Building Code Basics: Fire

Based on the 2009 International Fire Code®

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International Code Council
Scott Stookey

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PREFACE

Fire code enforcement is an important public safety function because unwanted fires kill and injure thousands annually. Unwanted fires have a monetary impact on communities because fires remove businesses from the tax rolls while the damaged building is rebuilt and reconstructed. Statistics confirm that over 40% of the businesses that experience a fire never reopen because they lose their customer base. Of concern to any community is the accidental release of hazardous materials because of their potential for fire, explosion, or causing injury due to incapacitation by the chemical's constituent. All of these incidents require a response by the fire department, which places fire fighters in danger, especially when an interior rescue and fire attack is required. Given the broad scope of hazards in society, the job of enforcing the fire code is challenging. This is especially true when dealing with hazardous materials, high-piled combustible storage, and combustible dust-producing operations.

Building Code Basics: Fire – Based on the 2009 International Fire Code® was developed to address the need for an illustrated text explaining the basics of the fire code. It is intended to provide an understanding of the proper application of the code to the most commonly encountered hazards found in many communities and cities. The text is presented and organized in a user friendly manner with an emphasis on technical accuracy and clear non-code language. The content is directed to fire service professionals, code officials, designers and others in the building construction industry.

The content of *Building Code Basics: Fire* is organized to correspond to the arrangement of the 2009 IFC. It commences with a review of the legal aspects associated with the adoption and enforcement of the fire code provisions including permitting, right of entry, and inspector liability. It progresses through common hazards that can be found in any occupancy, site and building features that must be addressed with any new construction, fire and life safety systems and features, special processes and uses, and it concludes with a review of the most commonly encountered hazardous materials. This format is useful to readers because it pulls together related information from the various sections of the IFC into one convenient location while providing a familiar frame of reference to those with any code enforcement experience. The arrangement of the book is formatted to follow the steps of new building construction or renovation as well as areas of focus during any fire inspection. This format and arrangement offers the reader a means to understanding why fire code enforcement is an important public safety function and why it is so important to the safety of emergency responders.

Anyone involved in the design, construction, or inspection of buildings or industrial processes and hazards will benefit from this book. Beginning and experienced fire inspectors, plans examiners, contractors, engineers, architects, environmental/health and safety professionals, and students in fire science, fire protection, and building inspection technology curriculum or related fields of study and work will gain a

fundamental understanding and practical application of the frequently used provisions of the 2009 edition of the IFC.

Reasonable and correct application of the code provisions is enhanced by a basic understanding of the fire code development process, the scope, intent, and correlation of the family of the International Codes, and the proper administration of those codes. This fundamental information is provided in the opening chapters of this manuscript. The book also explains the interaction of the fire code with other local and state regulations. Because the content is focused on the fire code, the book includes prerequisite reading which is important in understanding the *International Building Code* occupancy classification system, how buildings are assigned occupancy classifications, and how these classifications are used in the application of the fire code.

This book does not intend to cover all provisions of the IFC or all of the accepted materials and methods for the construction of fire protection systems, features, or the storage and handling of combustible and hazardous materials. Focusing in some detail on the most common hazards that are found in nearly every community affords an opportunity to fully understand the basics without exploring every variable and alternative. This is not to say that information not covered is any less important or valid. This book is best used as a companion to the IFC and appropriate National Fire Protection Association standards, which should be referenced for more complete information.

Building Code Basics: Fire features full color illustrations and photographs to assist the reader in visualizing the application of the code requirements. Practical examples, simplified tables, and highlights of particularly useful information also aid in understanding the provisions and determining code compliance. References to the applicable 2009 IFC sections are cited to assist readers in locating the corresponding code language and related topics in the code.

ABOUT THE INTERNATIONAL FIRE CODE

The IFC is a comprehensive, stand-alone model code that regulates minimum fire safety requirements for new and existing buildings, facilities, storage, and processes. The IFC addresses fire prevention, fire protection, life safety, and safe storage and use of hazardous materials in new and existing buildings, facilities, and processes. The IFC provides a total approach of controlling hazards in all buildings and sites, regardless of the hazard being indoors or outdoors.

The IFC is a design document. For example, before one constructs a building, the site must be provided with an adequate water supply for fire-fighting operations and a means of building access for emergency responders in the event of a medical emergency, fire, or natural or technological disaster. Depending on the building's occupancy and uses, the IFC regulates the various hazards that may be housed within

the building, including refrigeration systems, application of flammable finishes, fueling of motor vehicles, high-piled combustible storage, and the storage and use of hazardous materials. The IFC sets forth minimum requirements for these and other hazards and contains requirements for maintaining the life safety of building occupants, the protection of emergency responders, and to limit the damage to a building and its contents as the result of a fire, explosion, or unauthorized hazardous material discharge.

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PREREQUISITE READING—OCCUPANY CLASSIFICATION

Before readers of this book proceed into its content, they must understand that most communities regulate their buildings based on the occupancy classification. Occupancy is assigned based on the use and character of a building. A building's use is evaluated for life safety and fire risks, and its character represents the functions and activities that are expected to occur in the building. A correct occupancy classification establishes the foundation for all the code requirements that are intended for the building's safe use.

Occupancies are classified into groups and sub-groups using the requirements in the *International Building Code* (IBC). Normally the fire code official does not have the legal authority in most communities to assign an occupancy classification—this task is assigned to the building code official. The reason is the IBC has requirements that address not only fire and life safety aspects, but includes requirements for accessibility of mobility-impaired persons, building sanitation such as potable and wastewater systems, as well various structural loads of the building itself and external loads including snow, wind, rain, and seismic ground movements. A building's occupancy classification influences these and other building code provisions. The *International Fire Code* (IFC) is primarily concerned with the safety of emergency responders, that fire protection systems are properly designed, constructed and maintained, the control of combustible materials and ignition sources, and ensuring processes or uses that represent a fire hazard or a high potential of injury or death, such as the release of hazardous materials, are properly designed, constructed, operated, and maintained.

The factors that govern the classification of a building's use must be carefully considered so that those uses or occupancies having approximately the same combustible content and similar fire hazard characteristics will be classified under the same occupancy heading. Occupancies should be grouped so that fire protection requirements and height and area limitations applicable to the occupancy groups are rational for all building uses within that group.

Every classification must be based on the premise that the uses covered by each will have similar fire hazards and life safety problems and that they share like characteristics. Within any given occupancy group or subgroup, no wide differentiation should exist between the fire hazards of the most hazardous and the least hazardous uses.

The occupancy groups include ten major classifications as follows:

A Assembly
B Business
E Educational
F Factory-Industrial
H Hazardous

I Institutional
M Mercantile
R Residential
S Storage
U Utility and Miscellaneous

In addition to these major classifications, the occupancy groups of Assembly, Factory-Industrial, Hazardous, Institutional, Residential, and Storage are further divided into subgroups in order to accommodate some variations in the hazards associated with the uses within each group (for example, hotel versus an apartment dwelling in the Residential classification). The fire load characteristics in Factory-Industrial and Storage occupancies vary considerably depending upon the product or process involved and, therefore, these uses are further classified into subgroups of low and moderate hazard, depending upon the potential fire severity.

As more and more buildings are being designed either for a single specialized purpose or as a part of a larger type of building complex, the need for more special code considerations have been recognized. Some examples of these special uses include automobile parking structures, domed stadiums, high-rise buildings, covered mall buildings, airport terminals, and large industrial complexes such as steel mills and assembly plants.