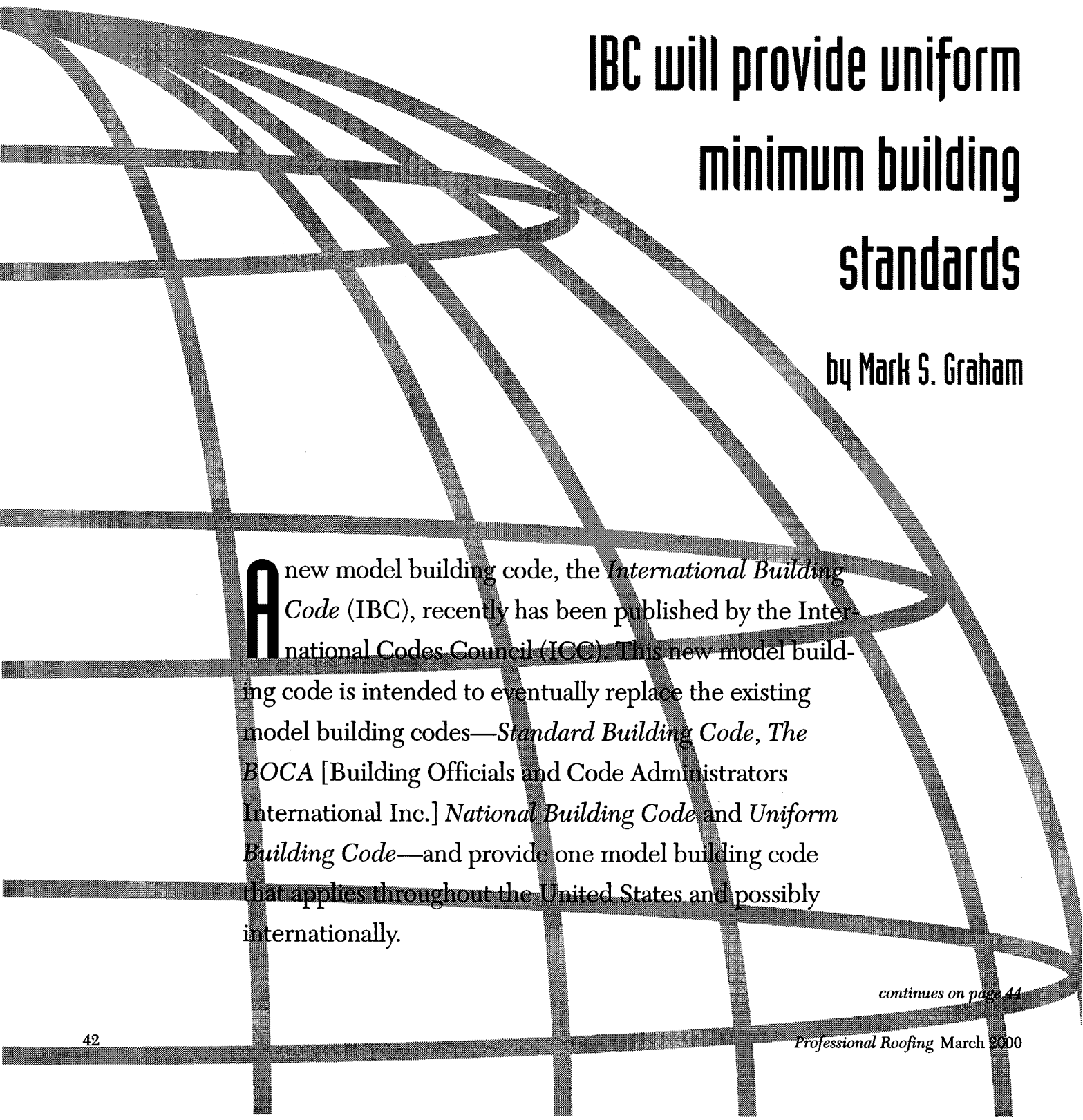
New building code offers unified standards

IBC will provide uniform minimum building standards

by Mark S. Graham



A new model building code, the *International Building Code* (IBC), recently has been published by the International Codes Council (ICC). This new model building code is intended to eventually replace the existing model building codes—*Standard Building Code*, *The BOCA* [Building Officials and Code Administrators International Inc.] *National Building Code* and *Uniform Building Code*—and provide one model building code that applies throughout the United States and possibly internationally.

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ICC

ICC was established in 1994 as a nonprofit organization dedicated to developing and maintaining a single set of comprehensive, coordinated national building codes. ICC's founders are the three major U.S. model building code groups: BOCA, International Conference of Building Officials and Southern Building Code Congress International Inc.

From 1995 through 1999, ICC developed and began to publish a series of new national model codes, including the following:

- *International Plumbing Code* (IPC)
- *International Private Sewage Disposal Code*
- *International Mechanical Code*
- *International Fuel Gas Code*
- *International Zoning Code*
- *International Property Maintenance Code*
- *International Energy Conservation Code*

In 1997, the Council of American Building Officials (CABO) was incorporated into ICC. CABO previously had published its own codes, including the *CABO One- and Two-Family Dwelling Code* and *CABO Model Energy Code*. In 1998, ICC updated the *CABO One- and Two-Family Dwelling Code* and titled it *International One- and Two-Family Dwelling Code.*

IBC features a relatively easy-to-follow format, as well as technical accuracy.

In addition to publishing IBC, ICC plans to publish the *International Residential Code* (IRC), *International Fire Code* and *ICC Electrical Code*. IRC is intended to replace the *International One- and Two-Family Dwelling Code.*

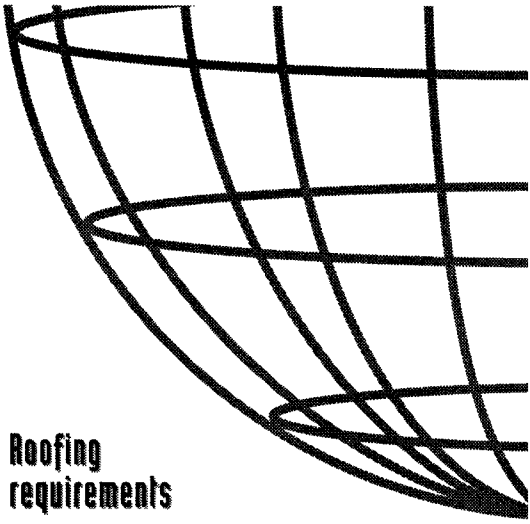
ICC's 11 model codes, commonly referred to as "I-codes," provide a comprehensive, coordinated set of model building codes for adoption by code jurisdictions throughout the United States.

IBC

NRCA and several other roofing industry organizations participated in IBC's development. IBC consists of 35 chapters. A majority of roofing-related code requirements are provided in Chapter 15, "Roof Assemblies and Rooftop Structures." However, some roofing-related requirements are provided in the code's other chapters. For example, requirements for attic ventilation are outlined in Chapter 12, "Interior Environment." Minimum requirements for thermal insulation for roof systems are provided in Chapter 13, "Energy Efficiency," and wind-load requirements are offered in Chapter 16, "Structural Design Requirements." Belowgrade dampproofing and waterproofing requirements can be found in Chapter 18, "Soils and Foundations."

Section titles from IBC's Chapter 15, "Roof Assemblies and Rooftop Structures"
Section 1501—General
Section 1502—Definitions
Section 1503—Weather Protection
Section 1504—Performance Requirements
Section 1505—Fire Classification
Section 1506—Materials
Section 1507—Requirements for Roof Coverings
Section 1508—Roof Insulation
Section 1509—Rooftop Structures
Section 1510—Reroofing

Figure 1: *Section titles from the* International Building Code's *Chapter 15, "Roof Assemblies and Rooftop Structures."*



Roofing requirements

Chapter 15 governs overall roof assembly and rooftop structure design, materials, construction and quality. The chapter is divided into 10 sections. (See Figure 1 for a list of the sections' titles.)

Section 1502 provides terms and definitions specific to Chapter 15. In addition, Chapter 2, "Definitions," lists terms and definitions that apply throughout the code.

Section 1503's requirements apply to all roof assemblies, including flashings, parapet copings, and drainage system and attic ventilation design. For example, this section indicates roof drains, gutters and downspouts are required to be sized according to IPC.

Wind resistance

Section 1504 provides specific performance requirements for all roof assemblies, including requirements for physical properties, as well as impact and wind resistances. All roof assemblies are required to be designed to resist wind loads that are explained in Chapter 16. Asphalt shingle roof assemblies are exempt from this requirement; they must be attached to roof decks according to the prescriptive fastening requirements provided in Section 1507.2.

IBC requires roofs' resistances to wind loads be tested according to FM 4450, "Approval Standard for Class 1 Insulated Steel Deck Roofs"; FM 4470, "Approval Standard for Class 1 Roof Coverings"; UL 580, "Tests for

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Roofing-related materials standards requirements for IBC		
Roof system type	**Materials**	**Required materials standards**
Asphalt shingles	Underlayment	ASTM D 226, Type I or ASTM D 4869, Type I
	Self-adhering polymer-modified bitumen sheet	ASTM D 1970
	Asphalt shingles	ASTM D 225 or ASTM D 3462
	Smooth roll roofing	ASTM D 224
Clay and concrete tile	Underlayment	ASTM D 226, Type II; ASTM D 2626, Type I; or ASTM D 249
	Clay tile	ASTM C 1167
	Concrete tile	Prescriptive requirements in IBC's Section 1507.3.5
Metal panels and shingles	Galvanized steel	ASTM A 653, G-90
	Prepainted steel	ASTM A 755
	Aluminum-zinc alloy-coated steel	ASTM A 792, AZ 50
	Lead-coated copper	ASTM B 101
Mineral-surfaced roll roofing	Underlayment	ASTM D 226, Type I
	Mineral-surfaced roll roofing	ASTM D 224, ASTM D 249, ASTM D 371 or ASTM D 3909
Slate	Underlayment	ASTM D 226, Type II
	Slate shingles	ASTM C 406
Wood shingles	Underlayment	ASTM D 226, Type I
	Wood shingles	CSSB Grade 1, Grade 2 or Grade 3
Wood shakes	Underlayment	ASTM D 226, Type I
	Interlayment	ASTM D 226, Type I
	Wood shakes	CSSB Grade 1 or Grade 2 or TFS Grade 1 or Grade 2
Built-up	Aggregate surfacing	ASTM D 1863
	Asphalt-coated fiberglass base sheet	ASTM D 4601
	Asphalt fiberglass felt	ASTM D 2178
	Asphalt-saturated and asphalt-coated base sheets	ASTM D 2626
	Asphalt-saturated organic felt	ASTM D 226
	Asphalt	ASTM D 312
	Acrylic coating	ASTM D 6083
	Asphalt adhesive	ASTM D 3747
	Asphalt cement	ASTM D 3019, ASTM D 2822 or ASTM D 4586
	Asphalt coating	ASTM D 1227, ASTM D 2823 or ASTM D 4479
	Asphalt primer	ASTM D 41
	Coal-tar cement	ASTM D 4022 or ASTM D 5643
	Coal-tar-saturated organic felt	ASTM D 227
	Coal tar	ASTM D 450, Type I or Type II
	Glass mat, coal tar	ASTM D 4990
	Glass mat, venting type	ASTM D 4897
	Mineral-surfaced inorganic cap sheet	ASTM 3909
	Fabric	ASTM D 5665, ASTM D 5726
Polymer-modified bitumen	Polymer-modified bitumen sheet	ASTM D 6162, ASTM D 6163, ASTM D 6164 or CGSB 37-56M
Thermoset single ply	Thermoset single-ply membrane sheet	RMA RP-1, RMA RP-2, RMA RP-3, ASTM D 4637 or CGSB 37-52M
Thermoplastic single ply	Thermoplastic single-ply membrane sheet	ASTM D 4434 or CGSB 37-54M
Spray polyurethane foam	Spray polyurethane foam	ASTM C 1029
Liquid-applied	Liquid-applied	ASTM C 836, ASTM C 957, ASTM D 6033, ASTM D 1227 or ASTM D 3468

Key: American Society for Testing and Materials (ASTM), Canadian General Standards Board (CGSB), Cedar Shake and Shingle Bureau (CSSB), Rubber Manufacturers Association (RMA), Forest Products Laboratory of the Texas Forest Services (TFS)

Figure 2: *Roofing-related materials standards referenced in the* International Building Code.

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Wind Uplift Resistance of Roof Assemblies"; or UL 1897, "Uplift Tests for Roof Covering Systems," for built-up, polymer-modified bitumen, fully adhered and mechanically attached single-ply, metal panel and other membrane roof systems.

Ballasted single-ply roof systems' wind resistances are required to be designed according to ANSI/RMA/SPRI RP-4, "Wind Design Guide For Ballasted Single-Ply Roofing Systems."

Fire resistance

Section 1505 details fire-resistance classification requirements for roof assemblies. Generally, all roof assemblies are required to have fire-resistance classifications. Specific classification requirements primarily are based on type of building construction, as prescribed in Chapter 6, "Types of Construction." Fire-resistance classifications typically are determined by testing according to ASTM E 180, "Standard Test Methods for Fire Tests of Roof Coverings," or ANSI/UL 790, "Tests for Fire Resistance of Roof Covering Materials."

Brick, masonry, slate, clay or concrete tile, exposed concrete deck, ferrous or copper shingle, and panel roof coverings are considered to have Class A fire-resistance classifications without being tested. Similarly, metal sheet or shingle roof systems are considered to have Class B fire-resistance classifications without testing.

Labeling

General roof system requirements, such as component compatibility, physical characteristics and specifications, are addressed in Section 1506. This section also outlines product identification requirements for roofing materials' labeling. According to IBC, roofing materials' packaging must bear manufacturers' and approved testing agency's (e.g., Factory Mutual [FM], Underwriters Laboratories [UL] Inc.) labels identifying the materials' fire-resistance classifications.

For example, such labeling should include a product's name and manufacturer; American Society for Testing and Materials (ASTM) or other material standard designation; and approved testing agency approval.

Materials standards

Section 1507 provides requirements for the following roof systems: asphalt shingle; clay and concrete tile; metal panel and shingle; slate; wood shingle and shake; spray polyurethane foam; liquid-applied; built-up; polymer-modified bitumen; and thermoplastic and thermoset single-ply membranes.

For each roof system addressed, specific minimum requirements are provided for deck, slope, materials and application. Generally, roofing materials are required to comply with consensus-based materials standards. Figure 2 provides a list of the specific materials standards referenced in IBC.

Other requirements

Section 1508 provides general requirements for insulation used in roof assemblies. Wood fiberboard insulation must comply with requirements in Chapter 23, "Wood." Foam plastic roof insulation is required to comply with requirements in Chapter 26, "Plastic."

Section 1509 details requirements for structures that sometimes are built



INTERNATIONAL CODE COUNCIL

Purchasing IBC

The *International Building Code* (IBC), as well as other codes published by the International Code Council (ICC), can be purchased from the following model building code groups:

Building Officials and Code Administrators International Inc.
4051 W. Flossmoor Road
Country Club Hills, IL 60478-5795
(708) 799-2300
www.bocai.org

Southern Building Code Congress International Inc.
900 Montclair Road
Birmingham, AL 35213
(205) 591-1853
www.sbcci.org

International Conference of Building Officials
5360 Workman Mill Road
Whittier, CA 90601-2298
(562) 699-0541 (publication orders only)
www.icbo.org

Additional information regarding ICC and its codes is available on ICC's Web site, www.intlcode.org.

on roofs. Specific requirements are provided for penthouses, tanks, cooling towers, towers, spires, domes and cupolas.

Reroofing

Section 1510 details IBC's requirements for reroofing applications. Reroofing situations need to be treated the same as new construction applications, with one notable exception—reroofing applications are not required to meet minimum design slope requirements for new construction (e.g., ¼ inch per foot [1.2 degrees]) provided roofs have positive drainage. The code's definition of positive drainage is similar to the definition in *The NRCA Roofing and Waterproofing Manual, Fourth Edition*: a drainage condition in which consideration has been made for all loading deflections of a roof deck and additional slope has been provided to ensure a roof will drain within 48 hours of precipitation.

Roof system removal and replacement, instead of re-cover applications, are required if an existing roof system is wet or has been re-covered. IBC does not permit re-covering of existing wood shake; slate; or clay, cement or cement-asbestos tile roof systems.

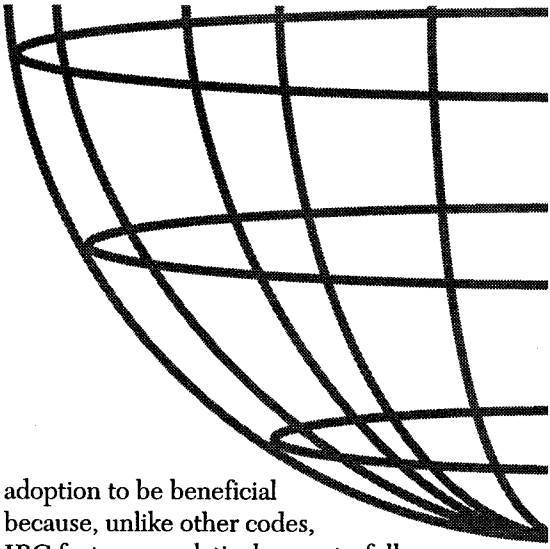
Code adoption

Now that IBC is published, individual code jurisdictions (e.g., state, county, municipal governments) can adopt it as the basis for their building codes.

NRCA is aware of several code jurisdictions that either are considering or already have begun the process of adopting IBC. These include Illinois, New York, North Dakota, Pennsylvania, Rhode Island, Wisconsin and Chicago. Additional code jurisdictions likely will adopt and enforce IBC by the end of the year. At press time, the extent to which the code will be adopted internationally was unclear.

Closing thoughts

Although IBC is the most stringent of the current model building codes, roofing professionals likely will find its adoption to be beneficial because, unlike other codes, IBC features a relatively easy-to-follow format, as well as technical accuracy.



However, these advantages will not be seen for several years. Once IBC is accepted universally, a single set of model building codes that provides the technical basis for code adoption and enforcement throughout the United States will benefit the entire construction industry.

Mark S. Graham is NRCA's associate executive director of technical services.

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