

The Tortuous Path... From Industry Standard To Local Code

From the editor ...

Periodically, we devote an Engineers Newsletter to an industry standard that in some way affects designers of HVAC systems, e.g., the way they specify equipment (ARI Standard 550/590) or the design practices they employ (ASHRAE Standard 62). This newsletter reviews the relationship between standards, model codes, and the laws enforced by local code authorities.

It also considers the implications of "continuous maintenance" standards for system designers and identifies ways to keep abreast of changes in the regulatory environment.

When it comes to building construction and code compliance, three truisms immediately come to mind:

- Building inspectors encounter the same violations day after day.
- Owners don't worry about building codes until one or more red tags delay construction.
- Noncompliance is costly. It delays occupancy, incurs additional expense, and inconveniences everyone involved. It also brings the credibility of the project team into question and, in extreme cases, can lead to litigation.

Most compliance problems can be traced to the complexity of the regulatory system—i.e., the sheer number and scope of regulated topics, exceptions granted by individual jurisdictions, and

the legion of architects, engineers, builders, manufacturers, fire marshals, and inspectors that must interpret them.

For example, the American Society of Heating, Refrigerating, and Air-Conditioning Engineers has a standard that prescribes the safe application of mechanical refrigeration systems. While this standard is the basis for locally enforced codes across the country, it's seldom adopted as is. The upshot is that if you work with clients throughout the United States, you not only need to know the standard, but some 50 variations of it as well.

To put this example in context, this single ASHRAE standard affects a fraction of the mechanical code ... there are many other standards and numerous sections of code. Keeping up with every variation

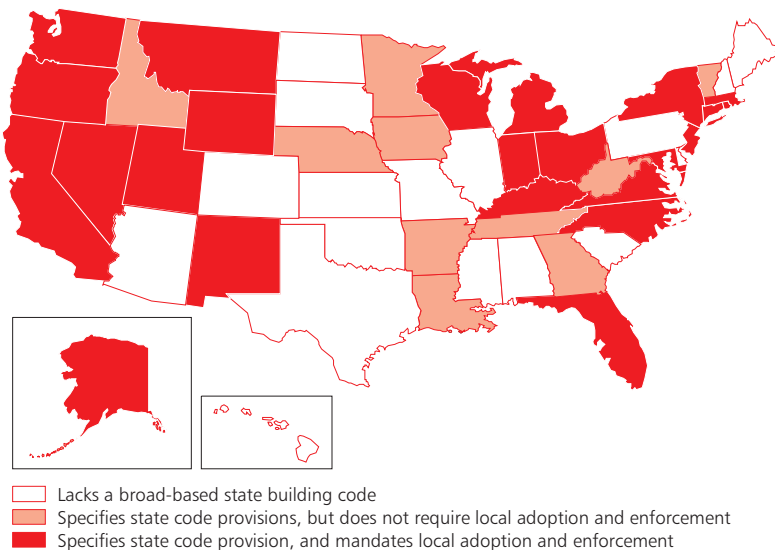
in every jurisdiction is a Herculean effort for everyone in the building community.

Three instruments shape the building regulations enforced by local code authorities: **state codes**, **model codes**, and **standards**.

State Building Codes

To protect the health, safety, and welfare of their inhabitants, many states have adopted broad-based building codes that set minimum requirements for construction practices and materials, building systems, and energy conservation. But the existence of such a code doesn't mean that it will be administered uniformly throughout the state (Figure 1), particularly where

Figure 1
Variations In Local Adoption/Enforcement Of State Building Codes



municipalities have primary responsibility for enforcement.

Few states compose their own unique set of regulations. Instead, they look to their regional model code for guidance. The process for converting the model code to state law varies greatly from state to state and from one section of code to another. The entire code may be incorporated as is or entire sections may be rewritten. Some legislatures reference a model code by year; others cite the “current” model code so that their building regulations reflect recent code changes without legislative intervention.

Model Building Codes

States have traditionally looked to the model code agency in their region for a comprehensive example of building regulations. This example, called a “model code,” is based on standards and other materials. It establishes minimum criteria for everyone in the construction industry ... whether architect, planner, consulting engineer, or facility manager.

Three organizations of building officials are responsible for developing and enforcing building codes in the United States:

- Building Officials and Code Administrators, **BOCA**, in the Northeast and Midwest
- International Conference of Building Officials, **ICBO**, in the West
- Southern Building Code Congress International, **SBCCI**, in the Southeast

All sectors of the building community, including federal agencies, have every opportunity to participate in the open process that BOCA, ICBO, and SBCCI use to maintain their model codes. That process is remarkably similar for all three agencies:

- Anyone can submit a change to the model code (Changes often originate from standards.)
- Each annual code-change cycle includes two public hearings at which anyone can testify
- A code change committee issues recommendations for each proposed change after the initial public hearing
- Members vote to accept or reject committee recommendations at the second public hearing
- Adopted changes become part of the revised model code

- New model codes are published after two or three annual cycles

International Code. BOCA, ICBO, and SBCCI cofounded the International Code Council (ICC) in 1994 to reduce the complexity of the current regulatory system. (See “The Quest For A Single Code” below.) The Council’s mission is deceptively simple: to develop a **single** model code. While the initial focus is to simplify the regulatory system in the United States, it’s hoped that the International Code will eventually be adopted worldwide.

The ICC code review process differs from the process described for BOCA, ICBO, and SBCCI in distinct ways:

- 1 Hearings.** Like its founders, the ICC conducts an initial hearing to obtain a committee recommendation for each code change. The second hearing, where the membership votes to uphold or overturn each recommendation, is conducted during the annual meetings of BOCA, ICBO, and SBCCI. The cumulative total of votes from these meetings determines the fate of each proposed change.
- 2 Floor votes.** Anyone can request a floor vote on a committee

The Quest For A Single Code

... (D)edicated to the public’s health, safety and related societal needs in the built environment through the development and use of a single set of consensus-based regulatory documents.

That’s the mission of the International Code Council (ICC), a nonprofit group founded in December 1994 by the three model code organizations: Building Officials and Code Administrators International, International Conference of Building Officials, and Southern Building Code Congress International. To fulfill this goal, the ICC is converting the sections within the existing model codes into an International Code. Each

completed section of the International Code replaces the related regional codes published by each of the ICC founders.

Work on individual code sections is proceeding concurrently. At the March 1999 ICC meetings, proposed revisions were considered for final drafts of:

- International Building Code™
- International Fire Code™
- International Residential Code™

There were also hearings on revisions proposed to sections already published:

- International Energy Conservation Code™

- International Plumbing Code™
- International Mechanical Code™
- International Private Sewage Disposal Code™
- International Fuel Gas Code™
- International Zoning Code™
- International Property Maintenance Code™

As a growing number of U.S. and offshore jurisdictions adopt it, the International Code should eventually—and, it’s hoped, *universally*—simplify regulation of the construction industry.

Visit www.intlcode.org for updates on ICC progress and to learn how you can become involved.

recommendation during the initial meeting. A simple majority of the active members present can defeat a change; approval requires a two-thirds majority.

Standards

Industry standards play an important societal role: they define a “standard of care” for wide-ranging issues such as indoor air quality, energy efficiency, and environmental impact. In doing so, they become an important reference for code-writing agencies.

BOCA, ICBO, and SBCCI, for example, have adopted all or parts of ASHRAE Standard 62–1989 into their model codes. This, in turn, makes it easier for state and local jurisdictions to adopt IAQ regulations for new and existing buildings.

While a number of industry and professional organizations publish standards, the primary author for the HVAC industry is the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Similar to the maintenance procedure for model codes (described on the preceding page), ASHRAE reviews and adopts revisions to its standards but requires a broad public consensus; that is, individuals or organizations can propose and defend changes.

Periodic Maintenance. Many ASHRAE standards are completely updated at regular intervals, with a maximum of five years between revisions. At the beginning of a standard’s maintenance cycle, the committee responsible for it reviews the content, recommends changes that reflect current “state-of-the-art” design practices, and submits a draft of the revised standard for public review.

Weighing The Benefits Of “Continuous Maintenance”

To date, ASHRAE has placed five often-publicized standards under continuous maintenance to help its committees more effectively administer their review. As with any change, the move from periodic to continuous maintenance is not without tradeoffs.

The Pros. Proponents of continuous maintenance cite three advantages:

- Issues can be addressed separately and deliberately, helping to focus discussion on specific points of contention.
- Review cycles are more manageable since comments are limited to the section presented for public review.
- Updates are more timely, useful, and responsive to technology.

If the comments collected and incorporated result in substantive changes, another public review is required. When there are no further substantive changes, the committee recommends the draft standard for publication.

Continuous Maintenance. Several ASHRAE standards have attracted considerable interest. Consequently, the public review step for their maintenance now generates thousands of comments. Obviously this puts a tremendous burden on the committees that must review and respond to each comment.

To ease that burden, ASHRAE instituted a “continuous maintenance” process for a number of its high-profile standards:

- ANSI/ASHRAE Standard 15, “Safety Code for Refrigeration Systems”
- ANSI/ASHRAE Standard 34, “Number Designation and Safety Classification of Refrigerants”
- ANSI/ASHRAE 62, “Ventilation for Acceptable Indoor Air Quality”

And The Cons. Critics of continuous maintenance counter that piecemeal revision of individual sections:

- May conflict with, or confuse, information presented in related-but-unrevised sections.
- Makes it more difficult to restructure the entire standard when needed.
- Publishing changes piecemeal makes it tougher for engineers and other users of standards to keep abreast of the “current standard of care.”

This debate reflects the comparative newness of continuous maintenance to ASHRAE, despite the long-standing tradition for its use within the model code community.

- ANSI/ASHRAE 90.2, “Energy Efficient Design of New Low-Rise Residential Buildings (Its counterpart for other nonresidential buildings, ANSI/ASHRAE 90.1, will be recommended for continuous maintenance at the 1999 Summer ASHRAE Meeting.)
- ANSI/ASHRAE 135, “BACnet™—A Data Communication Protocol for Building Automation and Control Networks”

Anyone, including committee members, can propose changes at any time to a standard under continuous maintenance. The committee responsible for the standard chooses the portion it will consider and submit for public review and comment. A fixed schedule dictates when proposed changes will be considered.

Recap

Model code agencies look to industry standards and other materials for “best practices,” then develop example codes that states and other governing bodies

can legislate into enforceable requirements. Sounds simple, doesn't it? But as we've seen, each step increases the complexity:

- Model codes lag behind "state-of-the-art" design practices.
- Adoption, amendment, and enforcement of statutes regulating construction vary within and between states.
- Code documents are written to be legally defensible rather than easily understood.

What You Can Do

As professionals, continuing education is a responsibility that we owe to ourselves as well as our clients. It equips us to provide the best possible services cost-effectively and efficiently.

There are various ways to increase your professional knowledge, particularly with respect to an ever-changing standard of care and its eventual effect on state and local statutes:

Establish good communication with code inspectors. Don't wait for the inspector to arrive on the job site. Make contact at the outset of each project and maintain an open dialog throughout.

Take advantage of the Internet. It's a convenient source of information about building-related issues and educational opportunities. (We've listed a number of sites at right.)

Monitor the progress of standards and guidelines. They represent the "standard of care" system designers should practice. They also provide direction to designers and manufacturers of building equipment, components and materials.

Become involved in a standards-setting organization. The exchange of ideas in this setting expands your professional knowledge, helps advance the industry, and benefits the public.

Join the model code agency in your region. Your willingness to invest the time to propose and defend revisions will ultimately determine its content.

Advocate adoption of the International Code. Uniform adoption will almost certainly lead to consistent enforcement and higher quality construction while lessening the bureaucratic burden.

Enroll in seminars. Recognition of the importance of continuing education is growing in the code regulatory and design community ... and with it, the

number of training opportunities sponsored by state agencies and nonprofit organizations. For example, you can earn Continuing Education Units (CEUs) by attending ICBO seminars on the International Mechanical Code™ and International Plumbing Code™.

If you haven't already implemented one or more of these practices, we strongly encourage you to do so. ■

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Take Advantage Of The Web

Internet access and a Web browser are invaluable tools that can help you keep abreast of evolving building standards, guidelines and codes. You may want to add one or more of these sites to your list of favorites.

www.ansi.org American National Standards Institute

www.asce.org American Society of Civil Engineers

www.ashrae.org American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

www.astm.org American Society for Testing and Materials

www.bocai.org Building Officials and Code Administrators International

www.energycodes.org U.S. Department of Energy Building Standards and Guidelines Program

www.icbo.org International Conference of Building Officials

www.nateval.org National Evaluation Services, Inc.

www.ncsbc.org National Conference of States on Building Codes and Standards, Inc.

www.nfpa.org The National Fire Protection Association

www.nibs.org National Institute of Building Sciences

www.nist.gov National Institute of Standards and Technology

www.nssn.org National Resource for Global Standards

www.sbcci.org Southern Building Code Congress International

