

## Part IV—Appendices

### APPENDIX A

## RISK FACTORS OF USE AND OCCUPANCY CLASSIFICATIONS

### A101 Objective

This section classifies buildings, structures, and portions of buildings and structures by their primary use in order to facilitate design and construction in accordance with other provisions of this code. When determining the design performance level, the building or structure needs to be assigned to a performance group. This appendix provides guidance as to the use group or occupancy classification of the building to determine the performance group when applying Table 303.1. The performance group classifications are needed to address the language in the various provisions that requires design features to be appropriate to the use for performance-based acceptable solutions and to provide the basis for the use of applicable provisions of the *International Building Code* as “deemed to comply” acceptable methods. If this appendix is used, any assumptions should be documented and verified. The descriptions found in this appendix need to be taken as a starting point, as many buildings and facilities have unique characteristics that would make a performance-based analysis on a general use and occupancy classification inappropriate.

### A102 Functional statements

This section states which factors should be considered when determining the primary use of a building. These factors include the use of the occupancy classifications found in the IBC and an analysis of the hazards and risks to the occupants. It is again emphasized that the occupancy classifications alone may not be sufficient, because of the unique hazards and risks associated with a particular building or facility.

### A103 Use and occupancy classifications

To provide consistency between the provisions of this code and the provisions of the *International Building Code*, the fundamental definitions for use and occupancy classifications are the same.

Should the *International Building Code* be used as the basis for an acceptable method for any of the use and occupancy classifications listed in this section, all of the applicable provisions of the *International Building Code* shall be applied.

#### A103.1 General

To provide a better understanding of the reasons and assumptions behind various use and occupancy classifications, and to provide a codified foundation for use of performance-based analysis and design methods as the basis for developing acceptable solutions for any of the use and occupancy classifications listed in this section, Appendix A has taken the occupancy classifications from the *International Building Code* and provided detail related to assumptions. The following sections provided some additional insight on those assumptions for the various classifications. Additional characteristics can be used for individual situations if the information is available and supportable.

##### A103.1.1 Assembly

These assumptions reflect nominal characteristics of persons using a public or commercial assembly space (all assembly areas outside of a one- or two-family residential occupancy) and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. This reflects the expectation that spaces where large populations are gathered will be afforded a high level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events).

##### A103.1.2 Business

These assumptions reflect nominal characteristics of persons using a business occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. Generally, people using business spaces have limited responsibility for their own safety and are relying on the owners, managers, and insurers of the space to provide an adequate level of safety. There is an expectation that large populations of the public will not be exposed to a high level of risk and

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that the building owners, managers, and insurers retain significant responsibility for the safety of employees and visitors, but that the building or structure is not considered critical in emergency situations.

### **A103.1.3 Educational**

This assumption reflects the fact that the people using educational spaces have limited responsibility for their own safety and are relying on the owners, managers, employees, and insurers of the space to provide an adequate level of safety. There is an expectation that spaces wherein large populations of children are gathered will be afforded a high level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events) and that the building or structure may serve a necessary purpose in the event of an emergency (i.e. shelter). The tolerance for any loss in such occupancies is very low because these buildings house children, and schools play a vital role in a community.

### **A103.1.4 Factory—Industrial**

The assumptions for factory occupancies reflect the fact that the people in factory spaces have significant understanding of the risks associated with the occupancy and have significant responsibility for their own safety.

### **A103.1.5 Hazardous**

These assumptions reflect the fact that the people in hazardous spaces have significant understanding of the risks associated with the occupancy. Although the users of the building or structure may voluntarily accept the associated risks, they have little control over the hazards and have only moderate responsibility for their own safety; thus, they rely on built-in protection to minimize the risks to the extent practicable. This reflects the perception that if the structure is classified as hazardous, the level of protection must be high.

### **A103.1.6 Institutional**

These assumptions reflect nominal characteristics of persons in an institutional occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. These assumptions reflect the fact that occupants of institutional spaces have limited to no responsibility for their own safety and are relying heavily on the employees, owners, managers, and insurers of the space to provide an adequate level of safety. In part, this reflects the expectation that spaces where large populations of confined or immobile persons are gathered will be afforded a high level of protection to avoid catastrophic losses. In addition, the building or structure may play an important role in the event of an emergency. Furthermore, there is a large vulnerable population that is dependent on others. The various classifications of Group I Occupancies have a spectrum of vulnerabilities. In some cases, the occupants are physically able to react to an emergency, but their movement is restricted. In other Group I Occupancies such as hospitals, the occupants are generally free to come and go but are physically unable to undertake egress on their own.

### **A103.1.7 Mercantile**

This assumption reflects the fact that the people in mercantile spaces have limited responsibility for their own safety and are relying on the employees, owners, managers, and insurers of the space to provide an adequate level of safety.

### **A103.1.8 Residential**

#### **A103.1.8.1 R-1, Transient**

##### **A103.1.8.1.1 R-1.1, Hotel/Motel**

These assumptions reflect nominal characteristics of persons in hotel/motel occupancies, wherein some employees are expected to be awake through the night. These assumptions provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. These assumptions reflect the fact that occupants of such residential spaces have limited to no responsibility for their own safety and are relying heavily on the employees, owners, managers, and insurers of the space to provide an adequate level of safety. This reflects the expectation that spaces where large populations are gathered, some of whom may be disabled or impaired, will be afforded a high level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events).

#### **A103.1.8.1.2 R-1.2, Boarding houses**

These assumptions reflect nominal characteristics of persons in boarding house occupancies, wherein employees may be sleeping. These assumptions provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. These assumptions reflect the fact that occupants of such residential spaces have limited to no responsibility for their own safety and are relying in part on the employees, owners, managers, and insurers of the space to provide an adequate level of safety. This reflects the expectation that spaces where large populations, some of whom may be disabled or impaired, are gathered will be afforded a high level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events).

#### **A103.1.8.2 R-2, Multitenant residential**

These assumptions reflect nominal characteristics of persons in an apartment-type occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. These assumptions reflect the fact that the people in apartment spaces have significant responsibility for their own safety. This reflects the situation in which the landlord maintains some level of responsibility in that the tenants cannot control risks in the building outside of their own living units. There is an expectation that spaces where large populations are gathered, some of whom may be disabled or impaired, will be afforded a high level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events).

#### **A103.1.8.3 R-3, One- and Two-family residential**

These assumptions reflect the fact that the people in one- and two-family residential spaces have significant responsibility for their own safety and the expectation that a person's home is his or her castle (i.e., more responsibility on the homeowner than on the local government to protect the occupants). Here again, this reflects the societal expectation that a person's home is his or her castle.

#### **A103.1.8.4 R-4, Residential care**

These assumptions reflect nominal characteristics of persons in residential care occupancies, wherein employees may be assumed to be asleep and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. These assumptions reflect the fact that occupants of such residential spaces have limited to no responsibility for their own safety and are relying heavily on the employees, owners, managers, and insurers of the space to provide an adequate level of safety. Also, there is an expectation that spaces where large populations are gathered, some of whom may be disabled or impaired, will be afforded a high level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events).

### **A103.1.9 Special Use**

#### **A103.1.9.1 SP-1, Covered mall building**

These assumptions reflect nominal characteristics of persons in mercantile-type occupancies and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. It is generally assumed that the people in mercantile spaces have limited responsibility for their own safety and are relying on the employees, owners, managers, and insurers of the space to provide an adequate level of safety. This reflects the expectation that although spaces where large populations are gathered should be afforded a higher level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events), the users of the space will be aware, awake, and readily able to respond in emergency situations.

#### **A103.1.9.2 SP-2, High-rise building**

The assumed risk levels, hazard levels, and occupant characteristics shall be appropriate to the uses present within the building, and the structural, fire protection, and means of egress features shall be designed to accommodate the highest risk level present in the building. As a high-rise building is simply a larger and taller building of an otherwise defined use classification, the appropriate risk levels, hazard levels, and occupant characteristics for the base use classification apply. Given the increased amount of people due to the larger size, the increased complexity of egress, and the increased difficulty presented to emergency responders, a higher level of risk and safety is appropriate. In multi-use high-rise buildings, the total population, the distribution of their characteristics, and the distributions of the risk should be considered in selecting a base risk level. As a starting point, the highest level of risk by use group classification should be assumed. It shall also be assumed that public expectations regarding the protection afforded those occupying, visiting, or working in such a building, structure, or portion of the building or structure are high. This reflects the expectation

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that spaces where large populations are gathered, some of whom may be disabled or impaired, will be afforded a high level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events).

### **A103.1.9.3 SP-3, Atrium**

As an atrium will be located in a building of an otherwise defined use classification, the appropriate risk levels, hazard levels, and occupant characteristics for the base use classification apply. Atriums have a special category primarily related to the concerns of the behavior of smoke during a fire.

### **A103.1.9.4 SP-4, Underground building**

As an underground building is simply a designation for an otherwise defined use group classification that happens to be below grade, the appropriate risk levels, hazard levels, and occupant characteristics for the base use classification apply. The primary reason for the special treatment of such buildings is similar to those of a high-rise building. More specifically, evacuation of occupants becomes more complex, and it increases the difficulty of performing search and rescue operations and responding to an emergency.

### **A103.1.9.5 SP-5, Mechanical-access open parking garage**

These assumptions reflect nominal characteristics of persons in a garage occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. Generally, such buildings will be occupied by employees only above the ground floor who, as noted in Appendix A, will be awake, alert, and able to exit without the assistance of others.

### **A103.1.9.6 SP-6, Ramp-access open parking garage**

These assumptions reflect nominal characteristics of persons in a garage occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. Unlike mechanical-access open parking garages, the general public will likely be allowed to move throughout ramp access parking garages. This will change the level of familiarity of the occupants and possibly allow a larger number of occupants.

### **A103.1.9.7 SP-7, Enclosed parking garage**

These assumptions reflect nominal characteristics of persons in a garage occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. Enclosed parking garages are those garages that cannot meet the requirements for open parking garages. Therefore, the hazards imposed upon the occupants are now somewhat different. If a fire were to occur, the smoke would not dissipate as well as it would for an open parking garage.

### **A103.1.9.8 SP-8, Motor vehicle service station**

These assumptions reflect nominal characteristics of persons in a service station occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety.

### **A103.1.9.9 SP-9, Motor vehicle repair garage**

These assumptions reflect nominal characteristics of persons in a motor vehicle repair occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety.

### **A103.1.9.10 SP-10, Motion picture projection room**

These assumptions reflect nominal characteristics of persons in a projection room occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety.

### **A103.1.9.11 SP-11, Stages and platforms**

These assumptions reflect nominal characteristics of persons using stages and platforms and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety.

**A103.1.9.12 SP-12, Special amusement building**

These assumptions reflect nominal characteristics of persons in a special amusement occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. These assumptions reflect the fact that the people in special amusement buildings have limited responsibility for their own safety and are relying on the employees, owners, managers, and insurers of the space to provide an adequate level of safety. There is an expectation that spaces where large populations, some of whom may be disabled or impaired, are gathered will be afforded a high level of protection to avoid catastrophic losses (i.e., a large loss of life in a single space is generally perceived as being worse than the loss of one or two lives in multiple, smaller events).

**A103.1.9.13 SP-13, Aircraft related structure**

These assumptions reflect nominal characteristics of persons in aircraft related structures and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety.

**A103.1.10, Storage**

These assumptions reflect nominal characteristics of persons in a storage occupancy and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. People using storage spaces have significant responsibility for their own safety and are not relying on the owners, managers, and insurers of the space to provide an adequate level of safety.

**A103.1.11, Utility and miscellaneous**

These assumptions reflect nominal characteristics of persons using miscellaneous occupancies and provide the basis for such estimations as time to recognize an alarm, time to begin to exit, and time to find the way to a place of safety. These assumptions reflect the fact that the people using miscellaneous spaces have significant responsibility for their own safety and are not relying on the owners, managers, and insurers of the space to provide an adequate level of safety.

**ACCEPTABLE METHODS**

Given that use groups are definitions, there are no acceptable methods. However, should an additional definition be required and/or a prescriptive approach to building design and construction be desired, applicable definitions and associated requirements in Chapters 3 and 4 of the *International Building Code* are permitted to be used.

Alternative classifications for building use are permitted where the use in the opinion of the designer, code official, building developer, owner, or manager is not adequately defined by this code and for which adequate justification is provided.

As the use classifications are based on primary building use, occupant characteristics, risk-to-life of the occupants, and importance of the building or its contents to the local community, any information that can better support any of these areas would be most welcome.

