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Resiliency Engineering and Security

October 25, 2016
Overview

– 2016 Connecticut State Building Code Adoption
– National Flood Insurance Program (NFIP) and Building Codes
– Flood Provisions of the Building Code
– Challenges and Benefits
Connecticut State Building Code

“The 2016 Connecticut State Building Code has been approved and will be effective for all permit applications on or after October 1, 2016.”

– CT Office of State Building Inspector
2016 Connecticut State Building Code

- 2012 International Building Code (IBC)
- 2012 International Residential Code (IRC)
- 2009 ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
- 2012 International Existing Building Code
- 2012 International Plumbing Code
- 2012 International Mechanical Code
- 2012 International Energy Conservation Code
- 2014 NFPA 70, National Electrical Code, of the National Fire Protection Association Inc.
Flood amendments
– Mainly administrative
– Do not appear to weaken or add higher requirements than the I-Codes
One- and two-family dwellings
Chapter 1. Administration
Section R322. Flood-Resistant Construction

All structures other than those covered by IRC
Chapter 1. Administration
Chapter 16. Structural Design Requirements

Required by IBC
Allowed by IRC in Zone V and Coastal A Zone, required in floodway

– Federal Emergency Management Agency
NFIP and Building Codes

– Common intent and purpose to protect public safety and reduce property damage
– NFIP regulations govern development in the floodplain
– Codes govern buildings and structures
– NFIP regulations largely unchanged since 1980s
– Building codes and standards updated on regular schedule using consensus process, experts, past experience
– Building codes can be more specific and include some higher standards
“ASFPM strongly believes the minimum NFIP floodplain regulations do not provide adequate long-term flood risk reduction for communities and that the benefits of flood risk reduction achieved by higher regulatory standards far outweighs the burden of administering them.”

– ASFPM Floodplain Regulations Committee
NFIP and Building Code

Building codes can be more specific and include some higher standards

– Provide specific requirements for determining flood loads
– Detailed specifications, such as for pile foundations
– Allow for design flood greater than the base flood
– More strict limitations on dry floodproofing
– Higher standards for critical facilities
States and localities should adopt and enforce the most current version of the IBC and IRC.

— Hurricane Sandy Rebuilding Task Force
Flood Provisions of the Building Code
Key Changes from 2003 IBC to 2012 IBC

– Require floodway analysis if floodway not mapped

– Limitations on granting modifications equivalent to NFIP variance provisions

– Require documentation of lowest floor elevation prior to final inspection

– Through reference to updated ASCE 24
  • Separate chapters for requirements based on flood zone
  • Coastal A Zone requirements
  • Freeboard requirements based on occupancy category
Flood Provisions of the Building Code
Coastal A Zone

- Higher requirement than NFIP
- Coastal A Zone buildings must meet Zone V requirements
- Flood openings required in breakaway walls
- Delineated on newer FIRMs by Limit of Moderate Wave Action (LiMWA)
Flood Provisions of the Building Code
Freeboard based on Occupancy Category

– Higher standard than the NFIP in most cases

<table>
<thead>
<tr>
<th>Elevation of Lowest Floor</th>
<th>Category I</th>
<th>Category II</th>
<th>Category III</th>
<th>Category IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>All A Zones not identified as Coastal A Zones: elevation of lowest floor</td>
<td>DFE</td>
<td>BFE +1 ft or DFE, whichever is higher</td>
<td>BFE +1 ft or DFE, whichever is higher</td>
<td>BFE +2 ft or DFE, whichever is higher</td>
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<thead>
<tr>
<th>Elevation of Bottom of Lowest Horizontal Structural Member</th>
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<th>Category II</th>
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<th>Category IV</th>
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<tbody>
<tr>
<td>All V Zones and Coastal A Zones: where the lowest horizontal structural member is parallel to direction of wave approach</td>
<td>DFE</td>
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<th>Elevation Below Which Flood-Damage-Resistant Materials Shall be Used</th>
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<td>All V Zones and Coastal A Zones: where the lowest horizontal structural member is perpendicular to direction of wave approach</td>
<td>DFE</td>
<td>BFE +2 ft or DFE, whichever is higher</td>
<td>BFE +3 ft or DFE, whichever is higher</td>
<td>BFE +3 ft or DFE, whichever is higher</td>
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Source: Highlights of ASCE 24-05 (FEMA)
### Flood Provisions of the Building Code

Freeboard based on Occupancy Category

- Higher standard than the NFIP in most cases

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<th>Minimum Elevation of Utilities and Equipment (Table 7-1)</th>
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<th>Dry Floodproofing of non-residential structures and non-residential portions of mixed-use buildings (Table 6-1)</th>
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<tr>
<td>All A Zones not identified as Coastal A Zones: elevation to which dry floodproofing extends</td>
<td>BFE +1 ft or DFE, whichever is higher</td>
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<td>BFE +2 ft or DFE, whichever is higher</td>
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<tr>
<td>All V Zones and Coastal A Zones: dry floodproofing not allowed</td>
<td>Not permitted</td>
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Source: Highlights of ASCE 24-05 (FEMA)
Flood Provisions of the Building Code
Key Changes from 2009 IRC to 2012 IRC

– Require documentation of lowest floor elevation prior to final inspection

– Allow use of ASCE 24 within delineated Coastal A Zones (in addition to allowed use in Zone V)

– Specify limitations on spread footing, mat, raft foundations that support columns and require ASCE 24 compliance

– Require space below elevated homes in Zone V to be free of obstruction
“It can be a challenge to administer two regulatory instruments that govern the same thing.”

- Anonymous
Challenges

– Communities in Connecticut have to enforce the building code and local floodplain management regulations
– Codes and floodplain regulations might be enforced by different departments
– Differences in requirements can be tedious to figure out
– Conflicting requirements can be confusing
Benefits

– Strengthened enforcement in flood hazard areas
– Improved construction quality
– Effective inspections
– Reduced damage
Resources

– CT Code Amendments:

– ICC Free eCode Viewer:
  http://codes.iccsafe.org/I-Codes.html#2012

– ICC Flood CodeMaster:
  http://shop.iccsafe.org/

– ICC Government Relations:
  http://www.iccsafe.org/about-icc/government-relations/map/connecticut/

– FEMA Resources:
  https://www.fema.gov/building-code-resources
Thank You

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