



Wealth Builder/Partners in Growth Conference

March 30, 2015
Scottsdale, AZ

Commercial code requirements

presented by

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Some background

- The I-codes are “model codes” developed by the International Code Council (ICC)
- Model codes serve as the technical basis for state or local code adoption
- The code provides the minimum legal requirements for building construction...and operation
- The code is enforced by the “authority having jurisdiction” (AHJ)
- The code can also provide a basis for construction claims-related litigation



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Who is responsible?

- The building owner
 - The “holder” of the certificate of occupancy
- Anyone who contracts with the owners
 - Assignment of liability is (very) common



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Legal considerations

“In most states, a building code violation is considered to be evidence of negligence. In some situations, a building code violation may be considered *negligence per se*...”

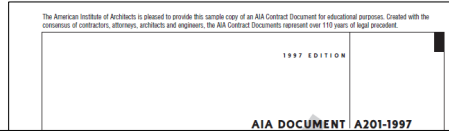
--Stephen M. Phillips
Hendrick, Phillips, Salzman & Flatt



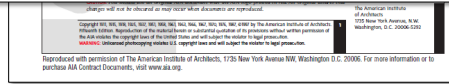
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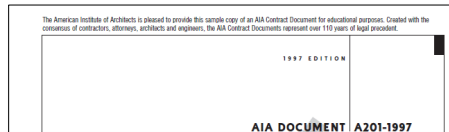
AIA A201 – General Conditions of a Contract for Construction



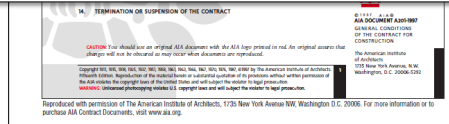
Article 3 Contractor
3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statues, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by and made known to the Contractor as a request for information in such a form as the Architect may require.



AIA A201 – General Conditions of a Contract for Construction



Article 3 Contractor
3.2.4 ...If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay the costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages ...for nonconformities of the Contract Documents to... codes...



International Code Council (ICC)



**INTERNATIONAL
CODE COUNCIL®**

People Helping People Build a Safer World™

THE I-CODES



- ICC Performance Code (ICCPC)
- International Building Code (IBC)
- International Energy Conservation Code (IECC)
- International Existing Building Code (IEBC)
- International Fire Code (IFC)
- International Fuel Gas Code (IFGC)
- International Green Construction Code (IgCC)
- International Mechanical Code (IMC)
- International Plumbing Code (IPC)
- International Private Sewage Disposal Code (IPSDC)
- International Property Maintenance Code (IPMC)
- International Residential Code (IRC)
- International Swimming Pool and Spa Code (ISPSA)
- International Wildland-Urban Interface Code (IWUIC)
- International Zoning Code (IZC)

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Publication cycle

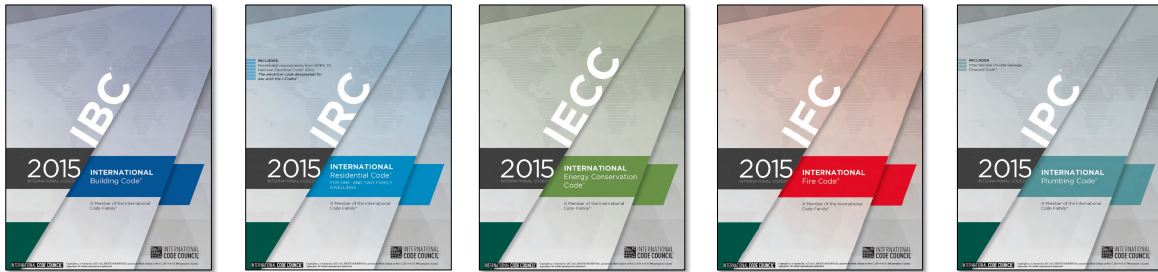
- 2000 edition
- 2003 edition
- 2006 edition
- 2009 edition
- 2012 edition
- 2015 edition
- 2018 edition (planned)

Three-year code development
and publication cycle

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Roofing-specific provisions

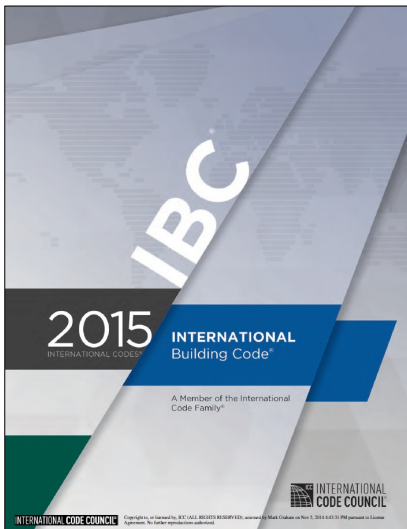
Discussed in this presentation



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International Building Code, 2015 Edition



- Applicable to all buildings and structures, except those where IRC 2015 applies
- Roofing-related requirements:
 - Ch. 10-Means of egress
 - Ch. 12-Interior environment
 - Ch. 13-Energy efficiency
 - Ch. 15-Roof assemblies and rooftop structures
 - Ch. 16-Structural design
 - Ch. 20-Aluminum
 - Ch. 22-Steel
 - Ch. 24-Glass and glazing
 - Ch. 26-Plastic



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Ch. 10 – Means of egress

International Building Code, 2015 Edition

Sec. 1015.6-Mechanical equipment, systems and devices

- *Guards* have been required for components where services are required within 10 ft. of roof edge or where elevated walkways are raised above 30 inches
- Exception now added for permanent fall arrest/restraint anchors
- Devices shall be re-evaluated for possible replacement when the entire roof covering is replaced



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Ch. 13-Energy efficiency

International Building Code, 2015 Edition

Sec. 1301.1.1-Criteria

- Reference to the *International Energy Conservation Code, 2015 Edition* (IECC 2015)



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Ch. 15-Roof assemblies and rooftop structures

International Building Code, 2015 Edition

Sec. 1501.1-Scope:

- Roof assemblies and rooftop structures
- Design, materials, construction and quality

Sec. 1511-Reroofing:

- Recovering or replacing shall comply with Ch. 15 (only)
- Exceptions: “positive drainage” and secondary drains



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Ch. 15-Roof assemblies and rooftop structures

International Building Code, 2015 Edition

Sec. 1504-Wind resistance:

- Determine wind loads using Ch. 16-Structural Design (ASCE 7-10)
- Tested load resistance using:
 - BUR, MB, single ply: FM 4474, UL 580 or UL 1897
 - Ballasted systems: ANSI/SPRI RP-4 and Table 1504.8
 - Structural metal panels:
 - Structural standing seam: Tested using ASTM E1592 or FM 4474
 - Through fastened: Tested using FM 4474, UL 580 or ASTM E1592
 - Aluminum: Designed using Sec. 2002.1 (ADM)
 - Steel: Designed using Sec. 2210.1 (AISI S100)



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Ch. 15-Roof assemblies and rooftop structures

International Building Code, 2015 Edition

Sec. 1505-Fire classification:

- Tested using ASTM E108 or UL 790 (Class A, Class B, Class C)
- *Listed* by an *approved* testing agency
- Exempted from testing, listing and approval:
 - Brick, masonry or exposed concrete surfaces
 - Metal sheets/shingles, tile or slate on non-combustible decks
 - Metal sheets on non-combustible framing (no deck)
 - 16 oz. copper sheets or slate on combustible decks



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Ch. 15-Roof assemblies and rooftop structures

International Building Code, 2015 Edition

Sec. 1505-Fire classification:

- Required classifications [Table 1505.1]:
 - Class A: Only in a fire district (IBC 2015, Appendix D) or where the *International Wildland-urban Interface Code* is adopted
 - Class B: Type IA, IB, IIA, IIIA, IV or VB construction
 - Class C: Type IIB, IIIB or VB construction



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Ch. 15-Roof assemblies and rooftop structures

International Building Code, 2015 Edition

Sec. 1506-Materials:

- “...Roof coverings shall be applied in accordance with... the manufacturer’s installation instructions...”



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Ch. 15-Roof assemblies and rooftop structures

International Building Code, 2015 Edition

Sec. 1507-Requirements for roof coverings:

- Many ASTM standard references
- Systems-specific prescriptive requirements



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Ch. 15-Roof assemblies and rooftop structures

International Building Code, 2015 Edition

Sec. 1511-Reroofing:

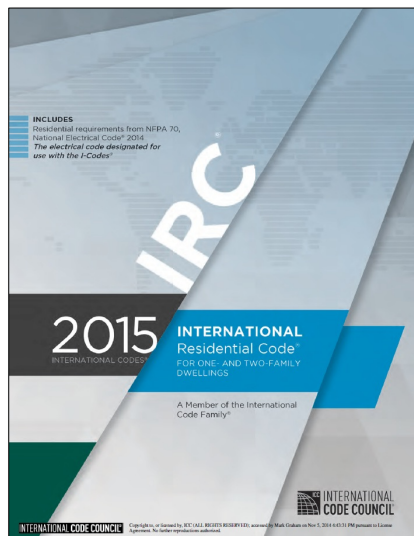
- Same Ch. 15 requirements (only) as new construction
- Roof replacement (vs. recovering) is required where:
 - Roof is “water soaked” or deteriorated
 - Existing slate, clay, cement or cement-asbestos
 - Two or more existing roofs
 - Removal of “all” layers is required [Sec. 1511.3]



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International Residential Code, 2015 Edition



- Applicable to one- and two-family dwellings and townhouses no more than three stories in height
- Roofing-related requirements:
 - Ch. 8-Roof/ceiling construction
 - Ch. 9-Roof assemblies



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Ch. 9-Roof assemblies

International Residential Code, 2015 Edition

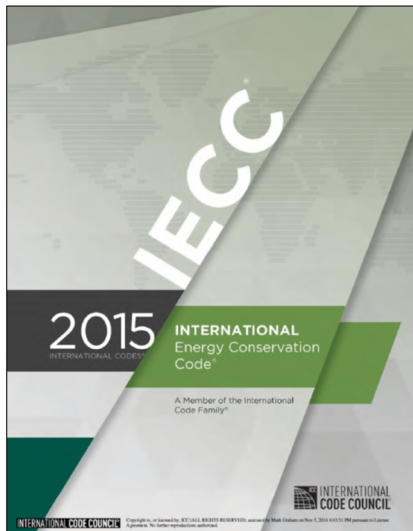
- Ch. 9 closely mirrors IBC Ch. 15's requirements
- Except IRC only requires fire classified roof assemblies where:
 - Required by local ordinance
 - Roof edge is less than 3 ft. from the lot line



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International Energy Conservation Code, 2015 Edition

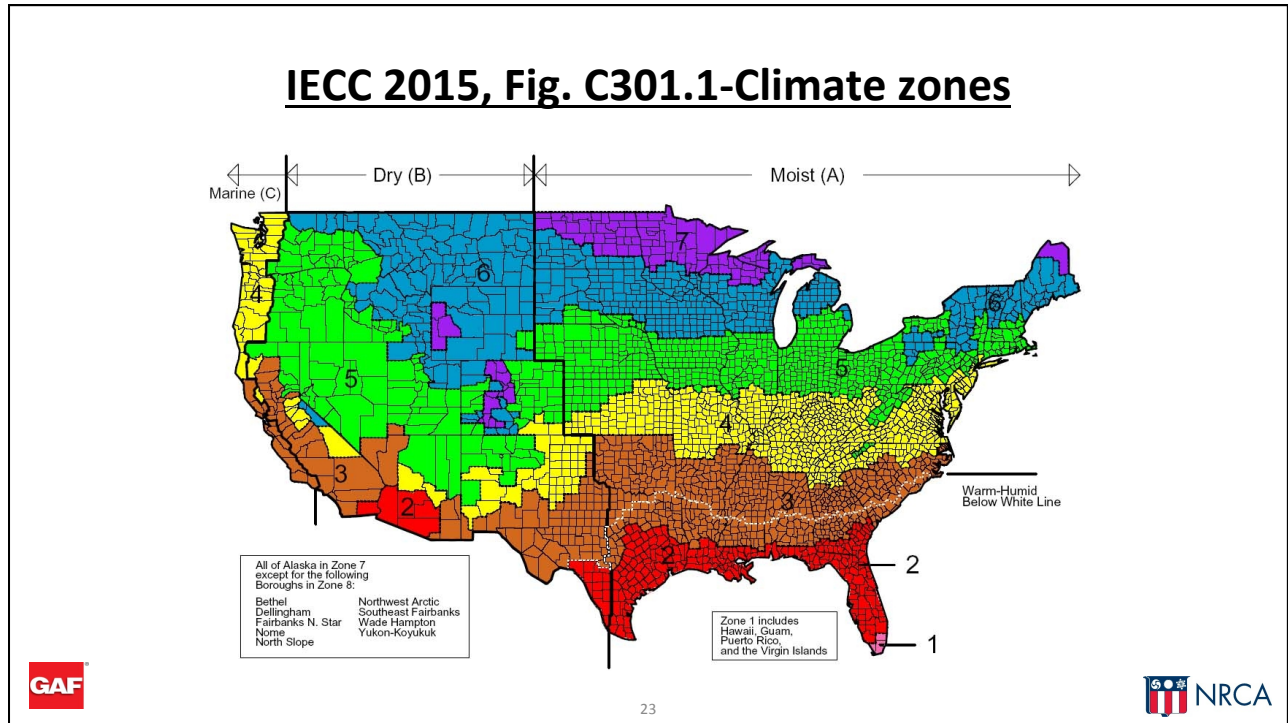


- Applicable to all buildings, including existing buildings (reroofing)
- Format:
 - Commercial provisions (C) vs. Residential provisions (R)
 - Ch. 1-Scope and Admin.
 - Ch. 2-Definitions
 - Ch. 3-General requirements
 - Ch. 4-Energy efficiency
 - Ch. 5-Existing buildings
 - Ch. 6-Reference standards



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Ch 4[CE]-Commercial energy efficiency

International Energy Conservation Code, 2015 Edition

Sec. C401.2-Application

- Reference to ASHRAE 90.1 changed from 2010 edition to 2013 edition

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Ch 4[CE]-Commercial energy efficiency

International Energy Conservation Code, 2015 Edition

Sec. C402-Building envelope requirements

- Section reformatted
- Low-energy buildings exempted:
 - Less than 3.4 Btu/h · ft² or 1.0 watt/ ft² of floor area
 - No *conditioned space*
 - Greenhouses
- Equipment buildings exempted (Sec. C402.1.2)



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Ch 4[CE]-Commercial energy efficiency

International Energy Conservation Code, 2015 Edition

Sec. C402.1.3-Insulation component R-value-based method

- Use Table C402.1.3 (see table on following slide)

Sec. C402.1.4-Assembly U-factor, C-factor or F-factor-based method

- Use Table C402.1.4



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Roofing-specific adaptation of Table C402.1.3

Commercial Buildings (Insulation component R-value-based method)

Climate zone	Assembly description		
	Insulation entirely above deck	Metal buildings	Attic and other
1	R-20ci (all other) R-25ci (Group R)	R-19 + R-11 LS	R-38
2	R-25ci		
3			
4	R-30ci	R-25 + R-11 LS	R-38 (except Marine 4)
5			R-38 (all other) R-49 (Group R, Marine 4)
6			
7	R-35ci	R-30 + R-11 LS	R-49
8			



ci = Continuous insulation; LS = Liner system

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Roofing-specific adaptation of Table C402.1.3

Commercial Buildings (Insulation component R-value-based method)

Climate zone	Assembly description		
	Insulation entirely above deck	Metal buildings	Attic and other
1	R-20ci (all other) R-25ci (Group R)	R-19 + R-11 LS	R-38
2	R-25ci		
3			
4	R-30ci	R-25 + R-11 LS	R-38 (except Marine 4)
5			R-38 (all other) R-49 (Group R, Marine 4)
6			
7	R-35ci	R-30 + R-11 LS	R-49
8			



ci = Continuous insulation; LS = Liner system

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Ch 4[CE]-Commercial energy efficiency

International Energy Conservation Code, 2015 Edition

Sec. C402.3-Roof solar reflectance and thermal emittance

- Climate zones 1, 2 and 3, low-slope roofs over cooled, conditioned spaces (some exceptions)
- Three-year aged solar reflectance 0.55 and three-year thermal emittance of 0.75, or three-year aged solar reflectance index of 64
- Aged calculation method based upon CRRC-1-12 (Sec. C402.3.1)



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Ch 4[CE]-Commercial energy efficiency

International Energy Conservation Code, 2015 Edition

Sec. C402.5-Air leakage-thermal envelope (Mandatory)

- All Climate zones, except 2B (IECC 2012 exempted Climate zones 1, 2, and 3)
- Whole building testing (ASTM E779); allowable maximum air leakage rate of 0.40 cfm/ft²
- Materials (Sec. C402.5.1.2.1) and Assemblies (C402.5.1.2.2) options
- Deemed-to-comply Materials options:
 - Closed cell SPF, minimum 1.5 pcf density,
 - Built-up roofing membrane
 - Modified bituminous roof membrane
 - Fully-adhered single-ply roof membrane



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Ch. 4[CE]-Commercial energy efficiency

International Energy Conservation Code, 2015 Edition

Sec. C503-Alterations

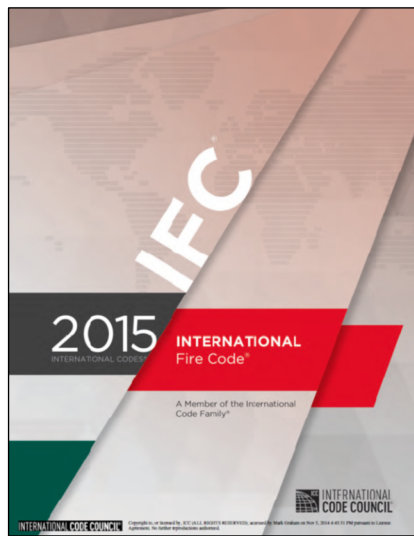
- New exception to Sec. 503.1-General:
“4. *Air barriers* shall not be required for *roof recover* and roof membrane replacement where the *alterations* or renovations to the building do not include *alterations*, renovations or *repairs* to the remainder of the building envelope.”



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International Fire Code, 2015 Edition



Applicability:

- Structures, facilities and conditions
- Existing conditions and operations



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Roofing-related provisions

International Fire Code, 2015 Edition

- Sec. 303-Asphalt kettles
- Sec. 317-Rooftop gardens
- Sec. 605.11-Solar photovoltaic systems
- Sec. 905.3.8-Rooftop gardens
- Sec. 3317-Safeguarding roofing operations



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International Plumbing Code, 2015 Edition



- Applicable to all plumbing systems, except those applicable to IRC 2015
- Roofing-related requirements:
 - Ch. 9-Storm drainage



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Ch. 11-Storm drainage

International Plumbing Code, 2015 Edition

Sec. 1101.7-Roof drainage

- Design based upon maximum possible water depth; assume drains are blocked.
- [Sec. 1105.2-Roof drain flow rate] Based upon head of water above the roof drain.

Sec. 1103-Traps

- Leaders and storm drains connected to a building sewer system shall not be required to be trapped.



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Ch. 11-Storm drainage

International Plumbing Code, 2015 Edition

Sec. 1101.6-Size of conductors, leaders and storm drains

- Design roof drainage based on flow rate of roof drain, Table 1106.2-Storm drain pipe sizing (gpm) and Table 1106.3-Vertical leader sizing (gpm)
- Design gutters based upon flow rate from the roof surface, Table 1106.6-Horizontal gutter sizing (gpm) and Table 1106.3-Vertical leader sizing (gpm)



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Alternative materials, design and methods of construction and equipment

- IBC 2015, Sec. 104.11
- IRC 2015, Sec. R104.11
- IECC 2015, Sec. C102.1 and Sec. R102.1
- IFC 2015, Sec. 104.9
- IPC 2015, Sec. 105.2



Professional Roofing, June 2008

Tech Today

Other options

Take advantage of alternative approval provisions in building codes
by Mark S. Graham

Building codes by their nature tend to be limiting — they limit design, materials and construction methods to those specifically prescribed in codes and meeting codes for means requirements. However, many codes contain provisions that allow building officials to approve alternatives that are not specifically permitted by the code.

You should be aware of these alternative approval provisions because they apply to an increasing number of roofing products and roof systems.

Alternative approval

The 2006 edition of the International Building Code (IBC) includes the following language regarding alternatives:

"104.11 Alternative materials, design and methods of construction and equipment.

The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work is for the purpose intended, at least the equivalent of that prescribed in this code for quality, strength, effectiveness, fire resistance, durability and safety."

Evaluation reports

To assist in evaluating alternatives, building officials likely will request supporting data in the form of valid research reports from recognized sources.

ICC Evaluation Service (ICC-ES) Inc. issues research reports, commonly referred to as "evaluation reports," based on technical evaluations the company performs on building products, components and materials. Because ICC-ES is a subsidiary of the International Code Council, which publishes IBC, ICC-ES evaluation reports are considered by most building officials to be valid research reports when considering alternative approvals.

ICC-ES evaluation reports are available for hundreds of manufacturers' building components, products and systems, including many roofing products. These reports can be obtained from the individual manufacturers that have requested evaluations and on ICC-ES' Web site.

Roofing products

ICC's alternative approval provisions provide a viable means for gaining building official approval of newly developed roofing products and roof systems and those not yet specifically permitted by IBC.

Roofing products that are not specifically permitted by IBC but have evaluation reports include synthetic membrane underlayments, fiber-reinforced and polymeric shingles, shales and slates, metal shingles, some specialty asphalt shingles and bare, fluid-applied membrane roof systems.

ICC's alternative approval provisions also can be used to gain a building official approval for roof systems that the code does not specifically address.

For example, IBC requires green roof systems as described in the code. However, the code does not contain specific structural and wind-resistance classifications information that is considered appropriate for vegetative green roof systems.

In this case, I am not aware of any manufacturer of vegetative green roof systems that has obtained a specific evaluation report. However, I hope manufacturers will pursue evaluation reports to help roofing professionals obtain building official approvals through the code's alternative approval provisions.

Additional information about building code requirements specific to roofing products and roof systems is provided in *The NRCA Building Code Manual, Third Edition*.

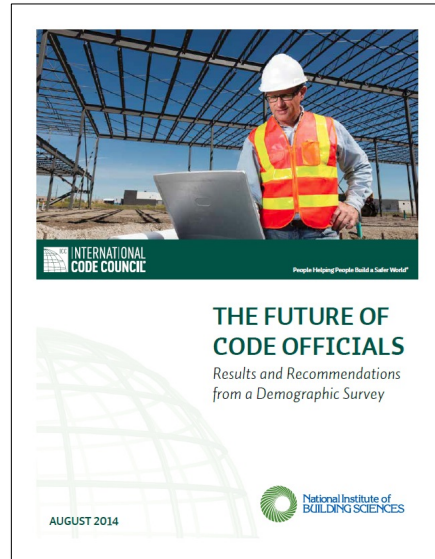
Mark S. Graham is NRCA's executive vice president of technical services.

July 2008 www.professionroofing.net



ICC/NIBS survey

www.ICCsafe.org



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A typical code official

- Between the ages of 55 and 64
- A jurisdiction employee (rather than third-party provider)
- Works in a one- to nine-person jurisdiction, less than 75,000 in population
- Earns between \$50,000 and \$75,000 (mean 2012 salary was \$51,017 according to the U.S. Census Bureau)
- Has 26 to 35 years of experience in the building industry, but only five to 15 years as a code official
- Entered the code profession in their 30s; held one to three prior jobs; first job was as a tradesperson



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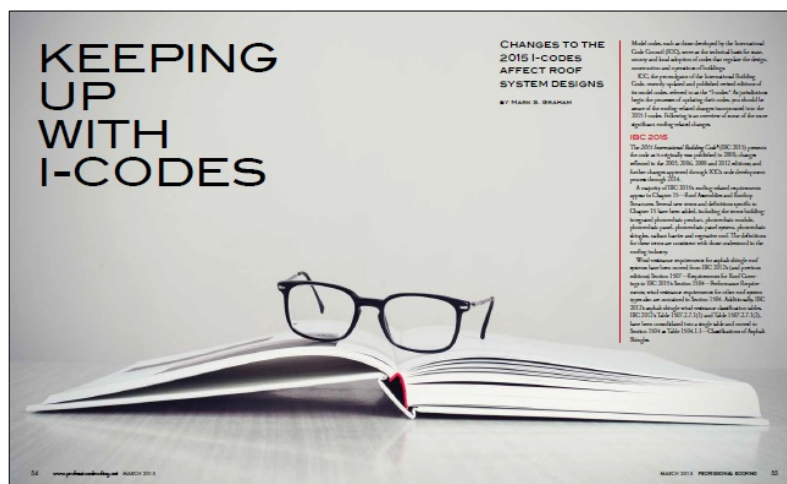
A typical code official - continued

- May possess a bachelor’s degree (27 percent), or have no additional education beyond high school (25 percent)
- If they hold a bachelor’s degree, it is probably in engineering, but it could be in management, accounting, finance, etc.
- Holds a professional license, certificate, certification or other credential
- Current role is as a inspector, plan reviewer or department manager; possibly all of these roles
- Expect to leave the profession in the next five to 15 years.



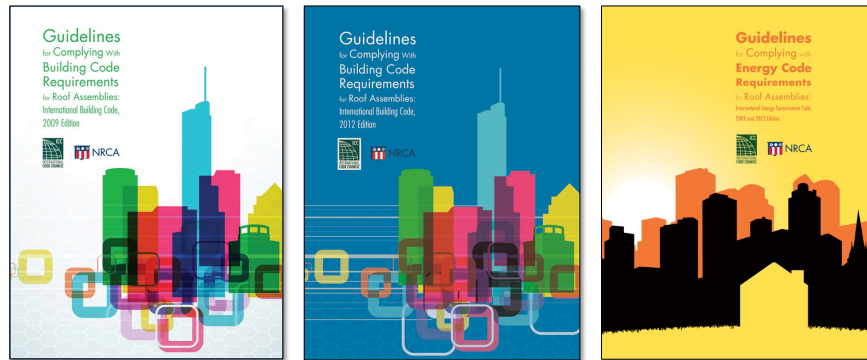
Professional Roofing, March 2015

Pages 54-60



NRCA code manuals

shop.nrca.net or (866) ASK-NRCA



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Consider joining ICC



Membership categories:

- Corporate member: \$400 (complete collection)
- Building safety professional member: \$150 (1 code)

<http://www.iccsafe.org/Membership/Pages/join.aspx>



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In summary

- Be knowledgeable of the applicable codes
- Beware of the status of state and local adoptions
- Comply with the Code



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Questions?



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