Codes of Hammurabi – 2000 BC

- “In the case of collapse of a defective building, the builder is to be put to death if the owner is killed by accident; and the builder’s son if the son of the owner loses his life...”

## Socrates – 341 BC

- He shall set the joists against each other, fitting, and before inserting the dowels he shall show the architect all the stones to be fitting, and shall set them true and sound and dowel them with iron dowels, two dowels to each stone...”



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# Origins of Modern Codes

- Insurance industry: Establish standards to minimize accidents/claims.
- Social organizations: Eliminate squalor and impact on health.
- Local governments: Develop regulations to deliver health and safety to taxpayers.
- Disasters: Mitigate loss of life and property based on public demand.



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# WHAT ARE BUILDING CODES?



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# What are Building Codes?



Jimmy and Debbie Bishop's house survived Hurricane Ike nearly unscathed.  
Source: Roy Tyson/FEMA

- Building codes specify the minimum legal design and construction requirements for a given jurisdiction:
  - Structural integrity
  - Construction materials
  - Fire protection
- Consistent standard



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# Who is involved in developing the codes?



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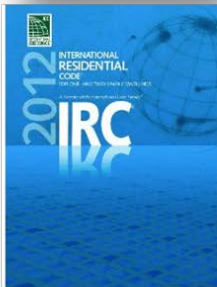


- The International Code Council (ICC) develops codes in collaboration with:
  - Federal Emergency Management Agency (FEMA)
  - Other Federal, states, local and private authorities



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# What are the different I-Codes?



The International Code Council (ICC) family of codes covers all aspects of construction and includes (but is not limited to):

- International Building Code (IBC): Applies to new and existing buildings, except those residential buildings covered under the International Residential code.
- International Residential Code (IRC): Applies to new and existing one- and two-family dwellings and townhouses of not more than three stories in height.



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# What are the different I-Codes?

- International Property Maintenance Code (IPMC): Applies to all existing buildings and addresses maintenance issues for continued safe use of buildings.
- International Existing Building Code (IEBC): Applies to the alteration, repair, addition, or change in occupancy of existing structures.
- International Fire Code (IFC): Applies to fire and explosion hazards.



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# What are the different I-Codes?



- International Green Construction Code (IgCC): Applies to sustainability measures to make buildings green.



- International Zoning Codes (IZC): Promotes uniformity and consistency in zoning for city planners, code officials and developers.

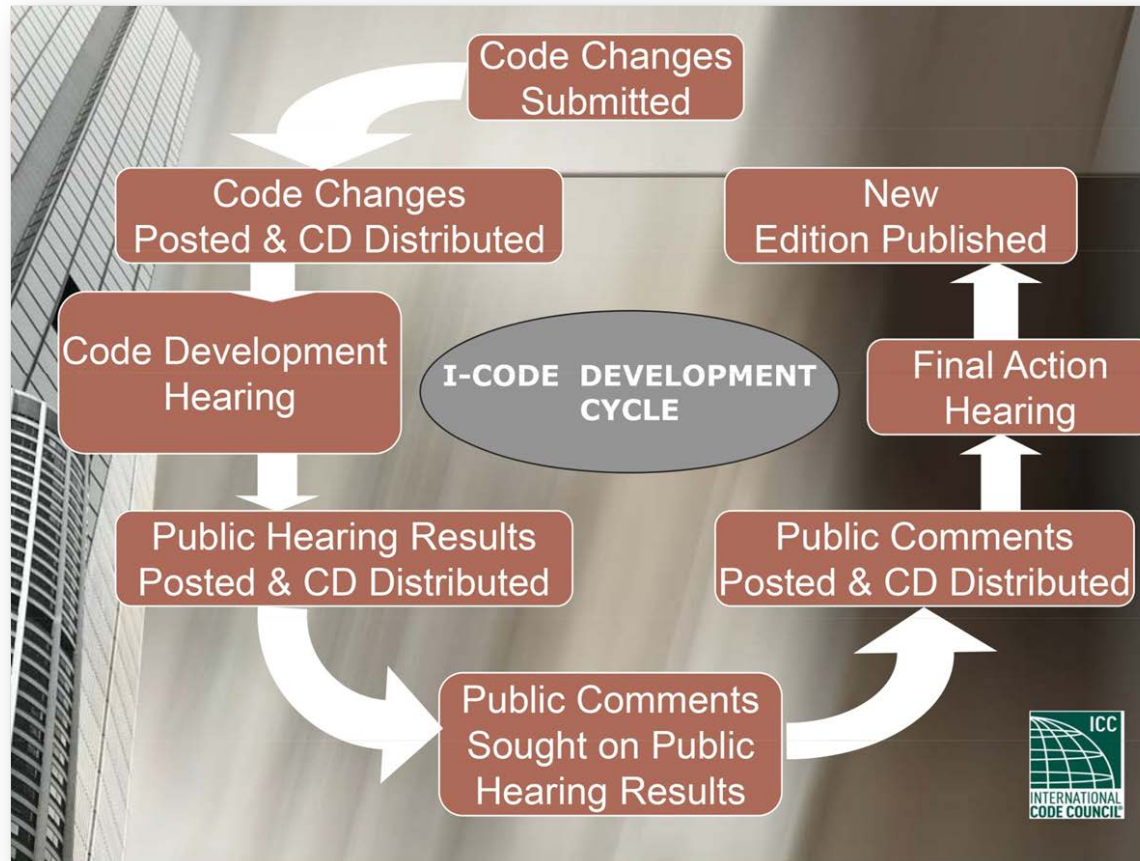


- ICC Performance Code for Buildings and Facilities (ICCPC): Presents regulations based on outcome rather than prescription.



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# I-Code Development Cycle



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# NFPA Codes and Standards

## National Fire Protection Association Codes



- More than 300 codes and standards:
  - Fire Code (NFPA 1)
  - Hydrogen Technologies Code (NFPA 2)
  - Recommended Practice on Commissioning and Integrated Testing of Fire Protection and Life Safety Systems (NFPA 3)
  - Standard for Integrated Fire Protection and Life Safety System Testing (NFPA 4)
  
- <http://www.nfpa.org>



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# FEMA and the Codes

- FEMA's Strategic Goal is to support disaster resilience and the ability of our local communities to withstand and recover rapidly from disaster events. Building Code adoption supports this goal.
- FEMA Building Science Branch and the National Earthquake Hazards Reduction Program (NEHRP) serve as the agency's technical resource for building codes information, standards, and guidance for proper rebuilding and construction.
- FEMA partners with ICC, the regions, design professionals, and local jurisdictions to disseminate information on disaster resilient building codes, train local officials, and support building codes adoption and enforcement.



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# WHY ARE BUILDING CODES IMPORTANT?



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# Building Codes Save Lives



A tornado safe room was not required by local building code but Tom Cook of Joplin, MO, built one anyway. It probably saved his and his daughter's life. [Click here](#) to see a Safe Room Testimonial Video.  
Source: Springfield news-Leader



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# Building Codes Protect Your Investment



- Reduce property and financial losses
- Recover fast
- Protect community tax base

Photo:

Top: Insufficiently embedded pilings in Daughin Island, AL, post Katrina.

Bottom: This post-Katrina retrofit is built to code.

Source: FEMA 549



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# Building Codes Save on Insurance



- Premium discounts:
  - Wind
  - Fire
  - Flood
  - Earthquake
- Reduced flood insurance rates.
- Everyone benefits when money is saved and losses are avoided.

Photo:

Top: This home had structural damage from trapped floodwaters.

Bottom: Bruce Colby of Slidell, LA, installed \$600 in flood vents, saving \$700 each year in flood insurance.

Source: FEMA Best Practice



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# Building Codes Increase Disaster Resilience



- Safeguard property and provide minimum life safety protections.
- Enable the continuation of operations and essential services.
- Allow individuals and families to rapidly recover with minimal costs.

Photo:

A FEMA worker hugs a Pope County, AR, resident whose home was damaged by a tornado. Building codes reduce damage and save lives.

Source: Leif Skoogfors/FEMA



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# IBHS Wind Lab Test



This is a video depicting why building codes and proper construction matters.

[Click here](#) to see the IBHS Research Center video.

Source: Insurance Institute for Business & Home Safety



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# Building Codes Enhances Building Stock



Building code provisions enhance the Nation's building stock over time by:

- Adopting codes for new construction.
- Regulating existing structures and trigger upgrades.
- Enacting legislation to supplement codes by mandating improvements or encouraging improvements through incentive programs.

Photo:

A new home being built after the Hardy Family's home was destroyed in 2011 when a string of deadly tornadoes swept through Alabama.

Source: Ruth Kennedy/FEMA



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# WHO'S INVOLVED?



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# Roles of ICC, FEMA, and Design Community

- Development: Building codes are developed by a coalition of national organizations and experts.
- Outreach: FEMA, ICC, and other partner organizations work together to educate and promote the value of building codes by sharing best practices and available resources.
- Training: FEMA and ICC provide training options to educate and promote the adoption, enforcement, and use of building codes with communities.
- Partnership: FEMA, ICC, and other partner organizations work together to ensure building codes are developed, adopted, enforced, and promoted nationwide.



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# Role of Insurance Industry



FEMA Community Relations team member speaks about available federal aid to victims affected by a deadly tornado that hit in 2011. An insurance agent waits her turn.  
Source: Liz Roll/FEMA

- The insurance industry has a vested interest to support the adoption of strong statewide building codes.
- By making buildings more resistant to damages, a property owner will have fewer insurance claims which results in less pressure on the insurance marketplace.
- Some insurance companies offer premium discounts.



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# Role of Emergency Managers



FEMA Community Relations representative, Linda Colon and Cabo Rojo Emergency Manager, Herbert Rodriguez listen to resident in flooded neighborhood.  
Source: Andrea Booher/FEMA

- Building Codes and emergency planning
- Building Codes as a requirement for construction grants
- Building relationships with local building code officials and the development community



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# Roles of States and Local Jurisdictions



A county official inspects the wiring in a FEMA supplied mobile home in California.  
Source: Amanda Bicknell/FEMA

- Adoption and Enforcement
- Building/Code Official
  - Officer charged with the administration/enforcement of the codes or a duly authorized representative.
- Building Inspector
  - Individual tasked with verifying whether construction is done according to plan.



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# Roles of Contractors, Architects, Engineers



Auburn University Professor Paul Holley discusses the design of FEMA's DAWG HAUS with FEMA HPA Engineer James Crawford III. Source: Ruth Kennedy/FEMA

- General Contractor
  - An organization or individual that is hired for the construction of a structure.
- Architect
  - An individual who initiates the building design.
- Engineer
  - Individual tasked with calculating, fitting, and determining the structural systems to be used for the project.



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# WHAT TOOLS ARE AVAILABLE?



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# For More Information:

- Consult your Local & State Building Departments
- International Code Council:
  - [www.iccsafe.org](http://www.iccsafe.org)
  - <http://www.icc-foundation.org>
  - International Code Council Call Center: Phone: (888) 422-7233 and press 0 or Email: [CareCenter@iccsafe.org](mailto:CareCenter@iccsafe.org)
- FEMA Building Science Branch:
  - <http://www.fema.gov/building-science>
  - <http://www.fema.gov/earthquake>
  - FEMA Building Science Helpline: Phone: (866) 927-2104 or Email: [FEMA-Buildingsciencehelp@fema.dhs.gov](mailto:FEMA-Buildingsciencehelp@fema.dhs.gov)
- FEMA Building Codes Toolkit: <http://www.fema.gov/earthquake-publications/building-codes-toolkit-0>



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# FEMA Publications & Technical Guidance



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