# Introduction to Model Codes

Concern for safety in buildings has been recorded in the laws of some of the most ancient civilizations. The regulation of building construction in the United States dates from the early settlement of North America. Construction laws developed and became more complex as the surrounding cities grew and experienced the threats and consequences of disease, fire and structural collapse.

In the early 1900s, special interest groups, such as the insurance industry (which was concerned with the mounting losses of life and property due to fire), joined others with similar concerns to develop a model law, or guide document, that could be adopted by a legislative body to reduce those losses. The result was the development and production of a model code that was offered to states and local governments for their voluntary enactment as law. The model code was promulgated by the National Board of Fire Underwriters, later to become the American Insurance Association, and was intended to be a foundation on which the legislative body could create its own regulations. The document, or any portion thereof, could be adopted by a specific reference to it in the legislation based on the perceived needs of that legislative body. Similarly, the legislative body could, in the preparation of the law, designate the application of the code to a certain class or classes of structures or to certain building uses. The model code was simply a document that a legislative body could utilize to the extent that they found necessary or desirable.

This first model code gained widespread popularity among legislative authorities by providing an accessible source of comprehensive, contemporary and respected technical requirements without the difficulties and expense of investigation, research, drafting and promulgation of individual local codes. Additionally, at approximately 10-year intervals, a new edition of the model code was produced. This allowed governments to reflect current construction technology and keep their building code requirements up to date.

Beginning in 1915, code enforcement officials, or those municipal officials charged with the responsibility of enforcing building code laws, began regular regional and national meetings to discuss their common problems and concerns. From these meetings came the formation of three organizations of code enforcement officials: Building Officials Conference of America, now known as Building Officials and Code Administrators (BOCA) International, Inc.; International Conference of Building Officials (ICBO); and Southern Building Code Congress International, Inc. (SBCCI). These three organizations created the International Code Council (ICC).

While legislative bodies are not obligated to adopt a model code and may write their own code or portion of a code, studies conducted by the federal government have indicated that more than 97% of U.S. cities, counties and states that adopt codes choose building and fire codes created by the three building safety groups that make up the ICC. BOCA, ICBO and SBCCI have more than 190 years of collective experience developing codes. ICC Codes are used across America and around the world. A code has no legal standing until it is adopted as law by a legislative body. When it is adopted as law, the code's original formal status is restricted to the geographic boundaries of that legislative body's political jurisdiction. All owners of property within the boundaries of the jurisdiction are required to comply with the enacted building code.

In cases where a code has not been adopted in a jurisdiction, the codes have assumed an authoritative status for building designers. Engineers and architects are licensed by the state to practice their profession and have a duty to be aware of the building features and elements that are a threat to the public and to the building user. The codes, then, are utilized by design professionals for their design in such geographical areas, even though the codes may not be universally adopted as law.

### Building Codes

The regulation of building construction in the United States is accomplished through a document known as a building code. This document is adopted by a state or local government's legislative body, then

enacted to regulate building construction within a particular jurisdiction. A building code is a collection of laws regulations, ordinances or other statutory requirements adopted by a government legislative authority involved with the physical structure and healthful conditions for occupants of buildings. The purpose of a building code is to establish the minimum acceptable requirements necessary for protecting the public health, safety and welfare in the built environment. These minimum requirements are based on natural laws, on properties of materials, and on the inherent hazards of climate, geology and the intended use of a structure (or its "occupancy").

The primary application of a building code is to regulate new or proposed construction. Building codes only apply to an existing building if the building undergoes reconstruction, rehabilitation or alteration, or if the occupancy of the existing building changes to a new occupancy as defined by the building code.

The term "building code" is frequently used to refer to a family of codes, such as the International Codes, that are coordinated with each other to address specific scopes of technical application. This set of codes generally consists of four documents: a building code, a plumbing code, a mechanical code and an electrical code.

## Why Have a Building Code?

Codes protect public health, safety and welfare

- Building codes provide protection from tragedy caused by fire, structural collapse and general deterioration in our homes, schools, stores and manufacturing facilities.

- Safe buildings are achieved through proper design and construction practices and a code administration program that ensures compliance. Home and business owners have a substantial investment that is protected through complete code enforcement.

Codes keep construction costs down

- The International Codes provide uniformity in the construction industry. This uniformity permits building and materials manufacturers to do business on a larger scale — statewide, regionally, nationally or internationally. Larger scale allows cost savings to be passed on to the consumer.

Codes provide consistent minimum standards in construction

- Codes establish predictable and consistent minimum standards, that are applied to the quality and durability of construction materials, a practical balance between reasonable safety, and cost to protect life and property. The term "minimum requirements" means that construction meets the criteria of being both practical and adequate for protecting the life, safety and welfare of the public.

- Inspection during construction is the only way to independently verify that code compliance has been achieved. An average of 10 inspections are conducted to homes, offices or factories to verify conformity to minimum standards.

Codes contribute to the well-being of the community

- The preservation of life and safety, as well as the maintenance of property values over time, are a direct result of the application and enforcement of model building codes.

- The conservation of energy contributes to intelligent use of resources and provides the consumer with cost savings.

## Local and State Codes

Development of local and state codes varies considerably in degree and procedures. Almost all local and state codes in America are based on the International Codes or model codes, particularly for engineering provisions.

State codes can be developed in a variety of ways. Some states adopt a particular edition of a model code, leaving administrative matters to local jurisdictions. Others start with a model code and revise and administer a separate code only for state-funded buildings. Still others may require a special code for certain occupancies, such as schools and assembly buildings.

Local codes also are diverse in the extent to which the base model code is amended. Most local amendments are limited to administrative provisions, which are subject to change to meet other local regulations regarding implementation of ordinances. Engineering provisions are among the least amended, with a common reason for amendments related to unique site conditions that affect foundation design or applied wind and snow loads.

There are still large cities that have had the advantage of a large professional population willing and able to provide advice on customizing nationally recognized codes and standards for local use. The list of these cities shrinks each year as the International Codes and national standards become more detailed in scope.

Local and state amendments to technical provisions in International Codes and national standards should be avoided and opposed in every case. A concern with a provision thought to be incomplete or improper should be addressed through the code development process and procedure made available to all by the International Code Council.

## Involvement by Technical Organizations

Many representatives of professional organizations participate in codes and standards activities at local, state and national levels. Most of them will have members that also hold national membership, which presents an opportunity to promote the support of model codes and national technical standards.

Trade associations that represent suppliers of construction materials are another type of organization most likely to have significant participation in all codes and standards activities.

## Standards

A standard is "a prescribed set of rules, conditions or requirements concerned with the definition of terms; classification of components; delineation of procedures; specification of dimensions, materials, performance, design or operations; descriptions of fit and measurement of size; or measurement of quality and quantity in describing materials, products, systems, services or practices." There are thousands of standards in existence, dealing with an endless array of consumer products, manufacturing methods, quality of materials and procedures for various operations and processes. Of concern to the model code process are those standards that play a key role in institutionalizing construction practices and procedures across the United States. A standard, in conjunction with a criterion that is the quality or quantity required by the building code as measured by that standard, can simplify the model code text and utilize the considerable expertise of those participating in specialized standards-writing activities. Any group of manufacturers, associations, consumers, users or agencies can cooperatively develop a standard for its own purposes and reasons. Only when the standard is developed in accordance with definitive rules of procedure and consensus does the standard obtain the stature appropriate and necessary for regulatory use in model codes. Additionally, a standard to be utilized by a model code must measure quantity or quality appropriate for regulation by the code.

For various reasons, an owner may utilize a standard and specify a criterion for performance of a building element over and above that which the applicable code requires. This is common and reflects a key fundamental aspect of a model code-a statement of minimum performance requirements and characteristics, with the protection of the public health, safety and welfare as its primary intent.

## Referenced Standards

Since not all standards are intended to be utilized by a model code, a model code must state the standards which are applicable and also when they are applicable. This is accomplished through a specific reference in the code to a given standard which clearly identifies when and how the standard is to be utilized. For example, a code will require that a building element be able to perform to a certain criterion and then reference a standard for use in measuring the performance of any proposed system intended to accomplish that performance.

The International Code Council has established a policy governing referenced standards that requires such standards to comply with the following requirements:

1. The need for the standard to be referenced shall be established.
2. A standard or portions of a standard intended to be enforced shall be written in mandatory language.
3. The standard shall be appropriate for the subject covered.
4. All terms shall be defined when they deviate from an ordinarily accepted meaning or a dictionary definition.
5. The scope or application of a standard shall be clearly described.
6. The standard shall not have the effect of requiring proprietary materials.
7. The standard shall not prescribe a proprietary agency for quality control or testing.
8. The test standard shall describe, in detail, preparation of the test sample, sample selection or both.
9. The test standard shall prescribe the reporting format for the test results. The format shall identify the key performance critical for the element(s) tested.
10. The measure of performance for which the test is conducted shall be clearly defined in either the test standard or in code text.
11. The standard shall not state that its provisions shall govern whenever the referenced standard is in conflict with the requirements of the referencing code.
12. The preface to the standard shall announce that the standard is promulgated according to a consensus procedure.
13. The standard shall be readily available.
14. The standard shall be developed and maintained through a consensus process such as ASTM or ANSI.

The model codes place great reliance on the use of standards produced in the private sector. Each standard is specifically identified in the code text with the manner and scope of required conformity to the standard. Assume, for example, that the code requires a reinforced concrete structural element to be designed in accordance with the ACI 318 uniquely identifies the standard *Building Code Requirements for Reinforced Concrete*, which is published by the American Concrete Institute (ACI). This standard is also listed in the code as one of the referenced standards.

A code-referenced standard may, and frequently does, reference other standards which are intended to be used in conjunction with the primary standard. References to a secondary standard by another standard are acceptable, provided that all such references are unambiguous and clearly reflect the requirements for code compliance. Similarly, the secondary standard may contain a reference to another standard. This tiered system of standards usage has proven very effective in accomplishing the use of relevant standards while minimizing confusion and the need to duplicate the effort expended by participants in the voluntary standards-writing processes.

Standards referenced in this tiered manner are regulations which are as binding as if all of the standards' test were to appear word-for-word in the code text itself. If all of the standards that are referenced in the code and applicable through standards references were to be reprinted and appear in the code, the code would be several thousand pages in length. The advantage of this manner of utilizing referenced standards it that the code is kept to a volume that is manageable, concise and up-to-date.

In summary, a code will specify the use of a standard to define the measurement of a performance feature of a building element or system. A specified and referenced standard, in conjunction with a code-established criterion, defines the performance level required by the code as measured by the standard.

## American National Standards Institute (ANSI)

ANSI is a private, not for profit membership organization founded in 1918 to coordinate the development of voluntary standards in the United States. It was founded by five professional and technical societies and three agencies of the federal government.

The role of ANSI is to encourage development of standards and develop procedures that provide criteria, requirements and guidelines for coordinating and developing consensus for American National Standards. The goal is the development of a single, consistent set of national voluntary standards by a variety of technical groups, trade associations and professional societies. ANSI does not develop the standards it accepts, however. The writing of the standards is done by accredited standards developers, such as American Society of Civil Engineers (ASCE) American society for Testing and Materials (ASTM), American Welding Society (AWS), American Society of Mechanical Engineers (ASME), National Fire Protection Association (NSPA) and Underwriters Laboratories Inc. (UL).

Many of these standards are referenced in building codes. The private-sector standards system, however, is much father reaching than building codes. ANSI lists more than 10,000 approved standards promulgated by more than 260 accredited standards developers. Such standards are used extensively for design, manufacture, application and procurement.

## Conclusion

The construction code system in the United States relies on the voluntary cooperative efforts of those persons and organizations within the private sector of the construction community. All of the organizations have developed a model comprehensive regulatory system that is legally responsive to both public needs and technological developments. The standards system in the United States and the use of standards in model codes places the cumulative scientific, engineering and industrial knowledge of the United States at the fingertips of participants in the construction community. The code enforcement official accepts with confidence the measurement methods and practices dictated by these standards. Code enforcement officials can then direct their attention to the criteria for application of these standards to accomplish the objectives of the code to enhance and preserve the public health, safety and welfare in the built environment of the United States.

# who needs BUILDING CODES?

We all do — whether in our homes, offices, schools, stores, factories, or places of entertainment. We rely on the safety of structures that surround us in our everyday living. The public need for protection from disaster due to fire, structural collapse, and general deterioration underscores the need for modern codes and their administration.

## HOW RELIABLE ARE THEY?

Most aspects of building construction — electrical wiring, heating, sanitary facilities — represent a potential hazard to building occupants and users. Building codes provide safeguards. Although no code can eliminate all risks, reducing risks to an acceptable level helps.

## WHAT IS A BUILDING CODE?

Practically, it is the government's official statement on building safety. Technically, it is a compendium of minimum safety standards arranged in a systematic manner (codified) for easy reference. It embraces all aspects of building construction — fire, structural, plumbing, electrical, and mechanical.

## WHAT IF I WANT TO DO A BUILDING PROJECT MYSELF?

Building departments have pamphlets and brochures explaining, in detail, how to obtain permits and design and construct a safe building. Inquire within your local community.

## WHY SHOULD CODES APPLY TO MY OWN HOUSE?

For several reasons:

- For your personal safety, and that of your family, and the guests invited into your home.
- To ensure the economic well-being of the community by reducing potential spread of fire and disease.
- For the conservation of energy.
- To protect future home purchasers who deserve reasonable assurance that the home they buy will be safe.

Local building departments provide a wide range of services beyond the usual plan review and building inspection process. These range from the administration of planning or zoning laws to housing maintenance inspection, nuisance abatement, and a number of other related or ancillary duties. Visit your local building department and get acquainted with the people who make it work.

# public safety

# support BUILDING SAFETY!

For more information about building codes and local requirements, contact your local building department below:

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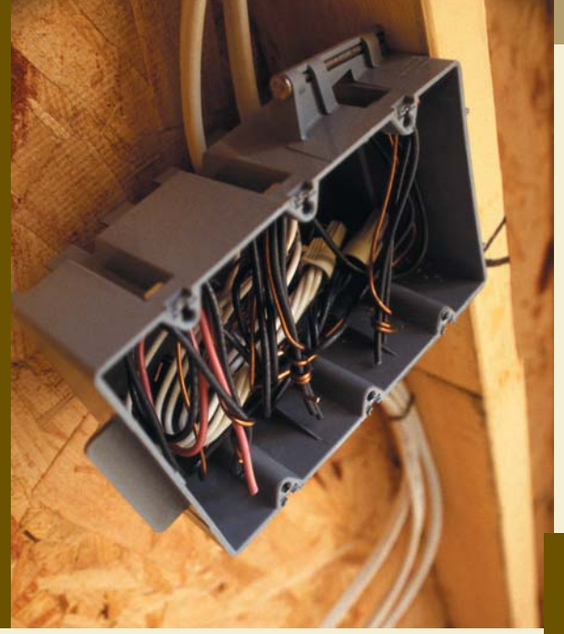
# building CODES

## HOW DO THEY HELP YOU?

# building codes
# HOW DO THEY HELP YOU?

**The regulation of building** construction is not a recent phenomenon. It can be traced through recorded history for more than 4,000 years. Through time, people have become increasingly aware of their ability to avoid the catastrophic consequences of building construction failures.



In early America, George Washington and Thomas Jefferson encouraged the development of building regulations to provide for minimum standards that would ensure health and safety. Today, most of the United States is covered by a network of modern building regulations ranging in coverage from fire and structural safety to health, security, and conservation of energy.

Public safety is not the only byproduct afforded by modern codes. Architects, engineers, contractors, and others in the building community can take advantage of the latest technological advances accommodated by these codes with viable savings to the consumer.

For codes to be effective, an understanding and cooperative relationship must exist between building officials and the groups they serve — homeowners, developers, urban planners and designers, and others in the construction industry. Codes must therefore be responsive to the government's need to protect the public. They must provide due process for all affected and keep pace with rapidly changing technology. These communities can work together to develop and maintain codes.

During the early 1900s, model building codes were authored by the code enforcement officials of various communities with key assistance from all segments of the building industry. Now, model codes are the central regulatory basis for the administration of programs in cities, counties, and states throughout the United States. They simply represent a collective undertaking, which shares the cost of code development and maintenance while ensuring uniformity of regulations so that the advantages of technology can be optimized.

Building safety code enforcement has historically been accomplished by defraying the costs of administration through a system of fees relating to a specific project — a system that is self-supporting. These fees are generally less than one percent of the overall cost of the building project. Public protection is thus obtained in a cost-effective manner with the entire process, from plan review to field inspection, carried out in a professional manner. The system is so well developed that the true complexity of the process is obscure to many. It is for the purpose of creating awareness of this important public service that this pamphlet is provided.

**For further information, contact your local building department.**

# the simple PERMIT PROCESS

## TALK TO YOUR LOCAL CODE OFFICIAL

Your code official wants your project to be a success and will help you avoid potential problems that could cost you time and money. You will be asked some basic questions (What are you planning to do? Where?), advised of any requirements, and, if necessary, referred to other departments for their approval. The code official will provide you with the resources and information needed for compliance with the applicable building codes. You will then receive an application for a building permit.

## SUBMIT APPLICATION

A t this stage you will document the "Who, What, When, Where, and How" of the job, along with any sketches or plans of the proposed work.

## REVIEW PROCESS

In a brief amount of time, the code official will review your plans and determine if your project is in compliance with local requirements. If your plans meet these requirements, a permit is issued. If not, the code official may suggest solutions to help correct the problem.

## RECEIVE PERMIT

Now that you have been approved for a permit, you have legal permission to start construction. A fee, based on the size of the job, is collected to cover the cost of the application, the review, and the inspection process. An experienced code official is available to you should you have any questions concerning your project. You should consider your code official as an ally who will help you make your project a success. Separate permits are typically required for electrical, plumbing, and heating or air-conditioning work.

## JOB-SITE VISITS

On-site inspections will be required to make certain the work conforms to the permit, local codes, and plans. Again, you will have access to the expertise of the code official to help you with questions or concerns regarding the project and to minimize potentially costly mistakes. The code official will let you know approximately how many inspections may be needed for your project. Usually, a one- or two-day notice is needed when requesting visits.

## FINAL APPROVAL

The code official will provide documentation when construction is complete and code compliance is determined. You will then have the personal satisfaction of a job done right. Enjoy your new surroundings with the peace of mind and the knowledge that they meet the safety standards in your community.

It takes everyone in a community to keep our homes, schools, offices, stores, and other buildings safe for public use. Your safe construction practices help protect you, your family, your friends, and your investment. Be sure to get your local code official involved with your project, because the building department is an important ally, from start to finish.

# support BUILDING SAFETY!

For more information about building codes and local requirements, contact your local building department below:

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# benefits of BUILDING PERMITS

# the benefits of BUILDING PERMITS

**By reading this brochure** you've already taken the first step toward protecting the outcome and investment value of your construction project and guarding against a lawsuit or injury. The following information describes simple steps you can take to obtain a building permit and how permits can work for you. You'll be surprised at how easy the whole process is.

The truth is, building permits are very beneficial to you and your community. By working with expert code officials, you will benefit from their knowledge of building codes to ensure your construction project is built right, will be safe, and will last. Read on to discover the "Benefits of Building Permits."

## WHAT'S A BUILDING PERMIT?

A building permit gives you legal permission to start construction of a building project in accordance with approved drawings and specifications.

## WHEN DO YOU NEED A PERMIT?

The best way to find out if you need a permit is to call your local building department. Discuss your plans with the code official before beginning construction to determine whether you need a permit. Even if a permit is not needed, the code official will answer construction questions and may provide valuable advice.

## PERMITS ARE USUALLY REQUIRED FOR THE FOLLOWING:

- New buildings
- Additions (bedrooms, bathrooms, family rooms, etc.)
- Residential work (decks, garages, fences, fireplaces, pools, water heaters, etc.)
- Renovations (garage conversions, basement furnishings, kitchen expansions, reroofing, etc.)
- Electrical systems
- Plumbing systems
- HVAC (heating, ventilating, and air-conditioning) systems

Your home or business is an investment. If your construction project does not comply with the codes adopted by your community, the value of your investment could be reduced. Property insurers may not cover work done without permits and inspections. If you decide to sell a home or building that has had modifications without a permit, you may be required to tear down the addition, leave it unoccupied, or make costly repairs.

A property owner who can show that code requirements were strictly and consistently met—as demonstrated by a code official's carefully maintained records—has a strong ally if something happens to trigger a potentially destructive lawsuit.

Your permit also allows the code official to protect the public by reducing the potential hazards of unsafe construction and ensuring public health, safety, and welfare. By following code guidelines, the completed project will meet minimum standards of safety and will be less likely to cause injury to you, your family, your friends, or future owners.

build smart

investment

# The Impact of Building Codes on Property Insurance

## Purpose

The International Building Code and other International Codes can have a positive impact on property insurance. This paper will educate decision makers on how adopting the I-Codes can improve the cost and availability of property insurance for their communities.

## Key Words

- Property loss reduction
- Reduced insurance costs
- Improved building safety
- Building code adoption, implementation and enforcement

## Background

Natural disasters such as hurricanes, tornadoes, tropical storms, hail, earthquakes and wild fires can have a devastating effect on the built environment and the economy. Studies of various catastrophes graphically demonstrate that effective building code enforcement greatly reduces associated loss. According to *Best's Review,* losses attributable to Hurricane Andrew would have been 30 to 40 percent lower if Florida communities had strictly enforced existing building codes. A study by Factory Mutual Insurance Group illustrates that effective enforcement of building codes in those affected Florida communities would have reduced damage to buildings by up to 55 percent.

Post-disaster assessments of many communities showed a direct relationship between building failures, the codes adopted, the resources directed toward implementation and enforcement, and the services available to support those codes. To reinforce this relationship between loss reduction and code adoption and enforcement, the Insurance Services Office, Inc. (ISO), working with the Insurance Institute for Property Loss Reduction (now the Institute for Business and Home Safety) and tapping the expertise of the three model code groups (now the ICC), developed the Building Code Effectiveness Grading Schedule (BCEGS) in 1995.

## About the BCEGS

The purpose of the BCEGS is to review the available public building code enforcement agencies, and to develop a building code effectiveness classification for insurance information and rating purposes. ISO assesses building code adoption and enforcement activities in a particular community, with special emphasis on mitigation of losses from natural disasters. Communities

with well-enforced, up-to-date codes would be expected to experience a reduction in loss, and in return, receive better insurance rates. This "better building/less loss" relationship provides an incentive for communities to adopt contemporary codes and rigorously enforce them, especially as the codes relate to windstorm and earthquake damage. The end result is safer buildings, less damage and lower insured losses from catastrophes.

The BCEGS program assigns each municipality a grade or classification of 1 (exemplary commitment to building code enforcement) to 10 (essentially no adopted codes). ISO develops advisory rating credits that apply to ranges of BCEGS classifications (1-3, 4-7, 8-9, 10), and provides insurers BCEGS classifications, BCEGS advisory credits and related underwriting information. Insurers use these in assessing risk and applying rate credits. This program was phased in over a five-year period, from 1996 to 2001. At present, all communities have been graded. ISO has begun re-grading communities based on code adoption and implementation activities that have occurred since the initial grading period.

A summary of the ISO classification and grading process is as follows:

- Each community is evaluated based on how it administers codes, reviews plans and conducts field inspections. Administration includes, among other things, whether the code is up-to-date, resources devoted to training and certification of code officials, contractor licensing, and records of code official certifications and training.
- Relevant information is provided to ISO by the code official. ISO field representatives conduct an on-site evaluation and assign a classification of 1 to 10 to the community. If the community has different codes and programs for different building types, a separate classification can be issued for each building type.
- ISO files rate credits to be applied to loss costs for personal and commercial property coverage in each community. Once state regulators approve or acknowledge the filings and they become effective, insurers that have given ISO filing authorization can automatically apply the credits.
- A community is reevaluated in five years, or sooner if requested, due to an enhancement in their code program.

When ISO evaluates a community, the classification automatically applies to any building receiving a certificate of occupancy on or after the date of classification. That classification remains with the building regardless of what happens with any future re-classification.

Issue Identification

Because the insurance industry, communities and their elected officials, the construction industry and the general public are all affected, the results of reclassification are critical. A community's classification or grade can be downgraded due to lack of initiative in adopting more contemporary codes, the availability and use of comprehensive support services for those adopted codes, and how they implement and enforce those codes. For example, one California community has reported that lack of action regarding adoption of a new state building code was the key factor in their ISO classification being changed from 3 to 7 during a recent reclassification. Such a downgrade adversely affects construction, and in turn, the economy of

the community and its citizens. In a worst-case scenario, erosion in a community's grade could shut down all new construction. In communities located in states with preemptive legislative authority to adopt building codes, the lack of action, or incorrect action, by the state affects each community on an individual basis, as well as the state at large.

The negative impacts of a higher (less exemplary) ISO grade or classification are:

- Increased risk of injuries and loss of life, property losses, and economic and social disruption from natural disasters.
- The loss of any possibility of insurance rate reduction on buildings constructed after the new classification.
- Loss of pride and decreased morale in the code enforcement department.
- Less support of state or local decision makers from the construction community and the public at large.

If a community or state has been enforcing an older model building code and has not yet adopted the International Building Code, it is at risk of receiving a higher grade or less desirable grade when reclassified.

Discussion

Clearly the insurance industry, construction community and state and local decision makers understand the link between loss of life and property, and the adoption, effective implementation and enforcement of construction codes. The BCEGS reinforces that link by rewarding communities that invest in a more robust building regulatory program, which is the focal point of this program and encompasses much more than the code that is adopted. It includes the entire program to support building safety – not on paper as evidenced by a code document but in practice as evidenced by safe, well-maintained buildings and the building department staff that enforce those codes on behalf of the elected officials and their constituents.

The importance of code provisions should not be minimized: codes must have sensible technical requirements, but also need to be usable, enforceable, cost effective, updated regularly, sensitive to acceptance of new technology, coordinated, reliable, trusted and based on a long history of success. The ISO process looks beyond the technical provisions of the adopted code to address all that takes place in the design, construction, inspection, approval and use of buildings. Given two scenarios – one with a code document that cannot be easily implemented and has no enforcement or support services, and another that can be easily implemented, has support services and is enforced; construction under the latter scenario is more likely to yield success. In short, the realization of safe buildings involves much more than simply looking at words in a code book and how they are developed.

For this reason the ISO process, and any other rational assessment of codes, is focused on the end result – safe buildings – and all code activities that can help achieve that end. This includes training and education for those in the related construction and code communities, certification of contractors and code officials, the level of plan review and construction inspection, the

availability of an evaluation program to facilitate the timely acceptance of new more effective building technology, a program to accredit testing laboratories and quality assurance agencies that play a vital role in code compliance, and all other activities conducted to ensure that code requirements are met at initial occupancy and throughout the life of the building.

All communities in the United States have been classified and rated by ISO and are now undergoing a re-classification process. As noted, a community's grade is based not only on the code adopted, but on the many factors that influence building safety at occupancy and during its life. When considering updating existing codes, communities need to look not only at the code requirements but also the usability and coordinated nature of all the adopted codes. Communities also must consider the resources needed to implement and enforce the codes and the support services available to augment those local efforts. State agencies with preemptive authority to adopt codes need to consider these issues, actively consult with the communities in the state and adopt a code that will improve the classification of communities within the state.

Conclusions

- The Building Code Effectiveness Grading Schedule can influence adoption and implementation of building codes. It has a direct impact on new construction, as well as the potential loss of life, property and economic viability associated with natural disasters affecting the built environment of each community as well as each state and the nation.
- The grading or classification of a community is based on much more than the code adopted. To look only at technical requirements of existing codes and codes to be adopted excludes many other factors that will impact building safety and could adversely affect the grading of a community. Not upgrading to the latest codes has similar consequences.
- A community's grading is also based on the usability of the code, the support services for the code and the ability of the community to enhance and maintain the professionalism and capabilities of those implementing and enforcing the code. The International Codes have an existing support structure, eliminating the need for each community or state to fund development and maintenance of that support structure.
- Building safety entails more than technical provisions in the code. The realization of a safe building is the result of a usable and understandable code, informed designers and builders, and capable and trained plan reviewers and effective field inspection by competent individuals supported by robust support services.
- Most communities in the United States that adopt codes use those developed and supported by the ICC. Those communities are more likely to retain or upgrade their existing classification by adopting the 2003 International Codes, with comprehensive support services to facilitate implementation and enforcement.

INDUSTRY OPINION

**The "Industry Opinion" section of the ICC Newsletter exposes readers to multiple viewpoints—some you may agree with and others you may not. Our goal is to present you with information. We leave it to you to form your own opinion.**

**This month, we're presenting a thought-provoking trio of articles that vary widely in perspective on how codes and standards are developed. Ron Nickson, vice president of building codes for the National Apartment Association/National Multi-Housing Council Joint Legislative Program, addresses the differences between the ICC and the National Fire Protection Association's**

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# Consensus Codes—Does It Matter?

By Ron Nickson

Does the process an organization uses to develop its model building code matter? Is one method really superior to another? Should an apartment owner/developer care whether the codes being adopted are developed by government consensus, true consensus or an ANSI-approved process?

The short answer is yes. The method does matter, as much as the outcome. The entire issue centers on who gets to vote. To understand why, you need to understand the difference between the ICC's "government consensus" method and the National Fire Protection Association's (NFPA) process, which it calls "true consensus." Understanding the key differences between these code development methods is the first step to understanding why National Apartment Association (NAA)/NMHC have chosen to support the ICC codes over the NFPA.

### The Long Answer

In the ICC's government consensus process, the final vote is controlled by public building and fire officials from local communities across the country. As impartial officials, they have no vested interest in any specific building product. Their primary concern is to identify the minimum standards necessary to safeguard the public's health, safety and general welfare. Their day-to-day experiences provide them with first-hand knowledge of what is important and provides them with a better understanding of the true impact the building codes will have on their local community.

While the ICC relies on the code officials for the final vote, its two-step open hearing procedure allows anyone to speak for or against a proposal. In the first step, the ICC benefits from the collective expertise of code officials, industry representatives, and technical experts sitting on committees listening to testimony at hearings. In the second step, the committee recommendations are sent to the ICC code official members for ratifications and a final vote. This final vote serves as an unbiased filter for processing code changes. The committee recommendations can be challenged by anyone present for a floor vote. In a floor vote, every member, including the industry representatives present, is allowed to vote. A successful floor vote on a challenge to a committee recommendation creates, in effect, an automatic challenge to the item for consideration at the second and final hearing. Additionally, anyone can challenge a committee recommendation at the final hearings.

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(Editor's Note: This article is reprinted with permission from Units magazine, published by the National Apartment Association.)

## ICC Set of Comprehensive Codes Developed Under the 'Government Consensus' Process

**International Building Code**
**International Fire Code**
**International Residential Code**
**International Plumbing Code**
**International Mechanical Code**
**International Property Maintenance Code**
**International Energy Conservation Code**
**International Fuel Gas Code**
**International Zoning Code**
**International Sewage Disposal Code**
**International Code Council Electrical Code**

## Consensus Codes

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The final vote, however, is conducted only by the building and fire officials present. Items that are not challenged are voted as a block by the code officials at the final hearing. Items that are challenged are discussed at the final meeting and then voted on by the code officials. This system provides industry participants, including apartment owners and developers, with multiple opportunities to challenge provisions and present data in support of their positions, with the final decision being made by impartial code officials.



### Another View

In contrast, the NFPA's true consensus is based on the American National Standards Institute (ANSI) procedure, which require balanced committees with representation from the various interests. Though one doesn't have to be a member to serve on a committee, the balanced committees requirement allows all dues paying members to vote on issues, including members who have a vested interest in specific products. The NFPA process lacks the third-party building code filter of the ICC process. In addition, the NFPA procedures permit "instructed" votes, which means members can arrive at meetings with instructions on how to vote on issues without any consideration of the technical merit or discussion at the meeting.

With the exception of the committee responsible for developing the new NFPA building code, discussion at NFPA committee deliberations is controlled, and non-committee members are required to seek permission in advance to speak at a meeting. The chairman of the committee can, and in many cases does, use this rule to limit outside participation. In contrast to the ICC two-step process, in the NFPA process all proposals go first to the committees. The committees meet twice to act on proposals, which are then forwarded to the membership for action. However, unlike the ICC process where the membership vote at the annual meeting is the final vote, in the NFPA process the membership vote is not the final action on any proposal. The final vote is taken by the Standards Council in a closed meeting.

Although the NFPA process is more closed and susceptible to vendor manipulation, the NFPA is trying to convince local governments that their code process is superior; that their true consensus or ANSI-approved is better than the ICC's government consensus. Upon further examination, however, it is clear that this argument is a red herring. Each process has its good and bad points. The most important element of either process is that the ICC and NFPA enforce the rule under which they operate. This is especially important in the NFPA process because of the vendor interest and procedures permitting instructed votes.

Even without the differences in the process, however, NAA/NMHC would still support the ICC codes over the to-be-developed NFPA building codes because the ICC codes are the only comprehensive set of national model codes designed to work together as a package.

The ICC codes replace the codes previously published by the Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO), and Southern Building Code Congress International (SBCCI) and they are very favorable to the apartment industry. While they are not perfect, they have removed many of the restrictive provisions found in the previous regional codes.

Another important component of the ICC codes are their accessibility provisions. The ICC accessibility provisions have been designed to comply with the Americans With Disabilities Act Accessibility Guidelines (ADAAG) and the U.S. Department of Housing and Urban Development (HUD) Fair Housing Accessibility Guidelines (FHAG).

In addition, HUD has approved the codes (International Building Code 2000, with 2001 Supplement) as a safe harbor for complying with the FHAG. And the ICC codes are easier to use because they have mainstreamed the accessibility provisions throughout the code. For example, the accessibility provisions related to means of egress are in the means of egress chapter and not in a separate accessibility section. The ICC accessibility provisions have also been harmonized to comply with the ADAAG provisions.

The ICC codes include many provisions important to apartment construction. The most important are the sprinkler design options, including extra heights and areas, permitted with the installation of an NFPA 13R sprinkler system. They are very extensive and in many cases offset the installation cost of the sprinkler system. This is especially true in areas in which the SBCCI and ICBO building codes are now being used. The only design options permitted under these codes required the installation of an NFPA 13 sprinkler system, which costs about double that of an NFPA 13R sprinkler system. Many of the design options apply to small and large buildings and they will become increasingly important in the 2003 edition of the IBC where sprinklers will be required in almost all occupancy including all apartments.

The IBC provisions for open-end corridors resolve code issues concerning corridors designed with open exte-

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## NFPA Standard

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ing debate on the measure, Schaitberger noted that future generations will look back on approval of the 1710 standard as a watershed event for the fire service, just as President Abraham Lincoln's Gettysburg Address changed the course of history. Schaitberger quoted Lincoln to make his point. "You cannot escape the responsibility of tomorrow by evading it today…I think those words say it all," he adds.



The IAFF dominated the meeting. IAFF District vice presidents, state presidents, and senior staff operated as whips on the floor, in a sophisticated operation that won praise even from the IAFF's harshest critics. On every vote to amend or defeat 1710 and on the final passage vote, thousands of IAFF hands rose in the air in unison to stake out—and win—the IAFF's position.

Following the vote on 1710, in an address to the IAFF members who came from every corner of the U.S. and Canada to support the standard, Schaitberger recalls, "I have never been so proud of this union and our members. We operated as a team. We called, you came, and because we are right on this issue, we were victorious." The gathering of IAFF members in Anaheim set a record for the largest meeting of IAFF members at any event in the 84-year history of the union.

On the final day before the NFPA vote, Schaitberger, accompanied by ICHIEFS President Brown, took his tireless campaign for 1710 into the heart of the opposition, when he spoke with the Western Fire Chiefs, who were among the last holdouts against 1710. They also spoke at the meetings of many NFPA interest sections, laying out the IAFF's reasons for promoting the breakthrough guidelines.

### Topic on Tour

Well before arriving in California, the IAFF played a key role in the campaign for the new standard. The Anaheim vote was the culmination of more than six years of determined work by the International, hundreds of local affiliates, and thousands of rank-and-file members to pass a comprehensive standard governing professional fire departments.

It was also the end stage of an IAFF strategy that was formulated last September to make sure that 1710 made it to the floor for a vote, and that the International mobilized as many votes as possible. With the full support of the entire executive board, the International dedicated significant resources to its multi-level campaign, and worked tirelessly to build internal support for 1710. Last October, Schaitberger and General Secretary-Treasurer Vinnie Bollon hit the road for a six-city, five-

## Consensus Codes

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rior exit stairs. Artificial restrictions on many things have been removed, most importantly, the removal of the restriction on the number of floors in parking garages under residential occupancies.

In contrast the NFPA codes, which are still under development, will be a compilation of codes developed by several organizations including: NFPA, the International Association of Plumbing and Mechanical Officials (IAPMO), the American Society of Heating and Air-Conditioning Engineers (ASHRAE), and the Western Fire Chiefs (WFC). The NFPA set of codes will not be as complete and comprehensive as the ICC codes, and they will not have all of the ICC codes' accessibility provisions. Most important, they will not have HUD's endorsement as a safe harbor for designing in accordance with FHAG.

The 18-month development cycle for the NFPA building code is also a major problem. Whereas the ICC took five years, including several drafts and two full code cycles, to develop the International Building Code, NFPA will be publishing the first edition of the NFPA building code after 18 months and with only one code development cycle. Because of the truncated procedure and the rush to make a code available, the NFPA building code will not have the detailed review that has been completed with the ICC Codes. Even now, as we go into the final months before publication, the first real draft of the code has not been released and many of the technical code provisions have not been resolved.

For these various reasons, NAA/NMHC have thrown their support behind the ICC codes. Local apartment firms are encouraged to support the adoption of these codes at the local level and to actively oppose the adoption of the soon-to-be-published NFPA codes.

Ron Nickson is vice president of Building Codes for the NAA/NMHC Joint Legislative Program.

OCTOBER 2001 VOLUME 26, NUMBER 11

# Natural Disaster Mitigation

By Cheryl Runyon, *Senior Fellow*

Natural disasters cannot be prevented but casualties and damage can be minimized through sustained and managed disaster mitigation. Mitigation—an ongoing effort to reduce the effect that disasters have on people and property—can take the form of keeping homes away from floodplains, engineering bridges and buildings to withstand earthquakes, including the latest wind safety provisions in building codes, and enforcing building codes to protect property from hurricanes and high winds. The implementation of a disaster mitigation program and the adoption of the most current comprehensive and coordinated International Building Codes developed by the International Code Council (ICC) are policy decisions that state and local governments must address to protect public health and safety. This report addresses protecting public health and welfare through a combination of strong building codes and active enforcement as a means of disaster mitigation.

The International Code Council (ICC) codes are comprehensive, coordinated, and represent the most up-to-date, functional set of codes governing building construction. The adoption and enforcement of these codes can improve safety and create safer, more energy-efficient, and more durable homes and buildings.

The Federal Emergency Management Agency (FEMA) found that approximately 75 percent of U.S. communities are not participating in disaster mitigation activities; in fact, nearly half the U.S. communities in high-risk coastal areas have done nothing to mitigate a potential disaster. Although some locations naturally are more prone to natural disasters—such as California (earthquakes) and south Texas and south Florida (hurricanes)—fires, floods and tornadoes can hit anywhere. Every local government can (and should) take proactive disaster mitigation measures as several states and communities learned in 1999, when the rains resulting from Hurricane Floyd caused severe flooding, even in inland towns and communities.

## A Decade of Expensive Natural Disasters

The 1990s produced several costly natural disasters that harmed local scenery, economies and housing. During the past 10 years, FEMA alone has spent $25 billion to help people repair and rebuild their

communities after natural disasters. This figure does not include the billions of dollars in insurance claim payments, lost revenues from businesses, lost employee wages, and the millions of dollars spent by other federal agencies to assist victims of natural disasters.

After Hurricane Hugo struck South Carolina in 1989, a post-hurricane survey of damages indicated that many roofing materials were poorly attached, resulting in flattened buildings (see sidebar). Hurricane Andrew then led off a decade of disasters, causing $25 billion to $30 billion in damages and leading to the deaths of 28 people in Florida and Louisiana in 1992. The insurance industry estimated that 25 percent to 40 percent of insurance claims for Andrew-based losses were due to slipshod construction practices. After hurricanes Fran and Bertha slammed North Carolina with a one-two punch in 1996, structural engineers found widespread cases of shoddy workmanship in construction.

**Physics of a Hurricane**

"Roofs are the Achilles heel of homes in hurricane-prone areas from Maine to Texas," according to John Tibbets of the South Carolina Sea Grant Consortium.

As strong winds strike a building, the air flow is diverted, swirling over and around the structure. Hurricane winds speed up around corners and edges, creating suction that pulls on building materials like a super-powerful vacuum hose. Fierce gusts and suction pressure are a dangerous combination that can yank off tiles and shingles and peel a roof like an orange. Tiles and shingles that are carried off by high winds can crash into windows in other houses and buildings.

Window shutters, if they fail, allow wind to rush into buildings and wreak havoc. If a window or door is lost during a hurricane, the winds push through the gap in the building, increasing air pressure and causing another break in the structure at its weakest point—usually the roof. Next, a dual wind force pushes the roof off from within while it also pries the roof off from outside. After the shingles or tiles are gone, the plywood and rafters are exposed. If the plywood is not nailed securely to the rafters (sometimes roofers miss the rafters), it flies away, and the roof bracing is gone. Sometimes the gables (the flat ends of the pitched roof) are not fastened to the walls. When the wind hits an unbraced gable, it can pull loose and allow the wind inside the building and the rafters can fall over. If the gables are not attached to the walls and the walls are not tied down to the slab, the house can collapse like a house of cards.

The 1999 hurricane season brought a bumper crop of disasters that led to 17 federal disaster declarations, surpassing the 1985 record. Hurricane Floyd caused 13 of the 17 major disaster declarations; 220 counties in 13 states were designated to receive federal assistance. In all, 42,973 homes sustained some degree of damage from Floyd, and 11,779 homes were destroyed or heavily damaged. Five injuries and 79 deaths were attributed to Floyd, and 4 million people were evacuated in Florida, Georgia, North Carolina and South Carolina.

Hurricane forecasters at Colorado State University predict the increase in storm activity seen during the past five years (the five most intense consecutive storm seasons on record), will perhaps continue for the next 20 years. In July 2001, the National Ocean and Atmospheric Administration's Hurricane Research Division reported that the increase in the number of hurricanes seen in recent years is likely to continue, possibly for decades.

## Strong Codes Mean Smarter Buildings

Whether or not the increase in disasters is a lasting natural phenomenon, one thing is clear—more people are moving into harm's way and then expecting state, local and federal assistance when their homes and businesses are damaged or destroyed at the whim of Mother Nature. "People just like to live along the water's edge," says former Woods Hole (Mass.) Oceanographic Institution scientist Graham Giese.

As more homes and businesses are constructed in high-hazard areas and as demands for frills—such as complicated roofs with numerous angles and pieces—increase, stronger building codes and enforcement of those codes are required to reduce the overall financial burden after a natural disaster. Although people are aware that they are at risk from recurrent hurricanes, floods or other events, they often do not truly understand the magnitude of their risk.

How can state legislators and local officials act to protect citizens and their investments in the community? Most important, perhaps, is the fact that policymakers no longer can afford to be complacent. Simply because a hurricane or other natural disaster has not hit a state or a certain part of the state for a number of years does not mean that it will not happen eventually. For example, a major hurricane did not strike south Florida for more than 20 years, until 1992's Hurricane Andrew; builders who moved to south Florida from other parts of the country often were constructing buildings in climatic conditions they did not understand. As a result, the area's construction quality declined, and building code enforcement was lax. The insurance industry estimated that 25 percent to 40 percent of insurance claims for Andrew-based losses were due to slipshod construction practices.

**Seeing Is Believing**

Although building safety is taken for granted by most people, building safety awareness helps to instill the importance of stronger building codes.

The city of Tampa, Fla., built a model house that displays building code applications and provides a unique method of explaining building codes to the public. The house "describes, shows and talks about building safety." The model house displays four different rooms—living room, kitchen, bedroom and bathroom—and is fully functional with a gas fireplace, running water, windows and smoke detectors. A cut-away wall displays regulation-based construction requirements that address hurricane strapping, bracing and connection. The living room fireplace has a safety valve for the gas connection and a chimney flue complete with fire stopping. The kitchen sink and the bathroom lavatory have counter outlets with ground-fault circuit- interrupter (GFCI) receptacles. Bathroom plumbing emphasizes water conservation through use of a 1.6 gallon toilet. The attic has roof trusses, truss strapping and lateral braces. Energy conservation is demonstrated with blown-in fiberglass insulation and with batt insulation.

The house allows building inspectors to interact with the public to educate them about how to properly insulate their homes and protect them from hurricanes. The house is displayed at trade shows, community events, schools, building conferences and other special events.

With hindsight, some policy actions may result in negative repercussions during the next major event. After Hurricane Andrew, then-Governor Lawton Chiles (Fla.) suspended contractor licensing requirements for 120 days; this allowed unlicensed contractors to operate scams and cheat homeowners. A significant percentage of homes in the Miami-Dade area were rebuilt or repaired by unlicensed contractors under minimal oversight by government inspectors. If another major hurricane hits the area, homes may not fare well.

## State and Local Policy Responses

Because the public memory is short, the wake of a natural disaster provides a brief political opportunity to implement new standards. "After a storm is the only time that John Q. Public says, 'I don't want this kind of destruction to happen again, '" reminds Jeff Robinson, a Florida shutter manufacturer.

*Some states have strengthened their building codes to prepare for future natural disasters.*

After helping to pay part of the $16 billion repair bill from Hurricane Andrew, the Florida Legislature directed state officials to survey public facilities in 1993 to determine which could withstand an intense tropic cyclone or a hurricane. In 11 counties, only 2 percent of facilities had adequate structural safety for a hurricane-prone area. State law now requires new schools to construct storm-resistant "pods" that meet tougher guidelines. Construction of these pods could take many years, however; school districts now are resisting the directive as an "unfunded mandate."

### *Florida's Statewide Building Code*

The Florida Legislature adopted The Statewide Unified Building Code (HB 219) during its 2000 legislative session. According to Paul Rodriguez, chairman of the Florida Building Commission, "This is the toughest building code in the country. It is only appropriate that the state most vulnerable to hurricanes takes the boldest step to make our homes less susceptible to the damage caused by high winds."

The legislation, effective July 1, 2001, establishes a statewide minimum standard for new construction and replaces 450 local codes. The Florida Building Code was produced by a coalition of building code experts, including the Florida Building Commission, the Southern Building Code Congress International and building code professionals who volunteered their time. The new regulations blend several codes—the *International Fuel Gas*; *Mechanical and Plumbing*; *Standard Building*; and *International Building* codes—to meet

the state's need to face its environmental challenges. The parent codes are the result of efforts by the International Code Council (ICC) to develop a single national building code with the goal to improve public safety in the built environment.

The bill's sponsor, Representative Lee Constantine, admits, "No one got everything they wanted." As the sponsor, he found himself refereeing and reconciling the concerns of almost 80 special interests to achieve passage of the legislation. Homebuilders think the code is too restrictive, while insurance companies want it strengthened even more. Construction manufacturers want to be assured that their products will meet code guidelines. Some local building code officials in Miami-Dade and Broward counties are unhappy that a state code will preempt their local codes.

Rick Dixon, executive director of the Florida Building Commission, voiced his support for the final product. "Florida can now move forward with a single minimum code that unifies all building design and construction regulations into a single code and provides expanded authorities and enforcement tools for local governments. We look forward to the improved effectiveness these reforms will provide in our rapid growth environment."

**Who Develops Model Building Codes?**

Three organizations—the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO) and the Southern Building Code Congress International (SBCCI)—came together in 1994 to develop a single set of codes under the International Code Council umbrella. The organizations decided that, rather than using three regional model building codes, the country needed a single national building code. The ICC formed a series of committees composed of code enforcement officials from throughout the United States, other regulators and the home building industry, architects, engineers and designers. The single family of comprehensive and coordinated model construction codes has been through public review and comment, discussion, formal comment and a final approval process. The codes address fires and other hazards, plumbing, sewage disposal, zoning, property maintenance, energy conservation, and electricity for residential and all other types of construction. Revised codes are published every three years to accommodate technological innovations and other necessary changes to address public safety and well-being.

When Governor Jeb Bush signed the bill, he brought into focus the reason for the legislation. "This new law improves the safety of Floridians during hurricanes. The construction of better-built homes will ensure Florida is a better prepared state." Constantine is proud of what the Legislature approved—" ... a single educational system, a single accountability system and a single interpretation."

### *Texas Approves Statewide Residential Code*

The Texas Legislature approved the adoption of the ICC *International Residential Code* as the municipal resident building code for one- and two-family dwellings in the state. The bill became effective Sept. 1, 2001; cities will have until Jan. 1, 2002, to make the transition and begin enforcing the new code. Senator Ken Armbrister and Representative Allan Ritter sponsored SB 365. Says Representative Ritter, "I believe that the adoption of the

*International Residential Code* will improve the homebuilding industry in Texas. The use of a single code throughout the state will lead to consistent code enforcement, higher quality construction, and less confusion in the construction process. I believe this bill will result in more affordable and safer homes." The bill had the support of the Texas Association of Builders, the state Municipal League, the Texas Society of Architects, the Hispanic Contractors' Association, the National Association of Home Builders, and members of the insurance and building officials associations.

### *Other State Action*

Other states also are examining their building codes. The South Carolina Code Council adopted the 2000 International Codes as construction guidelines in May 2000. Utah's Uniform Building Code Commission approved the adoption of the ICC *International Building Code*, the *International Residential Code* and the *International Energy Conservation Code*; implementation is scheduled for Jan. 1, 2002. The adoption of the ICC codes was supported by a coalition of public officials and industry organizations, including homebuilders, architectural and engineering groups, utilities, building owners and managers, and public safety officials. Utah previously adopted the *International Plumbing Code*, the *International Mechanical Code* and the *International Fuel Gas Code*. The state Fire Prevention Board is considering adoption of the *International Fire Code.* The Georgia Board of Community Affairs adopted the *International Building Code*, the *International Residential Code* and the *International Fire Code* on Sept. 12, 2001; the *International Codes* will update the state standard codes effective Jan. 1, 2002. The New York and North Carolina building code councils are considering the adoption of the ICC's family of codes for their states, and Virginia also has expressed an interest in adopting the International Codes.

*Statewide building codes are supported by home builders, architects, contractors and building code officials.*

Pennsylvania approved legislation in November 1999 (after six years of negotiations) to create the state's first state building code. In addition to the previous lack of a statewide code, about half of Pennsylvania's 2,600 communities had no local building codes. The state law supersedes any existing municipal codes that were less stringent; more stringent codes will remain in effect.

Other states also are addressing disaster mitigation to reduce the effects of future natural disasters to homes and businesses. Maine is moving toward local beach management plans to prevent erosion during development. Connecticut is promoting public education—through municipal officers and real estate agents—to homeowners who are new to the area.

Other states—California, Florida, North Carolina and Rhode Island—have laws that require natural hazards be taken into account when developing or revising a comprehensive local zoning and development plan.

States that are regularly affected by tornadoes and high winds are offering incentives to homeowners, local governments and schools to create "safe rooms" to withstand strong winds. (A safe room is a concrete and steel reinforced room—approximately 8 feet by 6.5 feet with 6-inch-thick walls and a steel door—built in a new or existing above-ground structure that provides greater protection from severe storms and tornadoes.) A 1999 Iowa law allows counties and cities to determine whether shelters are needed for mobile home parks. Iowa also offers grants to homeowners and local governments as part of its Tornado Shelter-Safe Room Initiative to develop underground or in-ground tornado shelters. The program, developed to limit the injuries and deaths from severe weather events, offers safe room construction and installation grants to residents ($3,500) and to local governments ($5,000) in one-third of its counties that have been affected by recent tornadoes and severe wind storms. Arkansas also reimburses homeowners up to $1,000 for construction of safe rooms or in-ground shelters.

*Other states are addressing natural disaster mitigation through beach management, zoning, development plans, public education and financial support for "safe rooms."*

In many states, critical local community structures—hospitals, fire and police stations, government buildings and schools—are being built to tougher standards to ensure they can function after a disaster.

Local governments also are responding to the need for building codes.

- In Freeport, N.Y., building codes now require hurricane straps to make houses more hurricane resistant.

- In New Hanover County, N.C., residential building codes now require new construction to be built several feet above the 100-year flood elevation.

- Salt Lake City, Utah, passed a bond measure to allow schools to be built to a higher seismic standard than currently is required to withstand a potential earthquake.

- Seattle, Wash., has developed an expedited process to grant a building permit to retrofit homes that could be destroyed during an earthquake.

- On New York's Long Island, where coastal erosion or flooding threatens $3 billion to $10 billion worth of property and infrastructure damage, the government is assessing the area's vulnerability to natural hazards. New York is developing a geographic information system (GIS) database of historical and current coastal events. The database will provide town planners with area profiles to better plan for hazard mitigation.

Additional mitigation policy measures are discussed in the sidebar on this page.

## The Need for Active Code Enforcement

In response to natural disasters, state and local governments are beginning not only to adopt stronger building codes, but also to provide requirements for the necessary training of inspectors and to increase the penalties for code violations.

**Additional Mitigation Policy Measures**

Additional efforts can be made to reduce future hurricane damage. State and local governments can take a number of policy measures, such as:

- Requiring retrofitting of current structures;
- Improving the strength of existing buildings (including emergency shelters);
- Establishing floodplain zoning restrictions and other measures to reduce construction in hazardous areas;
- Revisiting and toughening existing building codes and enforcement requirements so that new structures have a better chance of surviving high winds and floods;
- Requiring testing and approval of building products to ensure that materials can withstand hurricane-force winds and other pressure;
- Improving transportation routes for evacuations: and
- Conducting public education campaigns aimed at constituents and home owners that both explain these regulatory efforts and encourage initiatives by the building industry and homeowners.

By establishing training requirements and testing for government inspectors (and a funding mechanism to allow hiring enough inspectors), state and local policymakers will ensure that the building codes they adopt will be applied and enforced. "In many coastal areas, the housing industry is almost unregulated, either because the counties don't have codes or they lack enforcement," according to Tim Reinhold of South Carolina's Clemson University.

Part of the problem that faces inspectors is that major changes have occurred in the homebuilding industry. Contractors who once built one house at a time now have become schedulers for 25 to 30 subcontractors who work independently; gaps may be left in structures where there should be overlaps and seals. Inspectors who visit a site on a particular day may miss an important construction component because the subcontractor responsible for that piece of the work has not yet been to the job site.

## Conclusion

State legislators will want to be aware of state, federal and local emergency response plans in order to communicate recent developments to their constituents. Policymakers also will want to seek input from their constituents regarding 1) methods to strengthen homes, businesses and public buildings to withstand natural disasters and 2) how taxpayers will pay for these additional measures. In return, state legislators can explain to their constituents that protecting their homes and businesses against natural disasters must begin as a personal responsibility. The following checklist outlines initial steps that policymakers might want to consider as they develop their responses to mitigate natural disasters.

### Basic Community Preparedness Disaster Mitigation Checklist

#### Some Steps Public Officials Can Take

- Meet with your local emergency manager and review your community's contingency and emergency plans.
- Review the insurance coverage on all public buildings.
- Schedule an informal "tabletop" exercise with state and local emergency management staff to simulate an emergency.
- Review your community's school disaster preparedness plan.
- Work with communities and other officials to develop protocols for mutual aid arrangements, joint response and community education. Encourage participation in the development of the International Codes.

#### Some Key Messages from Public Officials to Constituents

- Make Homes Disaster Resistant: Install hurricane shutters on windows, put straps and reinforced bracing on roofs, reinforce garage doors, raise electrical appliances and outlets, install sewage backflow valves, and trim dead or weak branches from around the house to reduce damage caused by hurricanes, high winds and flooding.
- Purchase Flood Insurance: Many policies have a 30-day activation period before they take effect. Flood insurance is the only form of assistance that can reimburse homeowners for their losses from floods that result from hurricanes. Many homeowners do not realize that floods are not covered in their existing insurance policies.
- Develop Family Disaster Plans and Keep a Disaster Supply Kit: Every community should have a disaster plan, and every family should have an emergency supply kit and a personal disaster plan. The plans should give particular attention to relatives with special needs, small children and pets.

## State Legislative Reports

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# *What can a Jurisdiction expect from the adoption of the I-Codes?*

## General Expectations

- As a stakeholder in the ICC, a jurisdiction can exercise its right to vote on ICC code development matters and organizational policy as well as actively participate in the process through its appointed delegates within the building safety department, fire department, and other departments which exercise construction, health and energy code enforcement regulatory activities.
- Parochial modifications to the I-codes can be brought before all other ICC member delegates to be considered for national adoption, reflecting the jurisdiction's contribution to fire and life safety wherever the I-codes are adopted.
- Eligibility for membership in a not-for-profit, public benefit organization of professional fire and construction code enforcement officials, owned and controlled by its member jurisdictions.
- A comprehensive, coordinated and contemporary set of codes. Adoption of the I-Codes eases the administrative burden on the building department's code development and maintenance functions while enhancing consistent code enforcement, public safety and affordability.
- The I-Code system provides for the preservation of current code provisions which are unique to the jurisdiction and which have a proven record of public fire and life safety. The city has sole administrative authority to adopt and amend its codes, preserving local control of code content.

## Economic Expectations

- The I-Codes help create a more attractive development climate for businesses location since I-Code design/build requirements are familiar to out of state developers. Streamlined Building Safety Department operations would eliminate unnecessary delays in the construction timetable.
- Adoption of the I-Codes is the first step toward achieving a more favorable ISO rating. Beyond code adoption, ISO looks deeper into a jurisdiction's use and administration of the code. ICC has over 30 years of experience with training code officials and municipal personnel who work with inspectors. ICC can help your jurisdiction manage a vigorous implementation of the codes to further improve the ISO rating.
- I-Code adoption provides greater economic opportunity for resident designers, manufacturers, developers and the building trades when competing for business in surrounding communities. Knowledge of the I-Codes can be utilized in 50 states, Washington, D.C., Puerto Rico, the Architect of the U.S. Capitol, Department of Defense, General Services Administration, National Park Service, U.S. Department of State, U.S. Forest Service, Veterans Administration, National Bureau of Prisons and thousands of local jurisdictions throughout the U.S.

## Building Safety Department

- The I-codes will streamline the fire and life safety and building regulatory system by bringing consistency, compatibility and uniform codes enforcement applications through common interpretation, education and code information services.
- By relying on the 200 years of accumulated code development experience that ICC brings to its model codes, your jurisdiction can divert valuable staff resources from major code development activities. Building safety and fire department staff can submit code changes to the ICC code development process as do other members and interested parties, thus sharing the experience and wisdom the jurisdiction has accumulated over the years with other cities, states and local jurisdictions and vice-versa. Member building and fire safety code officials can participate in the final vote in the code development cycle.
- The resources of the ICC staff can, in essence, expand the staff of the building safety department. An ICC staff of more than 350 professionals dedicated to maintaining and enhancing the most exhaustive and technologically sophisticated construction codes in the world will be an available resource to fire and building code officials and to its code users. In addition, plan review services are available through ICC which can assist during periods of peak demand.
- Uniform education and certification programs can be utilized nationally, providing a pool of trained professionals who have demonstrated their competency in code knowledge and application. The City can draw from this pool to meet staffing demands.
- Certification also provides an advantage to current staff through the mobility needed to be employable should they desire to continue in some code enforcement capacity upon retirement. This mobility aids in staff retention and morale by providing a mechanism for long-term career planning.

## Services

- Utilize the resources of a staff of more than 325 professionals dedicated to the highest levels of member service.
- The resources of over 50,000 members are available for operational and administrative assistance.
- Plan review services can be provided when needed.
- A vast array of code support publications and architectural and engineering references, many of which are in electronic format for cutting and pasting into reports. The ASTM and UL Standards found in the IBC are published in single documents to eliminate the need for small design shops to purchase and maintain costly standards documents.
- For products, methods and technologies not fully addressed by the codes, any jurisdiction can rely on International Evaluation Service (IES) which will assure design professionals and code enforcement officials that products being specified meet the intent of the code for their application in building systems.
- ICC will bring professional development services to the community for initial and ongoing training to facilitate the transition. Code users will be able to quickly become familiar with code updates once the initial differences in format are learned.
- Your jurisdiction can use ICC certification services to demonstrate professional competency in code knowledge and application without the burden of utilizing inhouse staff.
- ICC can develop and administer contractor licensing exams, releasing valuable local resources to be utilized in other areas of department operations.