FOREWORD

Introduction

This User's Guide is provided as background to discuss the rationale and basis for the code provisions. This User's Guide is not considered part of the *International Code Council Performance Code® for Buildings and Facilities* (ICCPC®) but is provided for support with regard to interpretation and background information.

This User's Guide provides an overview of the structure and content of the ICCPC. Additionally, it provides insight about how a performance-based code works, and it explains the particular provisions found within the code. The 2001 edition of the ICCPC was drafted jointly by two committees composed of representatives from the code enforcement community (building and fire), academia, research firms, design firms and professional organizations. The drafting process consisted of the release of three reports that were open to comments from any interested parties. Following these, another draft was released, officially titled "Final Draft to the *International Code Council Performance Code for Buildings and Facilities*," which was then subjected to the ICC code change process in 2001, resulting in the 2001 edition. There have been six editions subsequent to the 2001 edition: the 2003 edition, the 2006 edition, the 2009 edition, the 2012 edition, the 2015 edition and the most current 2018 edition.

The ICCPC is not intended to be any different in scope than the current *International Codes®* (I-Codes®). It is, in part, a formalization of the alternate materials and methods section of the current I-Codes®. Currently, alternate designs occur with minimal guidance for all parties involved. The current alternate materials and methods approach in the prescriptive codes requires equivalency but does not describe how equivalency should be demonstrated, nor does it provide an administrative process to follow. A performance-based code provides structure to the alternate materials and methods approach. As part of that structure, the code and User's Guide provide code officials, designers and owners many approaches and resources that can be helpful in managing projects and administering approvals of performance-based designs.

This process goes beyond the formalization of the alternate methods and materials section, as it structures the prescriptive code in a more appropriate manner that focuses the code user on the intent of the code instead of on prescriptive solutions. For example, a subject not explicitly covered by the prescriptive codes is public welfare related to continuity of mission or the overall economic good (welfare) of a community. Examples might include a hospital, school, emergency services center, factory employing a vast majority of the residents of the community or a large mall that represents a significant tax base to the community. For one reason or another, these buildings are necessary for the well-being and viability of a community and thus need to be kept operating or have their "down time" minimized so that they can continue to serve the community even after suffering a major event such as an earthquake, fire or hurricane.

This User's Guide is to be used in conjunction with the ICCPC and not as a substitute for the code. The User's Guide is advisory background information only. The code official alone possesses the authority and responsibility for interpreting the code.

Background

The methodology employed in performance-based codes focuses on outcomes. In other words, a performance code approach would identify and quantify the level of damage that is acceptable during and after a fire, earthquake or other event. Generally, but not in all cases, the current prescriptive code focuses on solutions that achieve a certain outcome. The difficulty is that the outcome is unclear. Therefore, when a design is proposed that is different from the prescriptive code, it is often difficult to determine whether the approach will be equivalent. There may be other more appropriate and innovative solutions available. A performance-based code creates a framework that both clearly defines the intent of the code and provides a process to understand quantitatively what the code is trying to achieve. Without this framework, new construction techniques and innovations would be fairly difficult to accomplish and new methods of construction take longer to implement.

This code also addresses issues that are not specifically related to a natural or technological hazard event. For instance, providing equal access for those with disabilities is not related to an event but instead is a societal expectation of equality. Another example is energy efficiency, which is currently an important expectation of society but cannot be linked to a particular hazard event.

As noted, the prescriptive code is a solution that we have been applying over the years to achieve a certain outcome, and it will continue to be used as the primary viable solution. In fact, most designs under a performance-based code system will be conducted using prescriptive codes. More specifically, a performance code will not replace prescriptive codes. Developing a performance-based code creates a framework in which numerous design solutions are available, including the current prescriptive codes.

The development of performance criteria and acceptance methods is outside the scope of the ICCPC and will require industry, professional societies, research and evaluation services to take a role in the development and application of these criteria and methods. Such criteria and methods are not intended to be found or to be directly referenced in the performance code. The code simply provides criteria to help determine which methods are acceptable within Section 103, "Acceptable Methods."

Structure of the code provisions

The *International Code Council Performance Code for Buildings and Facilities* is the result of a joint effort of two committees; ICC Performance Building Committee and ICC Performance Fire Committee. Originally, these two committees had their own draft codes, but in November 1999, they decided to create a single performance code that contained several parts. These parts reflect the unique aspects of each of the drafting committees. The intention was that this code be adopted in its entirety, which is strongly recommended. Alternatively, Parts I and III could be adopted, which would accommodate fire departments that may be interested in the code as it relates to existing buildings or similar applications. A fire department would not usually have the authority to adopt provisions related to subjects such as structural stability or plumbing. Ultimately, the adoption decision is in the hands of policy makers. The four parts of the document are as follows:

Part I—Administrative (Chapters 1–4)

Part II—Building Provisions (Chapters 5–15)

Part III—Fire Provisions (Chapters (16–22)

Part IV—Appendices (A–E)

Part I—Administrative

Part I of the document contains four chapters in which common approaches were found for both building and fire. Chapter 1 contains administrative provisions such as intent, scope and requirements related to qualifications, documentation, review, maintenance and change of use or occupancy. Also, provisions for approving acceptable methods are provided. Chapter 2 provides definitions specific to this document.

Chapter 3, "Design Performance Levels," sets the framework for determining the appropriate performance desired from a building or facility based on a particular event such as an earthquake or a fire. Specifically, the user of the code can more easily determine the expected performance level of a building during an earthquake. In the prescriptive codes, the required performance is simply prescribed with no method provided to determine or quantify the level of the building's or facility's performance. In other words, all of the different requirements such as heights and areas, sprinklers and structural requirements are attempting to address the hazards to which buildings are subject and the losses that society is able to tolerate. Because these issues are dealt with implicitly, it is difficult to measure the level of safety provided. Therefore, when applying the alternate materials and methods approach for the prescriptive code, it is unclear what is meant by "equivalent," and often the designer must try to make the determination. The problem with the designer determining the intended performance level is that such decisions may not be technical in nature. They are value judgments, which should ultimately be made by policy makers. This chapter can serve as the link between the policy makers and the designers by specifically providing measurable guidance as to desired performance. See the User's Guide for Chapter 3 for a more detailed discussion. It should be noted that the structural provisions within the IBC are somewhat performance-oriented in that buildings are ranked in importance tables for occupancies. See Table 1604.5, Risk Category of Buildings and Other Structures, of the *International Building Code*. The structural requirements are then based on those occupancy categories.

Chapter 4 deals with the topics of reliability and durability and how these issues interact with the overall performance of a building or facility over its life. This issue has always been relevant to codes and standards but becomes more obvious when a performance code requires a designer to regard buildings as a system. Also, there is often a concern that when performance designs are implemented, necessary redundancies may be removed. As an example, greater dependence may be placed on the use of a single, active fire protection system rather than relying on a combination of passive compartmentation and active fire protection systems. Reliability includes redundancy, maintenance, durability, quality of installation, integrity of the design and, generally, the qualifications of those involved within this process. More discussion is found within the User's Guide for Chapter 4.

Parts II and III—Building and Fire

Parts II and III provide topic-specific qualitative statements of intent that relate to current prescriptive code requirements. As noted, Parts II and III are building and fire components, respectively. The building and fire components were not fully integrated because of concerns relating to how such a document might be used. For instance, a fire department might want to utilize the document for existing buildings or facilities but would not be able to adopt chapters dealing with issues such as structural stability or moisture. Therefore, the code is designed so that a fire department could adopt Parts I and III only. When Part II is adopted, the entire document should be adopted. Part III should always be included in the adoption of this code.

Generally, the topic-specific qualitative statements are the basic elements missing from the prescriptive codes. The statements follow a particular hierarchy, described as follows.

Objective. The objectives define what is expected in terms of societal goals or what society "demands" from buildings and facilities. Objectives are topic-specific and deal with particular aspects of performance required in a building, such as safeguarding people during escape and rescue.

Functional Statement. The functional statement explains, in general terms, the function that a building must provide to meet the objective or what "supply" must be provided to meet the "demand." For example, a building must be constructed to allow people adequate time to reach a place of safety without exposure to untenable conditions.

Performance Requirement. Performance requirements are detailed statements that break down the functional statements into measurable terms. This is where the link is made to the acceptable methods.

Societal goals are difficult to determine but need to be reflected within the code, since they are the purpose for having regulations for buildings and facilities. Society expects a certain performance from buildings and facilities and demands that the local codes and their enforcement provide that protection. As noted earlier, such goals need to match the expectations of the policy makers. These goals will vary among communities because of specific needs and concerns such as the preservation of an historic part of a community or a business that employs a majority of the town's work force. Policy makers have relied upon the model codes to reflect these goals, but the model codes today generally focus on the protection of life and property versus looking at a community overall and its unique features. So the desired goals are not always achieved by the simple adoption of model codes. Thus, variations in a community's social objectives are reflected by local amendments. In the performance-based code, objectives, functional statements and performance requirements are generalized by using terms such as "reasonable," "adequate" or "acceptable." In the current prescriptive code there is only one value that is deemed "reasonable"; thus, communities must amend the code to reflect their local needs. Justifying amendments is often difficult in a prescriptive code environment since we are looking at a single solution versus understanding outcomes tolerated by society in events such as earthquakes. The performance codes are an attempt to create an environment where "reasonable" is qualified by the level of damage that is tolerable to a community based on the type of events expected and the use and importance of the building impacted. It is hoped that this code will create a framework that policy makers can use to reflect what society expects more clearly and in a more consistent way from jurisdiction to jurisdiction.

Part IV—Appendices

Part IV contains the appendices to the code document. Each of the appendices relates to specific provisions of this code and are discussed within the User's Guide as applicable.

Equivalency versus performance-based codes

The new *International Code Council Performance Code for Buildings and Facilities* is intended to provide a more comprehensive structure than the previously published model codes regarding alternative materials, design and construction methods, and testing. Typically, these alternatives were used for specific building or facility applications, such as exiting requirements or innovative techniques for seismic design. Unfortunately, the building official, fire official or appeals board finds themselves in the position of determining acceptance criteria with only general guidelines, such as the following published in the 2012 editions of the *International Building Code* and *International Fire Code*.

2018 *International Building Code*

[A] 104.10 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the *building official* shall have the authority to grant modifications for individual cases, upon application of the owner or the owner's authorized agent, provided that the *building official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, accessibility, life and fire safety, or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.10.1 Flood hazard areas. The building official shall not grant modifications to any provision required in *flood hazard* areas as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.
5. Submission to the applicant of written notice specifying the difference between the *design flood elevation* and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the *design flood elevation* increases risks to life and property.

[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety. Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons why the alternative was not approved.

[A] 104.11.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

[A] 104.11.2 Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an *approved agency*. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

2018 *International Fire Code*

[A] 104.8 Modifications. Whenever there are practical difficulties involved in carrying out the provisions of this code, the *fire code official* shall have the authority to grant modifications for individual cases, provided the *fire code official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the department of fire prevention.

[A] 104.9 Alternative materials and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. The *fire code official* is authorized to approve an alternative material or method of construction where the *fire code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, *fire resistance*, durability and safety. Where the alternative material, design or method of construction is not approved, the fire *code official* shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.9.1 Research reports. Supporting data, when necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

[A] 104.9.2 Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *fire code official* shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *fire code official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *fire code official* for the period required for retention of public records.

Performance-based designs have been occurring under the preceding sections for years, despite the lack of guidance to designers or code enforcers. These sections do not address specific subject areas or state specifically what is intended. By contrast, a performance-based code will clearly state the intent for each specific area the code intends to cover, such as means of egress and indoor air quality, essentially expanding on the current alternative methods and materials section. Thus, decision making in terms of methodologies beyond the prescriptive code will become clearer. The intent statements are satisfied through the use of acceptable methods, which include the prescriptive code. The methodologies put forth in this code will provide a structure in which the designer and the code official are provided with the flexibility to determine a specific design performance level desired by the owner based on an evaluation of the level of risk and reliability of the solutions used, while still achieving the intent of the code. Design professionals have requested this flexibility for several years, and with the performance provisions, the designer now has the choice of using prescriptive, performance, or a combination of these provisions.

It is anticipated that prescriptive code provisions of the *International Building Code, International Residential Code, International Mechanical Code, International Plumbing Code, International Fire Code* and related codes will likely be used for most projects, and performance-based designs or a combination of prescriptive and performance-based designs will only be used for unique circumstances requiring design innovation. A benefit of the ICCPC, though most designs will be accomplished with prescriptive codes, is an improved understanding of the intent of the prescriptive requirements. Ultimately, the improved understanding will benefit the quality of the prescriptive documents by providing additional solutions generated by using a

performance code structure. Such a document can also provide a sounding board for the inclusion of requirements into the I-Codes during the code change process.

"Architecture" of the codes

There are often questions related to how the document will work with prescriptive codes in the adoption process. It is intended that this performance code is to stand alone from the prescriptive codes but utilize the prescriptive codes as an acceptable method. Essentially, if a jurisdiction were to adopt the ICCPC, it would still be using the prescriptive codes, such as the building, residential, fire, mechanical and plumbing codes, as acceptable methods. Also, it will always be possible that a jurisdiction could adopt the prescriptive codes without adopting the ICCPC. The ICCPC is intended as a framework document that creates a method more closely reflecting society's expectations of building and facility performance. This document has the necessary components to reflect society's expectations through better communication of intent and through placing buildings and facilities into more conservative performance groups.

Past experience with prescriptive codes, specifically with regard to seismic design, has demonstrated that public expectation of regulations is often higher than what the regulations and technical communities provide. The Northridge, California, earthquake on January 17, 1994, was an example of this disconnect. The engineers were satisfied that most buildings met the objective of life safety, whereas the public expected buildings to be much more usable after the event. Additionally, it is recognized that it will be some time before an overall performance-based system is adopted by most jurisdictions. It is hoped that this code can serve as an important tool in creating a comprehensive performance regulatory system.

Existing buildings and facilities

A performance-based regulatory system can be used as a tool in understanding at what level an existing building may perform in an event such as a fire or earthquake. There are some prescriptive tools available in current codes, such as the work area method and scoring method found in the *International Existing Building Code*. These methods have become fairly developed and provide a fair amount of flexibility but still do not indicate the actual performance of the building or portion thereof. Additionally, fire codes in the United States have limited requirements related specifically to existing buildings and facilities, but in cases where it can be shown that a distinct hazard exists, the requirements for new buildings and facilities would apply. The burden of showing that a distinct hazard exists rests with the jurisdiction. A performance code can be used to help pinpoint at what level an existing building or facility may perform in events such as a fire or an earthquake, for example. This could apply to a single building, a certain occupancy classification or to an entire community through an adopted ordinance. The ICCPC provides a tool to the jurisdiction to help assess the level of performance of existing buildings or perhaps a building type.

Additionally, a performance code provides options to designers and owners when they address a hazard in an existing building. For example, instead of simply stating that the travel distance must be decreased, the objectives of the code are discussed, which allows designers to determine other ways to achieve the objectives. A systems approach in many cases gives everyone involved a better, more realistic understanding of the actual hazards and the most effective means of addressing such hazards.

Summary

The approach provided in the performance-based document is in part a global expansion and a major improvement on the current equivalency approach. Also, the comprehensive structure that includes strengthened administrative provisions, design-performance level decision-making tools and topic-specific intent statements focuses codes on desired outcomes instead of on a single solution.

The prescriptive code is a very important element of a successful performance-based code system and will continue to play an important role in the future. Specifically, a performance code structure will create an environment that encourages innovative approaches, which may become solutions within the prescriptive code.

Currently, the design performance level concept provided in Chapter 3 of the code document specifically focuses on events such as fires, earthquakes and winds, and does not address everyday use issues such as interior environment, prevention of falls and various other topics that could be dealt with on varying design-performance levels. If Chapter 3 is not referenced within a specific chapter in Parts II and III, then there is assumed to be only one design performance level.

Some additional issues that need further study are durability and reliability and how these affect building performance.

Additional resources

There are additional resources available that may assist in the understanding of this code and the alternative/performance design process. These resources include the following:

- *Building Fire Performance Analysis* (Wiley, 2004)
- *Code Official's Guide to Performance-Based Design Review* (SFPE and ICC, 2004)
- *Egress Design Solutions* (Wiley, 2007)
- *International Fire Engineering Guidelines* (Australian Building Code Board, 2005)
- *Performance-Based Building Design Concepts, A Companion Document to the International Code Council Performance Code for Buildings and Facilities* (ICC, 2004)
- *SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings* (NFPA and SFPE, 2007)