Goal

- To identify and describe key provisions of the 2015 IEBC.

Objectives

- Upon completion, participants will be better able to:
  - Recognize the limitations and extent of the codes related to existing buildings.
  - Identify the three different compliance methods offered by the IEBC.
  - Recognize the classifications of work associated with existing buildings.
  - Identify fire protection systems that need to be upgraded.
  - Recognize vertical openings that need partial or complete enclosure.

Description

- Provides a basis for the correct use and application of the code.
- Builds an understanding of the intent of the code through detailing:
  - Basic tables
  - Categorizations
  - A case study
Objectives

- Upon completion, participants will be better able to:
  - Identify unsafe interior finishes that need to be replaced.
  - Determine adequate means of egress.
  - Identify needed accessibility improvements.
  - Identify improvements to structural systems.
  - Describe the compliance alternative tabular method of evaluating existing buildings.

Code Adoption

- A sample adoption ordinance is included in the front of the 2015 IEBC.
- The jurisdiction must adopt a specific edition of the code.
- Any appendix must specifically be adopted.
- The code official is responsible for enforcing the adopted code and any state laws dealing with construction issues.

Introduction to the IEBC

- Basic building block of code enforcement education
- Developed using ideas from the model building codes, model rehab codes, state rehab codes and numerous other standards and documents

Purpose is to encourage the use and reuse of existing buildings, while requiring reasonable upgrades and improvements.

- Upgrades and improvements, where applicable, are life-safety related and include upgrading fire protection systems, partially or completely enclosing vertical openings, replacing unsafe interior finishing, ensuring adequate means of egress, and improving accessibility and the structural system.
- It is important to note that the necessity of the upgrades and/or improvements is determined by the type and extent of the work, not the expense.
Introduction to the IEBC

- Is a regulatory code in the family of I-Codes, which is maintained and promulgated by the International Code Council® (ICC®).
- This code, as well as the rest of the family of I-Codes, was developed and is maintained using ICC’s Governmental Consensus Process that allows all interested parties to participate in the ongoing process to enhance and maintain the document.
- More recently, cdpACCESS has been launched that allows online collaboration and voting.
  - This includes voting by those who are unable to attend the code development hearings.

Why Was the IEBC Created?

- Based on the principles to encourage the use and reuse of existing buildings that adequately protect public health, safety and welfare provisions that do not unnecessarily increase construction costs, and do not restrict the use of new materials, products or methods of construction.
- One of the baseline principles within the IEBC is that whatever the type of classification of work being performed, the construction cannot reduce the existing level of safety or level of conformance in the building.

Purpose and Intent of the IEBC

- Before one can fully utilize the IEBC and understand the basic philosophy, the following questions will need to be answered:
  - Why was the IEBC created?
  - Why not use the IBC?
  - Is the IEBC considered an equivalent to the IBC?
  - How is the IEBC different than requirements for existing buildings in the IFC?

Why Not Use the IBC?

- It is not a reasonable expectation for existing buildings to comply with the IBC because, historically, the primary focus of model code provisions has been toward the construction of new buildings, not alterations of existing buildings.
- Further, model codes, including the I-Codes, are revised every three years.
- These codes recognize the latest technology in life-safety and structural systems.
- These types of systems can be cost prohibitive to retrofit to existing buildings.
- When dealing with existing buildings, local enforcement officials have to recognize and understand the local climate (e.g., economic development, revitalization efforts, political influences, etc.) while at the same time securing public safety related to the built environment.
Is the IEBC Equivalent to the IBC?

- Should not be considered an alternative or equivalent to the IBC for the construction of new buildings, but a fair and reasonable approach to the enhancement of public safety within existing buildings without gaining full compliance with the IBC.
- Provisions in the IEBC do not obtain the same overall level of safety as those provided for in the IBC.
- For this reason, code officials, registered design professionals, owners, etc., should fully understand the requirements of the IEBC, particularly the administrative provisions, in order to utilize all the options available to gain compliance.

How is the IEBC Different than Requirements for Existing Buildings in the IFC?

- The IEBC is sometimes referred to as a “point in time” code.
- In other words, it only applies when a repair, alteration, change of occupancy or addition occurs.
- The IFC, and particularly Chapter 11 of that document, are considered to apply to existing buildings regardless of whether changes are being made to a building.
- Chapter 11 of the IFC contains construction requirements for existing buildings if those building do not already minimally comply.
- In addition, the IFC also contains provisions related to operational and maintenance requirements.
- An example of a operational requirement would be requirements related to hot work.
- A maintenance requirement would be how automatic sprinkler systems are to be continually inspected and tested.

Introduction

- The 2015 IEBC, when adopted by a jurisdiction, is a legal document that regulates the repair, alteration, change of occupancy, addition and relocation of existing buildings.
- Provisions for application, enforcement and administration are in the first chapter of the IEBC.
General—Section 101

Section 101.2 – Scope

- The IEBC covers all aspects of existing buildings, including maintenance, repairs, alterations, additions, change in use, historic buildings and relocation.
- The scope of the IEBC does not exclude any specific category of buildings.
- The code is applicable to all occupancies and categories of buildings, including all categories of residential buildings.

Section 101.3 – Intent

- The code is intended to provide alternative approaches (regulations) that address the public health, safety and welfare in existing construction.
- This intent becomes important in the application of any enforcement-oriented interpretive action or judgment.
- More importantly, the code official needs to be able to review, evaluate and rule on performance designs, alternative methods of construction and modifications with respect to construction related to existing buildings.

Section 101.4 – Applicability

- A building or portion thereof not previously occupied or used for its intended purpose shall comply with the IBC, or the International Residential Code® (IRC®) as applicable, for new construction.
- Regardless of a jurisdiction’s previous enforcement process, to be considered an existing building that building would have to been occupied and used for its original purpose.
- One method of proof of occupancy may be the record of an occupancy permit.

Can a building take advantage of the more relaxed provisions of the code before construction of the building has begun?

No. A building or portion thereof that has not been occupied previously or used for its intended purpose must comply with the provisions of the IBC.
General—Section 101

- The legal occupancy of any building existing on the date of adoption of the code shall be permitted without change, unless the code official requires changes related to the general safety and welfare of the public.
- Legal occupancy may need to be established and verified.
- At the time a building was constructed, there was no law. Yes. If there is no violation of an established law, or no law existed, then occupancy would be legal, assuming that there exist no conditions that in the opinion of the code official, are considered unsafe to the safety and welfare of the public.

Applicability—Section 102

Section 101.7 – Correction of violations of other codes

- Repairs or alterations compliant with other adopted maintenance codes, such as the International Property Maintenance Code® (IPMC®) and the International Fire Code® (IFC®), are not required to comply with the IEBC, unless those codes so provide.

Section 102.1 – General

- Where there is conflict between a general requirement and a specific requirement, the specific requirement applies.
- “More restrictive,” in the case of conflicting requirements, is defined as that which will result in greater protection or less hazard for the occupants.

Section 102.2 – Other laws

- All parties involved in the process of enforcing regulations on existing buildings need to be aware of all laws that pertain to the maintenance and construction activity within the building.
Applicability—Section 102

Section 102.2 – Other laws

- In some states, there are specific accessibility laws that duplicate federal requirements and are required to be enforced by the local code official.

Applicability—Section 102

Section 102.4 – Referenced codes and standards

- It is the intention of the code to be in harmony with the referenced standards.
- If conflicts occur because of scope or purpose, the code text governs, unless the conditions of the listing of equipment or appliances are violated.
- In this case, the conditions of the listing would govern over the code provisions.
- If the extent to which a standard is referenced is within the scope of the code the provisions of the IEBC take precedence where there is a conflict.

Duties and Powers of Code Official—Section 104

Section 104.1 – General

- The code official is the ruling authority on interpretations and can adopt policies and procedures in order to clarify and give direction related to the application of the adopted code requirements.
- Such rulings, policies and procedures must meet the intent and purpose stipulated within the code.
- The code official does not have the authority to waive or create new requirements without due process of law.
Duties and Powers of Code Official—Section 104

Section 104.2.1 – Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas

- Addresses improvements to buildings in flood hazard areas.
- If the building official determines that the work being undertaken constitutes substantial improvement or substantial damage, then the flood hazard requirements of the IBC will apply.
- The terms substantial improvement and substantial damage are defined terms.

Duties and Powers of Code Official—Section 104

Section 104.2.1.1 – Building evaluation

- As a result of the aforementioned meeting, the code official is authorized to request an investigation and evaluation of the existing building by a registered design professional to determine the existence of any potential nonconformance to the code.
- The registered design professional is required to identify nonconformance to the code official.

Duties and Powers of Code Official—Section 104

Section 104.2.1 – Preliminary meeting

- This section mandates that the code official and permit applicant meet if one or the other requests such a meeting, and the work is not a repair or Level 1 alteration.

Duties and Powers of Code Official—Section 104

Section 104.6 – Right of entry

- This provision does not grant complete authority to the code official to enter any building at any time to enforce the provisions of an adopted code, even if there is reasonable cause.
- This is especially critical concerning existing buildings because these facilities routinely are occupied during construction, and those occupants have rights of privacy guaranteed by federal civil rights laws.
- The code official must request permission to access areas not normally and routinely accessible to the general public or obtain access according to due process of law.
Duties and Powers of Code Official—Section 104

Section 104.9.1 – Used materials and equipment
- Materials can be reused provided they meet the requirements for new materials.
- Equipment can only be reused if specifically approved by the code official.

Section 104.10 – Modifications
- The code official can allow modifications, provided that strict compliance with the code is impractical and that the modification meets the intent and purpose of the code.
- The owner or owner’s agent must apply for and request such a modification.
- Whatever decision the code official makes, the level of health, accessibility, life and fire safety, or structural integrity shall be maintained.

Section 104.10.1 – Flood hazard areas
- Contains requirements that are consistent with other I-Codes as it relates to flood hazard areas.
- Proposed modifications to flood resistance requirements must be substantiated against specific criteria, including the need for the modification and the impact the modification will have on public safety and property.
### Duties and Powers of Code Official—Section 104

**Section 104.11 – Alternative materials, designs and methods of construction and equipment**
- The code does not intend to prevent or prohibit any items or methods not specifically covered in the text.
- As a performance code, the IBC can be applicable to and provide a basis for the approval of an increasing number of newly developed, innovative materials, systems and methods for which no code text or referenced standards yet exist.
- The code official is expected to apply sound technical judgment in accepting materials, systems or methods that, although not anticipated by the drafters of the current code text, can be demonstrated to offer equivalent performance.

### Duties and Powers of Code Official—Section 104

**Section 104.11.1 – Research reports**
- When an alternative material or method is proposed for construction, it is incumbent upon the code official to determine whether this alternative is, in fact, an equivalent to the methods prescribed by the code.
- Reports providing evidence of this equivalency are required to be supplied by an approved source, meaning a source that the code official finds to be reliable and accurate.
- The ICC Evaluation Service is an example of an agency that provides research reports for alternative materials and methods.

### Duties and Powers of Code Official—Section 104

**Section 104.11 – Alternative materials, designs and methods of construction and equipment**
- By virtue of this text, the code regulates new and innovative construction practices, while providing for the safety of building occupants.
- This provision is similar to modifications in that the code official has to rule on the alternatives that are submitted.
- The alternative must meet the intent and purpose of the code and maintain the current level of safety and public welfare within the building.

### Permits—Section 105

**Section 105.1 – Required**
- Requires permits for work done under the auspices of the code.
- Annual permits are allowed for work to already approved electrical, gas, mechanical or plumbing installations.
- Reduces the amount of administrative work required to apply for a permit in each individual situation.
- The person to which an annual permit is issued needs to keep a detailed record of alterations made.
Permits—Section 105

Section 105.2 – Work exempt from permit
- Permits are not required for work as listed in Section 105.2; however, although a permit is not required, any work that is done must not violate the provisions of the IBC, or other laws or ordinances of the jurisdiction.
- This list identifies areas that are typically referred to as repairs or allows equipment that is not permanently installed.
- This criteria can potentially provide a level of accountability on the part of the contractor to the owner.

Construction Documents—Section 106

Section 106.1 – Submittal documents
- The design of the building construction must be performed by a registered design professional in accordance with the laws of the state where the work takes place.
- Compliance with pertinent state licensing laws is clearly essential; however, in some specific circumstances, the code requires documentation of a design by a registered design professional regardless of what is required by the state law (see Sections 404.2.1, 606.2.2.1, 907.4.1 and 1201.2).
Board of Appeals—Section 112

- Any interested party can make an application for appeal on a specific project.
- The board is a quasi-judicial board whose decisions are part of the due process of law and are legal and binding.
- The board does not have the authority to waive adopted requirements.

Board of Appeals—Section 112

- There are only three situations that are allowed to be heard by the board of appeals:
  - When the true intent or rules legally adopted have been incorrectly interpreted.
  - When provisions of the code do not fully apply.
  - When an alternative or equivalent is proposed.

Administration

1. Referring to Section 101 in the code, which activity does not fit within the scope of the IEBC?
   a. Adding an addition to a church that was built in the year 1956.
   b. Converting a two-car garage to a bedroom.
   c. Constructing a building on a vacant lot.
   d. Repairing a broken window in an autoshop.

Administration

2. Read the following scenarios. Put a check in the “Permit not required” or “Permit required” box, whichever is applicable.

   Scenario 1
   A technician is installing a temporary system required to service electrical equipment.
   Permit not required

   Scenario 2
   A contractor is installing a window awning supported by an exterior wall of a Group R-3 occupancy.
   Permit not required
Administration

Scenario 3
A contractor is installing a driveway that is 45 inches (1143 mm) above grade, is not over a basement or story below and is not part of an accessible route.

Permit required

Module 2
Chapter 3 Provisions for all Compliance Methods

Introduction to Compliance Methods—Section 301

Section 301.1 – General
- Explains the options available to a designer or owner when dealing with construction related to existing buildings:
  - Prescriptive compliance method (Section 301.1.1)
  - Work area compliance method (Section 301.1.2)
  - Performance compliance method (Section 301.1.3)

3. Work that requires a permit shall be subject to inspection by the code official. What inspections shall be performed?
   a. Footing or foundation inspection
   b. Concrete slab or under-floor inspection
   c. Lowest floor elevation
   d. Frame inspection
   e. Lath and gypsum board inspection
   f. Fire-resistant penetration inspection
   g. Other inspections, if required
   h. Special inspections, if required
   i. Final inspection
Introduction to Compliance Methods—Section 301

Section 301.1 – General

- There is one exception to using one of these three compliance methods that allows for compliance with the laws in existence at the time the structure was originally built unless the building has sustained substantial structural damage or is undergoing more than a limited structural alteration (note: Repairs and alterations in flood hazard areas have additional requirements to the laws in existence at the time the structure was originally built).

Introduction to Compliance Methods—Section 301

Section 301.1.1 – Prescriptive compliance method

- Allows compliance in accordance with Chapter 4 of the IEBC.
- Formally from Chapter 34 of the IBC (Sections 3401 through 3411 of the 2012 IBC).
- These provisions are intended to prescribe specific minimum requirements for construction related to existing buildings that includes the following: additions, alterations, repairs, fire escapes, glass replacement, change of occupancy, historic buildings, moved structures and accessibility.

Introduction to Compliance Methods—Section 301

Section 301.1.2 – Work area compliance method

- Allows compliance in accordance with Chapters 5 through 13 of the IEBC.
- Contain provisions that are based on a proportional approach to compliance where upgrades are triggered by the type and extent of the work.

Introduction to Compliance Methods—Section 301

Section 301.1.3 – Performance compliance method

- Allows compliance in accordance with Chapter 14 of the IEBC.
- Formally from Chapter 34 of the IBC (Section 3412 of the 2012 IBC).
- This chapter provides provisions for evaluating a building based on fire safety, means of egress and general safety.
Section 301.1.4 – Evaluation and design procedures

- Seismic evaluation and design of an existing building must be based on the procedures specified in one of three reference materials.
  - Guidelines for the Seismic Retrofit of Existing Buildings (GSREB) (2015 IEBC, Appendix A)
  - American Society of Civil Engineers ASCE 41

Section 301.1.4.1 – Compliance with IBC level seismic forces

- The use of a particular referenced standard is dependent upon the IBC requirements.
- When seismic forces are required to meet the IBC level, they must be based upon 100 percent of the values in the IBC or ASCE 41.

Section 301.1.4.2 – Compliance with reduced IBC level seismic forces

- When seismic forces are permitted to meet reduced IBC levels, they must be based on 75 percent of the values in the IBC or in accordance with the GSREB, ASCE 31 or ASCE 41.
- Table 301.1.4.2 provides the equivalents of Table 1604.5 in the IBC to ASCE 31 and ASCE 41 (wind design is based solely on the procedures in the IBC or IRC).
Introduction to Compliance Methods—Section 301

General Provisions—Section 302

Section 302.1 – Applicability
- This section sets the applicability of the provisions to all methods contained within the IEBC.

Section 302.2 – Additional codes
- Requires compliance not only with the method chosen in the IEBC but other applicable codes.
- Other codes such as the mechanical code contain provisions related to alterations, additions, repairs, change of occupancy and historic buildings.
- These additional codes also apply.

Section 302.3 – Existing materials
- Allows the continued use of building materials as long as they do not create an unsafe situation.
- The term unsafe is defined in Section 202.
General Provisions—Section 302

Section 302.4 – New and replacement materials
- Generally new materials are required to be used.
- Some flexibility is provided to use like materials for repairs and alterations if an unsafe situation is not created.
- Certain hazardous building materials would be prohibited such as lead or asbestos consistent with what the IBC would prohibit.

Compliance Methods

1. When seismic forces are permitted to meet reduced IBC levels, they must be based on what percent of the assumed forces prescribed in the IBC?
   a. 35
   b. 55
   c. 75
   d. 95

General Provisions—Section 302

Section 302.5 – Occupancy and use
- In order to consistently apply the IEBC, this section would require occupancy classifications to be based upon the IBC not upon the code under which the building was originally classified.

Compliance Methods

2. The seismic analysis must be based on one of the following procedures in which section of the code?
   a. 301.4
   b. 301.1.4
   c. 301.1.2
   d. 301.1

3. Section 302 is applicable to all compliance methods.
   a. True
   b. False
Additions—Section 402

Section 402.3 – Existing structural elements carrying gravity load
- Where additions and related alterations increase the force in any existing structural element by more than five percent, the structural elements must be altered and replaced to carry the increased load as required for new construction.
Additions—Section 402

Section 402.4 – Existing structural elements carrying lateral load

- There are three options for seismically designing an addition to an existing structure:
  - Design the addition as being structurally independent from the existing building: The addition must be designed to meet the requirements for new construction.
  - Design the addition as not being structurally independent from the existing building: The addition and existing structure must be designed to meet the requirements for new construction or comply with ASCE 41 using a tier 3 procedure (Table 301.1.4.1).
  - Design the addition as not being structurally independent from the existing building: The addition must be designed to meet the requirements for new construction and the addition must not increase the demand-capacity ratio of any existing lateral load-carrying element by more than 10 percent.

Alterations—Section 403

Section 403.3 – Existing structural elements carrying gravity load

- Similar to the requirements for additions, where alterations increase the force in any existing structural element by more than five percent, the structural element must be altered or replaced to carry the increased load as required for new construction.
- If the gravity load-carrying capacity is decreased, it shall be shown to resist the applicable design gravity loads from the IBC for new structures.

Section 403.4 – Existing structural elements carrying lateral load

- An existing building or structure that is altered must be carefully evaluated for its ability to withstand earthquake and wind loads.
- Alterations that affect existing structural elements to a lesser extent are permitted without requiring the existing structure to comply with the provisions for new structures, as long as the alteration itself complies.
- Alterations that increase the demand-capacity ratio on existing lateral load-carrying elements by not more than 10 percent or decrease the lateral resistance of existing structural elements by not more than 10 percent are permitted without requiring the existing elements to be altered.
- Note that where compliance with Section 1613 of the IBC is required that ASCE 41 using a tier 3 procedure is an acceptable alternative. (Table 301.1.4.1).
Alterations—Section 403
Section 403.5 – Bracing for unreinforced masonry parapets upon reroofing
- Similar to Section 707.3.1 (Level 1 alteration).
- Essentially requires unreinforced masonry parapets to be braced where more than 25 percent of the roof is being replaced.
- This is applicable only to Seismic Design categories D, E and F.

Alterations—Section 403
Section 403.6 – Wall anchorage for unreinforced masonry walls in major alterations
- Similar to Section 907.4.5 for Level 3 alterations in the work area method and requires that unreinforced masonry walls be anchored where located in Seismic design category C, D, E and F.
- Applies where the alteration exceeds 50 percent of the area of the building.
- This is consistent with work area.

Alterations—Section 403
Section 403.7 – Bracing for unreinforced masonry parapets in major alterations
- Similar to Section 907.4.6 for Level 3 alterations in the work area method.
- This requires that unreinforced masonry parapets be braced where located in seismic design categories C, D, E and F.
- Applies where the alteration exceeds 50 percent of the area of the building.
- This is consistent with work area.

Alterations—Section 403
Section 403.8 – Roof diaphragms resisting wind loads in high wind regions
- Similar to Section 707.3.2 for Level 1 alterations in the work area method.
- Removal of roofing provides an opportunity to inspect a portion of the structure that is otherwise concealed.
- In reroofing operations where more than 50 percent of the roof covering is removed and where the ultimate design wind speed $V_{uh}$ is greater than 115 mph (51 m/s) or special wind region a roof diaphragm that is a part of the main windforce-resisting system is required to be evaluated for adequate strength to resist and transfer the wind loads in the IBC.
- If the roof diaphragm is found deficient because of insufficient or deteriorated connections, such connections are required to be strengthened or replaced, unless they are capable of resisting 75 percent of those wind loads.
**Alterations—Section 403**

Section 403.9 – Voluntary seismic improvements
- Allows a building owner to initiate an improvement to the seismic-force-resisting system to the extent that it is viable, provided an engineering analysis is furnished that shows that the altered elements are no less conforming and that the new structural elements are detailed as required for new construction, including their connections.
- The intent is to encourage building owners to initiate upgrades to seismic systems that are considered prudent without making them cost prohibitive.

**Alterations—Section 403**

Section 403.11 – Refuge areas
- In Group I-2, I-3 and Ambulatory care facilities there is a dependence upon a defend in place strategy versus traditional building evacuation.
- In order to accomplish this appropriately sized refuge areas are required to be available.
- These sections are intended to make sure those refuge areas are addressed during alterations.

**Alterations—Section 403**

Section 403.10 – Smoke alarms
- Where an addition is made to a building or structure of a Group I-1 or R occupancy, the existing building shall be provided with smoke alarms in accordance with Section 1103.8 of the IFC.
Repairs—Section 404

Section 404.2 – Substantial structural damage to vertical elements of the lateral-force-resisting system
- Provides requirements that apply where the damage threshold that is based on the extent of damage to the vertical elements of the lateral-force-resisting system in any story is exceeded.
- The emphasis is placed on vertical elements, such as walls and columns, rather than horizontal elements, because it is the vertical elements of the lateral-force-resisting system that primarily determine the structure’s response, particularly to earthquakes.

Repairs—Section 404

Section 404.3 – Substantial structural damage to gravity load-carrying components
- Substantial structural damage to gravity load-carrying elements, such as columns or bearing walls, must be repaired so that these members are adequate to resist the dead and live loads in accordance with current code requirements, as must other elements of the load path.
- Snow loads also must be included where the substantial damage is associated with the effects of snow load.

Repairs—Section 404

Section 404.4 – Less than substantial structural damage
- For damage that is not deemed to be substantial structural damage, repairs are allowed that restore the building to its pre-damaged state using materials and strengths that existed prior to the damage.
- New structural members and connections used for this repair must comply with the detailing provisions for new buildings of similar materials, purpose and location.

Fire Escapes—Section 405

Section 405.1.1 – New buildings
- Fire escapes are not permitted as part of the means of egress in new buildings.
- Additions are considered new buildings and also would not be allowed to use fire escapes.
**Fire Escapes—Section 405**

**Section 405.1.2 – Existing fire escapes**
- Existing fire escapes are acceptable as a part of the means of egress in an existing building.

**Section 405.1.3 – New fire escapes**
- New fire escapes may be utilized for existing buildings only where exterior stairs meeting the requirements for new construction can not be utilized because of room limitations caused by lot lines, sidewalks, alleys or roads at grade level.

**Fire Escapes—Section 405**

**Section 405.1.4 – Limitations**
- Fire escapes that are new and existing can not constitute more than 50 percent of the required number of exits or exit capacity.

**Glass Replacement and Replacement Windows—Section 406**

**Section 406.2 – Replacement window opening control devices**
- Requires that when windows are replaced that window opening control devices be provided to protect children from falls.
- There are several conditions which must be met before this section becomes applicable.
- The control device can not reduce to less than that required in Section 1030.2. Section 702.4 also addresses this issue for Level 1 alterations.
  - Group R-2 Occupancies
  - Group R-3 Occupancies
Glass Replacement and Replacement Windows—Section 406

Section 406.3 – Replacement window emergency escape and rescue openings
- Essentially an exception to the requirements in Section 1030.2 (size), 1030.3 (max height from floor) and 1030.5 (window wells) for emergency escape and rescue openings.
- Section 702.5 also addresses this issue for Level 1 alterations.
- The provisions of this section apply to the following occupancies:
  - Group R-2 Occupancies
  - Group R-3 Occupancies

Change of Occupancy—Section 407

Section 407.4 – Structural
- With few exceptions, when a change in occupancy results in the structure being reclassified to a higher risk category, the seismic requirements for new construction apply to the existing structure or compliance with ASCE 41 using a tier 3 procedure and Table 301.1.4.1 (IBC level seismic forces).

Change of Occupancy—Section 407

Section 407.1 – Conformance
- A change in occupancy or use to an existing building requires it to meet the requirements of the IBC for the new use or occupancy.
- The code official may approve the new occupancy without mandating all of the requirements of the IBC if the new occupancy is less hazardous based on life and fire risk than the existing use.

Historic Buildings—Section 408

Section 408.1 – Historic buildings
- Except for historic structures located in flood hazard areas, a proposed change of occupancy that does not constitute a distinct life safety hazard may be approved by the code official without the provisions of Chapter 4 being applicable to the historic structure.
Historic Buildings—Section 408

Section 408.2 – Flood hazard areas
- A historic building located in a flood hazard area is required to comply with the flood provisions of the IBC, unless one of the following is applicable:
  - Is listed in the National Register of Historic Places.
  - Determined by the U.S. Department of the Interior as contributing to the historical significance of an historic district.
  - Designated as historic under a program that is approved by the U.S. Department of the Interior.

Moved Structures—Section 409

- All moved structures are required to meet all of the requirements for new construction.

Accessibility for Existing Buildings—Section 410

Section 410.4 – Change of occupancy
- Accessibility requirement levels are commensurate to the level of the change of occupancy. When a change of occupancy includes alterations to more than 50 percent of the building, Type B dwelling or sleeping units, as required by Section 1107 of the IBC, will be required in Group I and R facilities.
Accessibility for Existing Buildings—Section 410

Section 410.4.1 – Partial change in occupancy

- When a building undergoes a partial change in occupancy, such as where there is a tenant change or a change in function of a specific area, then the level of accessibility must be at the same level as if that space was undergoing an alteration.
- Basically, the intent is that any spaces or elements being altered will meet new accessibility provisions, unless technically infeasible (see Section 410.6).
- If the area changing occupancy is a primary function of the space, the accessible route, as well as bathrooms and drinking fountains serving this space must be made accessible, again, unless technically infeasible.

Section 410.4.2 – Complete change of occupancy

- This section establishes that when an existing building undergoes a complete change of occupancy, full compliance with six accessible route requirements listed are expected, regardless of cost.
- This would allow a person with mobility impairments to arrive at the building (Items 4 and 5), get to the accessible entrance (Items 1, 3 and 6) and have not less than one accessible route throughout the building to all the primary function areas (Item 2).
- There is a provision that where it is technically infeasible the list of requirements do not need to comply.
- Language is provided that requires as much compliance as technically feasible even if all items can not be met.

Accessibility for Existing Buildings—Section 410

Section 410.5 – Additions

- Provisions for new construction apply to additions.
- Note that if an addition affects accessibility to or contains an area of primary function Section 410.7 applies.

Section 410.6 – Alterations

- Alterations are required to comply with the provisions of Chapter 11 of the IBC, unless technically infeasible.
- Note that technically infeasible is a defined term.
Accessibility for Existing Buildings—Section 410

Section 410.7 – Alterations affecting an area of primary function
- If an altered area (i.e., change of occupancy, addition or alteration) contains a primary function, the accessible route to that function and any toilet rooms and drinking fountains serving it must be evaluated for accessibility.
- If full accessibility is not already provided, additional alterations will be required.
- A primary goal is that all buildings will become fully accessible over time.
- When a change of occupancy, addition or alteration is made to a building, the first evaluation is to determine if the altered area contains a primary function.
- If an alteration contains a primary function area, an evaluation must be performed of the existing accessibility for access points to the site; exterior and interior routes; entrances and any toilet rooms and drinking fountains that serve the altered area.
- If existing facilities are not already accessible, additional alterations will be needed.

Section 410.8 – Scoping for alterations
- Applies to the alterations to existing building and facilities.

Accessibility for Existing Buildings—Section 410

Section 410.8.1 – Entrances
- The reference in Section 410.8.1 is intended to send users back to the entrance requirements in Section 1105 of the IBC.

Section 410.8.2 – Elevators
- Requirements for new construction state that all elevators on an accessible route must be fully accessible in accordance with ICC A117.1.
- If a passenger elevator is altered, the altered element must be accessible in accordance with the existing elevator requirements in ICC A117.1 407.
- These requirements are not applicable to elevators within individual dwellings units.
- If the altered elevator is part of a bank of elevators, the same element must be made accessible in every elevator that is part of that bank.
- The purpose of this requirement is to have consistency among elevators in a bank so that a person with a disability is not required to wait for a specific elevator in a bank of elevators.
Section 410.8.3 – Platform lifts
- This provision permits the use of platform (wheelchair) lifts in existing buildings.
- If the space in an existing building precludes the installation of an elevator or ramp, a platform lift may be the only practical solution.
- Given the choice between no accessibility or accessibility by a platform lift, accessibility is preferable.
- Note that in accordance with Section 1007.5 of the IBC, the use of platform lifts for an accessible means of egress is limited; however, accessible means of egress are not required in existing buildings undergoing alterations in accordance with Section 410.6, Exception 2.

Section 410.8.4 – Stairs and escalators
- If a stair or escalator is added as part of an alteration where one did not previously exist, the alteration also must include an accessible route between the same two levels.
- If an accessible route is already available between the two levels, or the stair or escalator is replacing an existing one, this requirement is not applicable.
- In conjunction with Section 410.3, if the requirement for the accessible route would be in excess of what is required for new construction, this requirement is not applicable.
- The intent is that if a route is provided between accessible levels for a non-disabled person to use, it is reasonable to also expect an accessible route.

Section 410.8.5 – Ramps
- This section recognizes the circumstances where because of existing site or configuration constraints, a ramp with a slope of one unit vertical in 12 units horizontal (1:12) may not be feasible.
- In existing buildings, ramps that rise 3 inches (76 mm) or less may have a slope as steep as one unit vertical in eight units horizontal (1:8).
- In existing buildings, ramps that rise 6 inches (152 mm) or less may have a slope as steep as one unit vertical in 10 units horizontal (1:10). If it is possible to provide a lesser slope, it is desirable to do so.
- These steeper slopes should only be utilized when the one unit vertical in 12 units horizontal (1:12) slope is not possible.

Section 410.8.6 – Dwelling or sleeping units
- Section 410.8.6 sets forth the rate for creation of Accessible units in Groups I-1, I-2, I-3, R-1, R-2 and R-4 when such facilities are altered or added.
- Assuming that Accessible units are not already provided, the number of Accessible units to be incorporated into each alteration is based on the number of units being altered or added.
- If a nursing home is being altered a portion at a time, 50 percent of the units being altered each time are required to be Accessible units.
- It is not the intent that all rooms being altered are required to be Accessible units.
- The total number of Accessible units in the required facility is not required to exceed that required for new construction as indicated in Section 410.3.
- It is unreasonable to require a greater level of accessibility in an existing building than is required in new construction.
Section 410.8.7 – Type A dwelling or sleeping units

- This section sets forth the rate for providing Type A dwelling or sleeping units in Group R-2 facilities when more than 20 units are added or altered.
- Group R-2 requirements for Type A units also would include convents and monasteries with 20 or more sleeping units and could include some townhouse-style units.

Section 410.8.8 – Type B dwelling or sleeping units

- This section sets forth the rate for providing Type B dwelling or sleeping units in Group I-1, I-2, R-2, R-3 or R-4 facilities when four or more units are added in an addition.
- Additionally, when an alteration exceeds 50 percent of the building area Type B dwelling or sleeping units are required in accordance with the Section 1107 of the IBC.
- This only applies to the units being altered.
- The Type B units in the facility are not required to exceed that required for new construction.
- It is unreasonable to require a greater level of accessibility in an existing building than is required in new construction.

Section 410.8.9 – Jury boxes and witness stands

- If a ramp to access a jury box or witness box would limit or block means of egress for the general occupants, alternative locations for the accessible space are viable.

Section 410.8.10 – Toilet rooms

- Section 410.8.11 deals with the circumstances in which it is technically infeasible to alter existing toilet facilities to be accessible because of, for example, the room size and existing arrangement of plumbing fixtures.
- In new construction, both the men's and women's facilities are required to be accessible.
- An alternative solution is offered when it is technically infeasible to alter the existing toilet rooms.
- It would be the creation of a single unisex toilet or bathing room containing the accessible facilities.
- If this alternative solution is selected, the room must be located on the same floor, in the same area, as the existing toilet or bathroom.
- Proper directional signage in accordance with A117.1 must be provided from the inaccessible toilet.
Accessibility for Existing Buildings—Section 410

Section 410.8.11 – Dressing, fitting and locker rooms
- Section 410.8.11 for dressing rooms takes a similar approach to Section 410.8.10 for toilet rooms and bathing facilities.
- If it is technically infeasible to alter existing dressing rooms to be accessible, then space elsewhere and the level must be committed to providing not less than one accessible dressing room.
- In this case, if the existing dressing rooms provide separate rooms for each gender, then not less than one accessible dressing room for each gender must be provided.

Section 410.8.12 – Fuel dispensers
- Many existing facilities have gas pumps located on raised islands as a feature for the protection of the pumps from accidental contact.
- This section would allow the new gas pump with a reach range of 15 inches (380 mm) to 48 inches (1220 mm) to be located on top of a six-inch (150 mm) curb and still meet the maximum reach of 54 inches (1370 mm).

Section 410.8.13 – Thresholds
- Thresholds at doorways may be a maximum 3/4 inches (19 mm) high in existing buildings. In new construction, a typical threshold is 1/2 inch (13 mm) maximum in accordance with Section 1010.1.7 of the IBC.
- This section recognizes that such things as differences in floor materials may create changes in elevation greater than that allowed in all new construction.
- Edges of thresholds must be developed to allow for the passage of a wheelchair.

Section 410.8.14 – Amusement rides
- Where amusement rides undergo extensive alterations such that it is much different than originally manufactured it must be made accessible in accordance with Section 1110.4.8 of the IBC.
Section 410.9 – Historic buildings

The general idea is the same for alterations and change of occupancy in a historic building as it is in any existing building.

If you touch it, fix it. If the alteration contains a primary function area, address accessible route requirements.

The issues for technical infeasibility and accessible means-of-egress requirements also are the same.

The difference is if the alterations would threaten, compromise or destroy the historical aspect of the building.

Section 410.9 recognizes that the historic character of a building may be adversely affected by strict compliance with accessibility provisions.

For example, compliance with the door-width requirements may necessitate the removal of an existing set of doors that is critical to the historic character of the building.

The intent is to exempt such conditions in order to maintain the historic character of the building.

A limited extent of accessibility is desired in all facilities, so Sections 410.9.1 through 410.9.4 allow for alternatives.

Section 410.9.1 – Site arrival points

Full compliance would require an accessible route from all site-arrival points.

If this requirement would adversely effect the historical significance of the building, the alternative available is to provide an accessible route from a single site-arrival point.

Section 410.9.2 – Multilevel buildings and facilities

Full compliance might require an accessible route to levels above or below, as well as throughout the entrance level.

If this requirement would adversely affect the historical significance of the building, the alternative is to provide an accessible route from the accessible entrance to all spaces open to the public on the entrance level.
Accessibility for Existing Buildings—Section 410

Section 410.9.3 – Entrances

- Full compliance would require 60 percent of the entrances to be accessible.
- If this requirement would adversely affect the historical significance of the building, only one main entrance is required to be made accessible.
- If a main entrance cannot be made accessible, then an employee or service entrance may serve as the accessible entrance, provided that it remains unlocked when the building is open, or a notification system (e.g., doorbell) or remote monitoring (e.g., security camera) is provided.

Accessibility for Existing Buildings—Section 410

Section 410.9.4 – Toilet and bathing facilities

- Full compliance would require an accessible toilet/bathing facility at each location where toilet/bathing facilities are provided.
- If altering the existing facilities to be accessible would adversely affect the historical significance of the building, only one accessible toilet/bathing facility is required.

Introduction

- This chapter sets the various levels of work for the second method of compliance provided in the IEBC termed “work area method.”
- The classification of work (repair; Level 1, 2 and 3 alterations; change of occupancy; additions; historic buildings; and relocated or moved buildings) are described, and respective scoping and application are identified.
- This chapter is analogous to Chapter 3 of the IBC, but sets forth conditions and types of work rather than occupancies.
Introduction

- Traditional classifications include the following:
  - Repair
  - Alteration
  - Addition
  - Change of occupancy
  - Moved structures

- Nationally Applicable Recommended Rehabilitation Provisions (NARRP) classifications include the following:
  - Repair
  - Renovation
  - Alteration
  - Reconstruction
  - Addition
  - Change of occupancy

Introduction

- More than one classification can apply to a project.
- A proportional approach is taken with regards to alterations (see Figure 1).
- The more work that is being done to a particular portion of a building, the more extensive the requirements.

Introduction

- Chapter 5 of the IEBC is classified as the following:
  - Repair
  - Alteration–Level 1
  - Alteration–Level 2
  - Alteration–Level 3
  - Addition
  - Change of occupancy
  - Relocated or moved buildings
  - Historic buildings

Introduction

- As seen in the following graph (see Figure 2), compliance with Level 3 alterations also requires compliance with Level 1 and 2 alterations.
Classification of Work

1. Use your IEBC to match the statements to the applicable term.
   - b. Level 1 Alterations
   - c. Level 2 Alterations
   - a. Level 3 Alterations
   - d. Change of Occupancy
   - e. Additions

   a. Applies where the work area exceeds 50 percent of the aggregate area of the building.
   b. Includes the removal and replacement or the covering of existing materials, elements, equipment or fixtures that serve the same purpose.
   c. Includes the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system or the installation of any additional equipment.
   d. Must comply with the provisions of Chapter 10.
   e. Must comply with the provisions of Chapter 11.

Introduction

- Will discuss the details of repairs as it relates to existing buildings.
- Will also discuss the three levels of alterations and how those levels play a role in the work performed on existing buildings.
- Repair is defined as the restoration to good or sound condition of any part of an existing building for the purpose of its maintenance.
- This includes the patching or restoration of materials, elements, equipment or fixtures.
- Repairs, with a few exceptions, may be made with like or similar materials, even if those materials are not otherwise permitted under the I-Codes.
- The reason for this is that repairs are considered to consist of restoring an existing condition to good or sound quality.
- Note that hazardous building materials, such as asbestos and lead-based paint, shall not be used where the code would not permit such use.

General—Section 601

Typically, repairs are made as a result of maintenance requirements.
- Buildings are usually maintained in accordance with the IFC and the IPMC.
- When repairs need to be made, they need to comply with the IEBC even though most repairs are completed without being required to have a building permit or inspections.
- As with all types of classification repairs, the work shall not reduce the level of conformance to the building, fire, plumbing, mechanical or electrical codes.
Building Elements and Materials—Section 602

Section 602.2 – New and replacement materials
- Repairs can be made with like materials to that which is being repaired, unless such materials are deemed to be hazardous, such as asbestos, lead-based paint, etc.

Means of Egress—Section 604

- Any repairs shall not reduce the current level of protection and compliance.

Fire Protection—Section 603

- Any repairs shall not reduce the current level of protection and compliance.

Accessibility—Section 605

- Any repairs shall not reduce the current level of protection and compliance.
Structural—Section 606

Section 606.1 – General

- This section gives the requirements that pertain to structural materials and elements in need of repair; Section 606.2.1 addresses repairs for less than substantial structural damage; Section 606.2.2 addresses repairs for substantial structural damage to vertical elements of the lateral-force-resisting system; and Section 606.2.3 addresses repairs for substantial structural damage to gravity load-carrying components.

Structural—Section 606

Section 606.2.1 – Repairs for less than substantial structural damage

- For damage less than substantial structural damage (see definition), repairs are allowed that restore the building to its pre-damaged state using materials and strengths that existed prior to the damage.
- New structural members and connections used for this repair shall comply with the detailing provisions of the IBC for new buildings of similar structure, purpose and location.

Structural—Section 606

Section 606.2.2 – Substantial structural damage to vertical elements of the lateral-force-resisting system

- Buildings that have sustained substantial structural damage to the vertical elements of the lateral-force-resisting system are required to have an engineering evaluation and analysis, which determines the structural adequacy of the building.
- In preparing the analysis, all damaged members are permitted to have their original strength and stiffness.
- One of the three methods specified in Section 301.1.4.2 is permitted to be used for the analysis.

Structural—Section 606

Section 606.2.3 – Substantial structural damage to gravity load-carrying components

- Gravity load-carrying components not related to the lateral-force-resisting system that have sustained substantial structural damage, as well as undamaged vertical load-carrying components that receive loads from rehabilitated components, are required to be rehabilitated to comply with the provisions for dead and live loads in the IBC.
- New structural members and connections that are provided to comply with this section are required to comply with the detailing provisions of the IBC for new buildings.
**Electrical—Section 607**

- Repairs to existing electrical wiring and equipment shall be allowed to be made with like material, except for the following, which shall comply with the respective sections of NFPA 70, the National Electrical Code:
  - Replacement receptacles
  - Plug fuse of the Edison-base type
  - Replacement of non-grounding-type receptacles
  - "Nonhospital grade" receptacles in patient bed locations of Group I-2
  - Grounding of appliances

**Mechanical—Section 608**

- Repair work to mechanical equipment and systems must not alter the nature of appliances and equipment in a way that would invalidate the listing or conditions of approval.

**Plumbing—Section 609**

- This section is essentially referring the user to the IPC in order to determine which materials are prohibited for use in repair of plumbing systems.
  - For example, Chapters 6 and 7 of the IPC contain prohibited plumbing system joint and connection methods that also would be applicable to repair work.

**For Example**

- A fire has caused damage to a one-story building.
  - Many walls, ceilings and doors must be replaced, including the walls and the doors of a corridor that were not fire-resistance rated, but would be required to be fire-resistance rated under the IBC.
  - The walls are not load bearing.
Plumbing—Section 609

- Can the walls of the corridor be reconstructed, and the other doors be replaced with the same construction and door as before the fire?

No. The walls of the corridor would be considered a Level 2 alteration because of the reconfiguration of the corridor. The construction of the corridor would be considered new construction; therefore, Section 801.3 would apply and must comply with all of the requirements of the IBC. A permit also would be required.

Repairs

1. Replacement glazing in locations determined to be hazardous is allowed to be any approved glazing material.
   a. True
   b. False

2. Substantial structural damage is a trigger for structural repairs to comply with the provisions for new construction. What is required for structural repairs that have less than substantial structural damage?
   a. They must meet the requirements of the IBC.
   b. They are permitted to be designed for 80 percent of the live load and dead load required by the IBC for a similar use or occupancy.
   c. Structural elements being repaired are permitted to be restored to their pre-damage condition.
   d. An evaluation in accordance with Section 606.2.2.1 is required to determine what are the minimum requirements.

3. New structural frame members used in the repair of damaged buildings, including anchorage and connections, must comply with which I-Code?

   a. IBC

Module 6

Chapter 7 Alterations—Level 1
Introduction

- An alteration is defined as any construction or renovation to an existing building other than a repair or addition.
- Alterations have been divided into three categories: Level 1, Level 2 and Level 3. Alteration—Level 1 includes the removal, replacement or covering of existing materials, elements, equipment or fixtures using new materials, elements, equipment or fixtures that serve the same purpose.
- Under this classification, improvements to the life-safety elements of the building are typically not mandated.
- However, all newly installed interior finishes and carpeting are required to comply with the IBC and the I-Codes standards for materials and construction.
- Materials and methods requirements are also applicable to new elements, fixtures or equipment.

General—Section 701

- Level 1 alterations being performed must not lessen the safety of the existing building unless such alterations comply with the IBC.
- If alterations meet the definition of substantial improvement compliance with the flood hazard provisions of Section 1612 of the IBC is required.

Building Elements and Materials—Section 702

- All new work must comply with the prescribed material and method requirements for new construction as where provided for in the respective I-Codes.
- All interior finishes must comply with the flame spread requirements of the IBC.
- Carpeting must comply with the radiant flux requirements of the IBC.

Discussion

The owner of a five-story, multiple-family building plans to replace all the faucets, lavatories and water closets, and all the carpeting in the entire building in all units. What requirements should be followed?

This is an Alteration—Level 1. The fixtures and all materials used to install them must comply with the IPC. Further, all new carpeting must comply with the radiant flux requirements of the IBC. No additional requirements are triggered.
Building Elements and Materials—Section 702

Section 702.4 – Window opening control devices

- Requires that when windows are replaced that window opening control devices be provided to protect children from falls.
- There are several conditions which must be met before this section becomes applicable.
- The control device can not reduce to less than that required in Section 1030.2. Section 406.2 also addresses this issue for the prescriptive method.
  - Group R-2 Occupancies containing dwelling units
  - Group R-3 Occupancies containing dwelling units
  - One- and two-family dwellings and townhouses

Fire Protection and Means of Egress—Section 703 and 704

- All alterations shall be done such that the current level of safety is maintained.

Accessibility—Section 705

Section 705.1 – General

- Any building, facility or element that is altered (whether Level 1, 2 or 3) must comply with the accessibility provisions in Section 705, Chapter 11 of the IBC and ICC/ANSI A117.1, unless technically infeasible.
- The accessibility requirements are applicable to a limited extent if such elements are part of the work in that category.
- Altered items to review for accessibility include entrances, elevators, ramps and toilet rooms.
- Note that Sections 705.1.1 through 705.1.14 are essentially the same as section 410.8.1 through 410.8.14.
- The one exception is that dining areas are not addressed in 410 as they are in Section 705.1.5.
Accessibility—Section 705

Section 705.1.7 – Accessible dwelling or sleeping units
- Also referred to in Section 806.3.
- Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling units or sleeping units are being altered, the requirements for accessible units in Section 1107 of the IBC apply only to the quantity of spaces being altered.

Section 705.1.9 – Type A dwelling or sleeping units
- This section sets forth the rate for providing accessible units and visible alarms in Group R-2 when such facilities are altered.
- Assuming that the required number of Type A units are not already provided, and that the alteration includes more than 20 dwelling or sleeping units, the number of Type A units to be incorporated into each alteration is based on the number being altered.

Accessibility—Section 705

Section 705.2 – Alterations affecting an area containing a primary function
- If the alteration affects the accessibility to the function, the route to the primary function area also must be accessible, including toilet facilities and drinking fountains.
- The cost of providing the accessible route is not required to exceed 20 percent of the costs of alterations affecting the primary function area.
Reroofing—Section 706

- Duplicated from Section 1510 of the IBC to address reroofing and the conditions and requirements associated with reroofing.
- This is typically an existing building issue so it was felt appropriate to also locate within the Level 1 alteration requirements.

Structural—Section 707

Section 707.2 – Addition or replacement of roofing or replacement of equipment

- Buildings undergoing a replacement of roofing or equipment that results in additional dead loads must comply with the vertical load requirements of the IBC if the stress is increased by more than five percent, and the additional dead load is increased by more than five percent.
- The addition of a second roof covering is permitted over a single existing layer of roof covering as long as the second layer weighs three pounds per square foot (psf) (0.1437 kN/m²) or less.

Structural—Section 707

Section 707.3.1 – Bracing for unreinforced masonry bearing wall parapets

- The failure of parapets in unreinforced masonry (URM) bearing wall buildings has been a recurring problem in areas that experience significant earthquakes.
- Because this poses a very real risk, the code requires these elements to be braced where the seismic hazard is deemed to be relatively high as reflected in a building’s seismic design category SDC and the reroofing work to be greater than 25 percent of the roof area.
- Note that only the parapet bracing for seismic loads is required.

Structural—Section 707

Section 707.3.2 – Roof diaphragms resisting wind loads in high wind regions

- Removal of roofing provides an opportunity to inspect a portion of the structure that is otherwise concealed.
- In reroofing operations where more than 50 percent of the roof covering is removed and where the ultimate design wind speed \(V_u\) is greater than 115 mph (51 m/s) or special wind region, a roof diaphragm that is a part of the main wind-force-resisting system is required to be evaluated for adequate strength to resist and transfer the wind loads in the IBC.
- If the roof diaphragm is found deficient because of insufficient or deteriorated connections, such connections are required to be strengthened or replaced, unless they are capable of resisting 75 percent of those wind loads.
Energy Conservation—Section 707

- Construction related to the alterations is required to conform to the requirements of the International Energy Conservation Code® (IECC®), or the IRC, as applicable.
- The entire building is not required to conform to the IECC or the IRC energy provisions.

Alterations—Level 1

1. For a ramp slope that is steeper than 1 unit vertical in 10 units horizontal (1:10) but not steeper than 1 unit vertical in 8 units horizontal (1:8), the maximum rise is _____ inches.
   a. 3
   b. 6
   c. 9
   d. 12

2. For a ramp slope that is steeper than 1 unit vertical in 12 units horizontal (1:12) but not steeper than 1 unit vertical in 10 units horizontal (1:10), the maximum rise is _____ inches.
   a. 3
   b. 6
   c. 9
   d. 12

3. Where the replacement of roofing equipment results in additional dead loads, structural components supporting such reroofing or equipment must comply with the vertical load requirements of the IBC, except when structural elements whose stress is not increased by more than _____ percent.
   a. 5
   b. 10
   c. 15
   d. 20

4. The maximum height of thresholds at doorways shall be ¾ inch (19 mm).
   a. True
   b. False

5. What three conditions require the removal of existing roof coverings down to the roof deck?
   1. Addition or placement of roofing replacement
   2. Bracing for unreinforced masonry bearing wall parapet
   3. Roof diaphragms resisting wind load in high wind regions
DM1

Note is same section number as previous.

Danita Morgan, 8/2/2015
Chapter 8 Alterations–Level 2

Introduction

- These types of alterations include the following:
  - Reconfiguration of spaces. This would include the removal and addition of walls that could alter the paths of egress.
  - The addition or elimination of any door or window.
  - Reconfiguration or extension of any system or installation of new equipment, such as HVAC, plumbing, electrical systems, etc.
  - Alterations–Level 2 apply where the work area is less than 50 percent of the aggregate area of the building.

- Supplemental requirements apply where the work area exceeds 50 percent of the floor area on any floor.
- The requirements of Chapter 8 apply to the entire floor as it relates to the following:
  - Shafts and floor openings
  - Interior finish
  - Fire suppression
  - Fire detection
  - Corridor openings
  - Means of egress lighting
  - Exit signs
**General—Section 801**

Section 801.1 – Scope
- If reconfiguration is solely related to compliance with the accessibility requirements stipulated in Section 705.2, only Chapter 7 applies.
- Level 2 alterations shall comply with the requirements in both Chapters 7 and 8.

Section 801.3 – Compliance
- All new construction related to Level 2 alterations shall comply with the related I-Codes (i.e., building, plumbing, mechanical, etc.), except for the following:
  - Windows that may be added without meeting the light and ventilation requirements of the IBC.
  - Electrical equipment that shall comply with Section 808.
  - Length of dead-end corridors in renovated spaces that shall comply with Section 805.6.
  - Minimum ceiling height in new habitable and occupiable spaces that shall be 7 feet (2134 mm).

**Building Elements and Materials—Section 803**

Section 803.1 – Scope
- States that unless noted, the requirements only apply to the work area.

Section 803.2 – Vertical openings
- All existing vertical openings connecting two or more floors must be enclosed with assemblies of one-hour fire-resistance-rated construction and approved protected openings.
- Even without the 14 exceptions listed in this section, this provision is less stringent than the IBC shaft enclosure requirements that require two-hour fire-resistance-rated enclosures for buildings four stories or more in height.
- Additionally, the scoping provisions of Section 803.1 indicate that the enclosure requirements triggered under Level 2 alterations apply only to work areas.
- As such, if the alteration is on the first floor of a multiple-story building, and the vertical opening is within the work area, only the portion of the vertical opening within the first floor is required to be enclosed.
Building Elements and Materials—Section 803

Section 803.3 – Smoke compartments
- The following requirements apply to smoke barriers in Group I-2 occupancies:
  - Story containing the work area exceeds 30 patients, the story shall be divided into a minimum of two compartments by smoke barrier walls.
  - Each compartment shall Comply with IBC Section 407.
    - I-2 condition 1 - 22,500 square feet
    - I-2 Condition 2 - 40,000 square feet
  - Travel distance from any point to the door in smoke barrier cannot exceed 200 feet (60,960 mm).
  - Must have a minimum one-hour fire-resistance rated smoke barrier assembly constructed in accordance with the IBC.

Building Elements and Materials—Section 803

Section 803.6 – Fire resistance ratings
- Where sprinkler systems are installed in accordance with NFPA 13 or 13R, fire resistance ratings can meet the current IBC.
- In other words in some cases fire resistance ratings can be reduced if a sprinkler system is installed.
- This would require further compliance with the IBC such as additional separations not currently provided.
- A report with specific details as to what is being reduced and other changes being made must be provided to the code official for approval.
- The code official has the final discretion as to whether this section can be applied.

Building Elements and Materials—Section 803

Section 803.5 – Guards
- Regardless of the work area, all floor areas greater than 30 inches (762 mm) above a floor or grade below where no guards exist or guards are in danger of collapsing, shall have guards installed in accordance with the IBC.

Fire Protection—Section 804

- Requirements limited to work areas, unless supplemental requirements apply.
- Automatic suppression system shall be installed in accordance with the IBC.
Fire Protection—Section 804

Section 804.2 – Sprinkler systems
- Sprinkler requirements apply to the following:
  - Work areas that include exits and corridors shared by more than one tenant or serving an occupant load greater than 30.
  - High-rise buildings.
  - Work areas in non high-rise buildings for all occupancies, except Groups B, F2, R-3 and U.
  - Windowless stories.
  - Other types of suppression systems listed in the IBC.

Section 804.3 – Standpipes
- Standpipes are required where the work area includes exits and corridors shared by more than one tenant; are located more than 50 feet (15 240 mm) above the lowest level of fire department access; and shall be installed in accordance with the IBC.
- Pumps are not required if the fire department has adequate water to supply the flow and pressure necessary.

Section 804.4 – Fire Alarm
- Fire alarm and detection systems shall comply with the following:
  - Fire alarm systems must be installed in work areas of Groups E, I-2 and I-3, and residential care and assisted living facilities that are Group I-1, R-2 and R4 occupancies in accordance with the IFC.
  - Fire alarm systems must be installed throughout Group R-1 occupancies in accordance with the IFC.
  - Automatic heat detection is not required if the building is equipped with automatic suppression in accordance with Section 804.2 (work area).
  - Fire detection systems must be installed in accordance with NFPA 72 (see the IBC and the IFC).
  - Such systems shall be installed throughout the floor area if the work area exceeds 50 percent of the floor area.
  - Smoke alarms must be in accordance with the IFC and shall be installed in work areas of Groups R and I-1.
Means of Egress—Section 805

Section 805.1 – Scope
- Section 805 requirements are limited to work areas that include means-of-egress shared by more than one tenant and where Level 2 alterations are being performed.
- Requirements for door swing, panic hardware, corridor openings, means-of-egress lighting and exit signs are to extend throughout the entire floor area where the work area exceeds 50 percent of the floor area.
- This requirement does not apply to means of egress in or serving only a tenant space that is entirely outside the work area.

Means of Egress—Section 805

Section 805.2 – General
- There are two exceptions to 805 which are either compliance with NFPA 101 or compliance with the building code under which it was constructed if the code official agrees that it does not constitute a distinct hazard.

Means of Egress—Section 805

Section 805.3.1 – Minimum number
- The number of required exits on each story with a work area shall comply with the IBC, provided that the work area includes exits and corridors utilized by more than one tenant.
- Buildings complying with any of the 10 different scenarios listed in Section 805.3.1.1 are permitted to have only one exit.

Means of Egress—Section 805

Section 805.3.1.2 – Fire escapes required
- Allows for the use of an existing or newly constructed fire escape as a required exit when more than one exit is required, provided that the fire escape complies with Sections 805.3.1.2.1 through 805.3.1.2.3.
**Means of Egress—Section 805**

**Section 805.3.2 — Mezzanines**
- Mezzanines with an occupant load greater than 50 and a travel distance in excess of 75 feet (22,860 mm) are required to have two means of egress, unless the travel distance is less than 100 feet (30,480 mm) and a fire suppression system is present throughout the building.

**Means of Egress—Section 805**

**Section 805.3.3 — Main entrance—Group A**
- In use Group A buildings with an occupant load greater than 300, there shall be a main entrance serving as the main exit with a capacity of not less than 50 percent of the total occupant load.
- The main exit must clearly be designed and recognized as a main entrance to the building.

**Means of Egress—Section 805**

**Section 805.4.1 — Two egress doorways required**
- Two egress doors shall be provided in work areas in accordance with the following:
  - In all rooms and spaces within the work area with an occupant load exceeding 50 and a travel distance exceeding 75 feet (22,860 mm).
  - Patient rooms or suites in excess of 1,000 square feet (93 m²) in Group I-2 occupancies.

**Means of Egress—Section 805**

**Section 805.4.2 — Door swing**
- All egress doors in the egress path in and from the work area serving an occupant load in excess of 50 shall swing in the direction of the of exit travel.
Means of Egress—Section 805

Section 805.4.3 – Door closing
- All doors in the work area opening onto an exit passageway at grade or an interior exit stairway shall be self-closing or automatically closed by approved methods.

Means of Egress—Section 805

Section 805.4.4 – Panic hardware
- Panic hardware shall be installed on doors within work areas and paths of egress from work areas in Group A occupancies with an occupant load in excess of 100.

Means of Egress—Section 805

Section 805.4.5 – Emergency power source in Group I-3
- Power operated sliding doors or power operated locks for swinging doors need a manual release mechanism at the door in work areas in existing Group I-3 occupancies.
- These doors also require emergency power in accordance with the IBC.

Means of Egress—Section 805

Section 805.5.1 – Corridor doors
- Shall be a minimum of 1\(\frac{3}{4}\)\text{-inch} (44 mm) solid core wood door or an approved equivalent with approved closers.
- In dwelling units or sleeping units of Groups I-1, R-1 and R-2, a minimum of a 1\(\frac{3}{8}\)\text{-inch} (35 mm) solid core wood door or equivalent can be used with approved closers.
Means of Egress—Section 805

Section 805.6 – Dead-end corridors

- Dead-end corridors in any work area must not exceed 35 feet (19,669 mm).
  - In other than Groups A and H; existing dead-end corridor; fire alarm systems—50 feet (15,240 mm).
  - In other than Groups A and H; existing dead-end corridor; fully sprinklered—70 feet (21,336 mm).
  - In other than Groups A and H; existing, new or extended dead-end corridor; sprinklered floor—50 feet (15,240 mm).

Means of Egress—Section 805

Section 805.7 – Means-of-egress lighting

- Means-of-egress lighting shall comply with the IBC.

Means of Egress—Section 805

Section 805.8 – Exit signs

- Exit signs are required in accordance with the IBC.

Means of Egress—Section 805

Section 805.9 – Handrails

- All required exit stairs with three or more risers must be provided with not less than one handrail.
- All exit stairways with a required width greater than 66 inches (1676 mm) must have handrails on both sides.
Means of Egress—Section 805

Section 805.10 – Refuge Areas
- In Group I-2, I-3 and Ambulatory care facilities there is a dependence upon a defend in place strategy versus traditional building evacuation.
- In order to accomplish this, appropriately sized refuge areas are required to be available.
- These sections are intended to make sure those refuge areas are addressed during alterations.

Accessibility—Section 806
- Facilities being altered shall comply with this section and Section 705.
- Where new escalators and stairways are added where they had not existed previously an accessible route must be added.

Structural—Section 807

Section 807.1 – General
- This section applies when alterations include the installation of additional equipment that is structurally supported by the building or the reconfiguration of space such that portions of the building become subjected to higher gravity loads in accordance with Table 1607.1 of the IBC.
Section 807.2 – New structural elements
- New structural members (also referred to in Section 807.3), which include connections and anchorage in alterations must comply with the IBC.

Section 807.4 – Existing structural members
- Existing structural elements that support additional gravity loads or snow drift loads must comply with the requirements of the IBC, unless the stress is not increased by more than five percent.
- In the case of Group R buildings with not greater than five dwellings or sleeping units, the existing building and its alteration shall comply with the conventional light-frame construction method in the IBC or the IRC.

Section 807.5 – Existing structural elements resisting lateral loads
- When the demand-capacity ratio of an existing lateral load-resisting element, with a proposed alteration considered, exceeds 10 percent its demand-capacity ratio with the alteration ignored, the requirements for the IBC wind provisions and reduced IBC-level seismic forces must be complied with.
- Requiring these ratios to include applicable load combinations and design lateral loads, as well as to account for the cumulative effects of work that has taken place since the original construction of the building, will more reflect the actual increase in percentage change of capacity.
Structural—Section 807

Section 807.6 – Voluntary lateral-force-resisting system alterations
- This section addresses the issue of upgrading a building's lateral-force-resisting system voluntarily for improved resistance to wind and seismic forces.
- This section allows an owner to initiate an improvement to the lateral-force-resisting system to the extent it is viable to do so and provided the requisite engineering analysis is furnished.
- Since no minimum load requirement is established by the code, the building owner and the registered design professional have the latitude to establish performance goals and objectives.

Mechanical—Section 809

- All alterations that involve the reconfiguration of spaces intended for occupancy and all spaces converted to habitable or occupiable space within a work area shall be provided with natural or mechanical ventilation in accordance with the International Mechanical Code® (IMC®).
- Minimum outdoor air and ventilation air per person is prescribed.

Electrical—Section 808

- All new electrical equipment and wiring installed in a work area shall comply with the material and method requirements of Chapter 7.
- Electrical equipment and wiring installed in newly constructed partitions and ceilings shall comply with NFPA 70.

Plumbing—Section 810

- If the occupant load of a story is increased by more than 20 percent, plumbing fixtures for the story must be provided based on the requirements of the IPC for the increased occupant load.
Energy Conservation—Section 811

- Construction related to the alterations is required to conform to the requirements of the IECC or the IRC, as applicable, but the entire building or structure does not need to comply.

Alterations—Level 2

1. All new construction elements, components, systems and spaces must comply with the requirements of the IBC, except when the minimum ceiling height of the newly created habitable and occupiable spaces and corridors are _____ feet.
   - a. 5
   - b. 7
   - c. 9
   - d. 11

2. Where the work area on any floor exceeds 50 percent of that floor area, the enclosure requirements of Section _____ must apply to vertical openings other than stairways throughout the floor.
   - 803.2

3. Smoke compartments must be provided where the story used for sleeping room exceeds patients.
   - a. True
   - b. False

4. Fire sprinkler systems shall be supervised. Name five fire systems that do not require supervision.
   - b. Halogenated extinguishing systems.
   - c. Carbon dioxide extinguishing systems.
   - d. Dry and wet chemical extinguishing systems.
   - e. Automatic sprinkler systems installed in accordance with the NFPA 13R, here a common main is used to supply both domestic and automatic sprinkler systems and a separate shutoff valve for the automatic sprinkler systems is not provided.

5. Mezzanines in the work area and with an occupant load greater than 50, or the travel distance to an exit exceeds 75 feet (22,860 mm) must have access to how many independent means of egress?
   - a. 1
   - b. 2
   - c. 3
   - d. 4

6. Plumbing fixtures for the story must be provided in quantities as specified in the IPC based on the increased occupant load where the occupant load of story is increased by more than ___ percent.
   - a. 10
   - b. 20
   - c. 30
   - d. 40
Alterations—Level 2

7. When is a main exit required for an existing Group A occupancy undergoing a Level 2 alteration?
   a. Occupant load of 100 persons
   b. Occupant load of 300 persons
   c. Occupant load of 500 persons
   d. Occupant load of 1000 persons

Introduction

- Level 3 alterations are basically Level 2 alterations where the work area exceeds 50 percent of the aggregate area of the building (i.e., the sum total of all floors in the building).
- Work area is defined as that portion or portions of a building consisting of all reconfigured spaces, as indicated in the construction documents.
- The work area excludes portions of the building in which work not initially intended by the owner is specifically required by the code.
- Triggers in this classification are work that potentially affects the building’s fire protection systems, vertical openings, means of egress, accessibility and structural systems.

General—Section 901

Section 901.2 – Compliance
- In addition to the requirements identified in Chapter 9, all work must also comply with the Level 1 and 2 alteration requirements in Chapters 7 and 8, respectively.
- The requirements in Chapter 8 for building elements and materials, fire protection and means of egress shall apply in all work areas regardless if they include exits and corridors shared by more than one tenant and regardless of the occupant load.
- If the reconfiguration of space affecting exits of shared egress is solely due to the accessibility requirements of Section 705.2, compliance with Chapter 9 is not required.
Special Use and Occupancy—Section 902

Section 902.1 – High-rise buildings
- High-rise buildings are buildings with an occupied floor more than 75 feet (22,860 mm) above the lowest level of fire department vehicle access.
- This section addresses minimum requirements for elevators and protection of HVAC system. Must have not less than one elevator serving the work area.
- New installation of elevators shall comply with the provisions of the IBC.

Elevators in high-rise buildings can be very effective for fire-fighting and rescue purposes.
- Not less than one existing elevator in a high-rise building undergoing a Level 3 alteration with a travel distance of 25 feet (7620 mm) or more is required to be provided with emergency operation in accordance with ASME A17.3.
- When a Level 3 alteration includes the installation of a new elevator, the new elevator is required to be provided with emergency recall and in-car operation in accordance with ASME A17.1.
- Chapter 11 of the IFC also addresses retroactive installation of emergency operation features.

Additionally, all floors served by a recirculating air or exhaust system with a capacity in excess of 15,000 cubic feet per minute (cfm) (7.07 m³/s) must have smoke and heat detection devices in that system.
- These detectors are required to be installed in accordance with the IBC and the IMC.
- These detectors are intended to shut down the ventilation system in order to halt the rapid spread of smoke and heat throughout the building.

Special Use and Occupancy—Section 902

Section 902.2 – Boiler and furnace equipment rooms
- Unless satisfying one of the exceptions, all boiler and furnace-equipment rooms within the following must be equipped with fire-rated construction (1 hour):
  - Groups I-1, I-2, I-4, R-1, R-2 and R-4 occupancies.
**Building Elements and Materials—Section 903**

**Section 903.1 – Existing shafts and vertical openings**
- Existing stairways that are part of the means of egress must be enclosed as identified in Section 803.2.1 (Level 2 alterations).
- The enclosure is required between the highest work area floor and the level of exit discharge, as well as all floors below.

**Fire Protection—Section 904**

**Section 904.1 – Automatic sprinkler systems**
- Automatic sprinkler systems shall be installed in work areas in accordance with Section 804.2 for Level 2 alterations.
- There also are more stringent requirements for high-rise buildings, and rubbish and linen chutes and Group F-1, M and S-1 occupancies where upholstered furniture is manufactured, displayed or stored.

**Building Elements and Materials—Section 903**

**Section 903.2.1 – Separation required**
- In attached dwelling units of Group R-3 occupancies or townhouses, separation walls between dwelling units are required to be continuous to provide continuous separation using construction materials consistent with the existing wall construction or complying with the provisions of the IBC or the IRC.
- All construction shall be performed on the work area side of the dwelling unit.

**Fire Protection—Section 904**

**Section 904.2 – Fire alarm and detection systems**
- Fire alarm and detection systems complying with Sections 904.4.1 and 904.4.3 for Level 2 alterations must be provided throughout the building.
- Also, manual and automatic fire alarm systems are required, as applicable, to occupancy based upon the requirements in the IBC and the IFC.
Means of Egress—Section 905

Section 905.1 – General
- Except for exit signs and means-of-egress lighting, the provisions in Section 805 for Level 2 alterations must comply.

Means of Egress—Section 905

Section 905.2 – Means-of-egress lighting
- All means of egress from the highest work area floor to the floor of exit discharge must be equipped with artificial lighting in the exit enclosure in accordance with the IBC.

Means of Egress—Section 905

Section 905.3 – Exit signs
- All means of egress from the highest work area floor to the floor of exit discharge must provide exit signs throughout.

Accessibility—Section 906

Section 906.1 – General
- Compliance with both Section 705 and 806 is required.
Accessibility—Section 906

Section 906.2 – Type B dwelling or sleeping units
- Where four or more dwelling or sleeping units are being altered or added, Type B dwelling units need to be provided in accordance with Section 1107 of the IBC.
- This requirement only applies to the units being altered or added.
- This requirement also applies to the visible alarms requirements in the IBC and the IFC, as well.

Structural—Section 907

Section 907.4 – Structural alterations
- All existing lateral load-resisting structural elements of existing lateral force resisting systems need to comply with Section 907.4 and subsections.

Section 907.4.2 – Substantial structural alteration
- Where more than 30 percent of the total floor and roof areas are altered within a five-year time frame, the evaluation must demonstrate that the building is in compliance with the IBC for wind loading and with reduced IBC level seismic forces (Section 301.1.4.2) for seismic loading.
- The analysis must be determined using one of the methods in Section 301.1.4.
- Where not more than 30 percent of the total floor and roof areas are altered within a five-year time frame, the altered building must comply with loads applicable at the time of the original construction or the most recent sustained structural alteration.
- The 30 percent includes area tributary to vertical load-carrying components (i.e., joists, beams, columns, walls and other structural components that have been or will be removed, added or altered), as well as mezzanines, penthouses, roof structures, and in-filled courts and shafts.
### Structural—Section 907

**Section 907.4.3 – Seismic Design Category F**
- Regardless of the size of the structural alteration if a building is located in seismic design category F any structural alteration requires that the lateral load resisting system complies with the reduced IBC level seismic design levels (Section 301.1.4.2).

### Structural—Section 907

**Section 907.4.4 – Limited structural alteration**
- A building undergoing alterations not exceeding the threshold established in Section 907.4.2, but resulting in a seismic base shear increase greater than 10 percent, needs to be evaluated for the loads applicable at the time the building was originally constructed or for the loads at the time of the substantial structural alterations rather than current code requirements.
- The intent of the provisions is to require altered elements, at a minimum, to satisfy the reduced level seismic forces of Section 301.1.4.2 of the IBC.

### Structural—Section 907

**Section 907.4.5 – Wall anchors for concrete and masonry buildings**
- Wall anchorage systems in existing buildings that are being reroofed and are in SDC D, E or F; and have a structural system consisting of reinforced concrete or masonry walls, and a flexible roof diaphragm may be required to have wall anchors installed at the roof line to resist the reduced seismic forces allowed in Section 301.1.4.2 of the IBC.
- Also structural systems consisting of unreinforced masonry walls with any type of roof diaphragm in SCC C, D, E or F will require wall anchors.
Section 907.4.5 – Bracing for unreinforced masonry parapets

- This section requires the installation of parapet bracing in buildings undergoing a Level 3 alteration and assigned to SDC D, E or F that have parapets constructed of unreinforced masonry whether or not reroofing is involved.
- Consider a two-story building where the rearrangement of several tenant spaces results in the reconfiguration of more than 55 percent of the first floor and 50 percent of the second floor.

- This is Level 3 alteration project because the work area as defined in Section 202 exceeds 50 percent of the building aggregate area (Level 3 alterations must comply with Chapter 9) (see Figure 3).
- Chapter 9 requires that Level 3 alterations comply with the requirements of Chapters 7 and 8, as well as Chapter 9.

- Additional requirements of Chapter 8 are as follows:
  - Interior finish. The interior finish in upper and lower corridors, stairways and work areas must comply with the IBC or be treated with an approved fire-retardant coating (see Sections 903.3).
  - Fire alarm system. A manual fire alarm system is required in the work areas on both floors. Alarm notification devices must be provided on both floors (see Section 904.2.1, and Section 907.2.2 of the IBC).
  - Means-of-egress lighting and exit sign. Egress lighting in the exterior exit stairways and exit signs are required in the main corridors, exit stairs and within the work areas (see Sections 805.7 and 805.8 and 905).
  - Accessibility. An elevator must be installed; and the reconfigured spaces and toilet rooms on both floors and accessible route to areas of primary function must comply with ICC/ANSI A117.1 unless technically infeasible as defined in Section 202 (see Sections 901.2 and 905.9).
  - Handrails: If stairs do not currently have handrails, they must be provided in accordance with Section 805.9.1. The design and installation of such handrails must be in accordance with the IBC (see Sections 901.2 and 805.9).
Alterations—Level 3

1. Match the following sections with the statements below:
   a. Section 705.1
   b. Section 804.2
   c. Section 902.1
   d. Section 903.2
   a. Any building having occupied floors more than 75 feet (22,860 mm) above the lowest level of fire department vehicle access shall comply with the requirements of this section.
   b. Automatic sprinkler systems shall be provided in all work areas in accordance with this section.
   c. Fire separation in Group R-3 occupancies shall be in accordance with this section.
   d. A building, facility or element that is altered shall comply with this section.

2. Means of egress from the highest area floor to the floor of exit discharge must be provided with artificial lighting within the exit enclosure in accordance with the requirements of which I-Code?

   IBC

3. Where there is not more than 30 percent of the total floor and roof areas of the building involved in structural alteration within a 5-year period, what must the evaluation and analysis demonstrate?

   The evaluation analysis shall demonstrate that the altered building or structure complies with the loads applicable at the time the building was constructed.

Introduction

- A change of occupancy is defined as a change in the as a change in the use of the building or a portion of a building.
- A change of occupancy shall include any change of occupancy classification, any change from one group to another group within an occupancy classification or any change in use within a group for a specific occupancy classification.
- There are three basic types of change of occupancy:
  - One in which the occupancy classification changes to a different group.
  - One where the changes within a group.
  - One where the occupancy classification stays the same but the use of the building.
- Section 302 of the IBC lists the ten classifications of occupancy (i.e., Groups A, B, E, F, H, I, M, R, S and U).
Introduction

- A change in occupancy classification would be an existing mercantile building, occupancy classification of Group M, used for the retailing of men’s clothing being altered to a nightclub that would be in a Group A classification.
- In several of the individual occupancy classifications listed in the IBC, there are multiple types of occupancies listed.
- For example, in occupancy classification A, there are five distinct types of occupancies, which include Groups A-1, A-2, A3, A-4 and A-5.
- A change of occupancy where the occupancy classification remains the same would be an existing community hall, Occupancy Group A-3, being altered to a restaurant with a night club, Occupancy Group A-2.

Introduction

- In this chapter, the various occupancies are given a tabular ranking of their relative hazard related to the following:
  - Life safety and exits
  - Height and area
  - Exposure of exterior walls
- Triggers in this chapter are predicated on a change of occupancy to a higher hazard classification and a change in occupancy classification.
- A change of use of a historic building must comply with Section 1205. Compliance with Chapter 14 is deemed equivalent to Chapter 10.
- Potentially, a change in use could occur without any alterations or repairs if an evaluation of the new proposed use meets the compliance alternative method.

Introduction

- A change of occupancy where the occupancy classification stays the same would be a Group A-2 with an existing occupant load of 15 square feet (1.39 m²) per person that remains as an Group A-2, but increases the occupant load to five square feet (0.47 m²) per person.

Introduction

Change in occupancy with no change in occupancy classification

- In Section 1001.2, a change in occupancy with no change in occupancy classification requires compliance with Sections 1002 through 1011.
- Section 1012 contains requirements for a change in occupancy with a change in occupancy classification and, therefore, not applicable.
- Further, a change in occupancy with no change in occupancy classification may require compliance with the provisions of the applicable I-Codes.
- The phrase “where there is a different fire protection system threshold requirement in Chapter 9 of the IBC” clarifies this intent.
Introduction

- For example, assume the occupancy classification is a Group A-2 nightclub, unsprinklered in accordance with the 2015 IBC and the 2015 IFC, with a posted occupant load of 275.
- The owner proposes to increase the occupant load to 325, which may or may not include an associated alteration or reconfiguration of the space.
- Under the new construction provisions in the 2015 IBC and the 2015 IFC, this space would be required to be sprinklered.

General—Section 1001

Section 1001.2.1 – Change of use

- Any repair or alteration performed involving a change in occupancy that does not involve a change in classification must conform to Chapters 7, 8 and/or 9 based on the classification of work determined by Chapter 5 and to the requirements of Sections 1002 through 1011.

Section 1001.3 – Change of occupancy classification or group

- A change in occupancy with a change in occupancy classification or change of occupancy to another occupancy group requires compliance with Sections 1002 through 1012.
- Section 912 contains requirements specific to a change in occupancy with a change in occupancy classification.
- As discussed earlier, a change in occupancy classification can be either a change in from one group to another (M to R-2) or a change within a group (A-2 to A-3).

Section 1001.4 – Certificate of occupancy required

- A certificate of occupancy is required to be issued whenever a change of occupancy classification occurs regardless of the repair or alteration activity.
- This requirement is necessary in order to maintain an accurate and current record of the history of the building as it relates to safety.
Special Use and Occupancy—Section 1002

- This section addresses eleven special use and occupancy categories.
- Due to the unique hazards related to these types of occupancies, any change to one of these occupancies would be required to comply with the provisions of the IBC.
- Other than incidental use areas, all the provisions for these special uses can be found in Chapter 4 of the IBC.
- Requirements for incidental use areas can be found in Section 509 of the IBC.

Structural—Section 1007

Section 1007.1 – Gravity loads

- If the change of occupancy results in higher uniform or concentrated loads (see Table 1607.1 of the IBC), the building must comply with the gravity-loads provisions in the IBC, provided the stress is increased by more than five percent.

Section 1007.2 – Snow and wind loads

- If the change of occupancy results in a higher wind-or snow-risk category (see Table 1604.5 of the IBC), the building must comply with the applicable wind/snow provisions in the IBC, provided the new occupancy with the higher risk category is more than 10 percent of the total building floor area.
Structural—Section 1007

Section 1007.3.1 – Compliance with the IBC level seismic forces

- If the change of occupancy results in higher risk category (see Table 1604.5 of the IBC) or results in a higher hazard category (see Table 1012.4), the building must comply with the seismic requirements of the IBC, provided one of the exceptions is not met.

Electrical—Section 1008

- This section identifies specific occupancies that have unique hazards as they relate to electrical installations.
- This section refers to NFPA 70.
- Requirements for these specific occupancies can be found in Chapter 5 of that standard.

Mechanical—Section 1009

- If an existing building or portion of that building is changed such that the new occupancy is subjected to different kitchen exhaust or increased ventilation requirements, the new occupancy shall comply with the IMC related to those respective provisions.

Plumbing—Section 1010

Section 1010.1 – Increased demand

- If the new occupancy is required to have increased or different plumbing fixture requirements, or increased water supply requirements, the new occupancy must comply with the IPC.
Plumbing—Section 1010

Section 1010.2 – Food handling occupancy
- This section requires protection of food or drink preparation areas from possible waste lines located above those areas.

Plumbing—Section 1010

Section 1010.3 – Interceptors
- New occupancies that process grease or oil laden waste shall provide interceptors to collect the grease and oil.

Plumbing—Section 1010

Section 1010.4 – Chemical wastes
- All piping must be compatible with material and no waste is permitted into sewer without specific approval.

Plumbing—Section 1010

Section 1010.5 – Group I-2
- Where the occupancy classification is changed to Group I-2 compliance with the IPC as new is required.
- Note that Section 1002.1 requires the special occupancy requirements to apply to Group I-2 occupancies as well.
### Change of Occupancy Classification—Section 1012

- This is the main section of the code when dealing with a change in occupancy group classification of a building.
- This type of change is considered to be equivalent to a Level 3 alteration, and, therefore, all work must comply with Chapter 8.
- Level 3 alterations exceed more than 50 percent of the aggregate area of the building.

### Change of Occupancy Classification—Section 1012

#### Section 1012.1.1.1 – Change of occupancy group without separation

- If a portion of a building is changed to a new occupancy classification and is not separated in accordance with the mixed occupancies provisions of Chapter 5 of the IBC with fire barriers, the entire building shall comply with all of the requirements of Chapter 9 applied throughout the building for the most restrictive occupancy group.

#### Section 1012.1.1.2 – Change of occupancy group with separation

- This section is similar to Section 1012.1.1.1 but only applies to that portion of the building where the occupancy is being changed and not throughout the entire building, provided that occupancy is separated in accordance with the provisions of the IBC.
Change of Occupancy Classification—Section 1012

Section 1012.1.3 – Change of occupancy classification based on hazard category

- If a proposed change in occupancy results in a higher hazard category related to means of egress, heights and areas, or exterior wall exposure, then additional requirements may be applicable to the area of the change of occupancy or other portions of the building. The hazard categories for means of egress, heights and areas, and exterior wall exposure are contained in Tables 1012.4, 1012.5 and 1012.6, respectively.

- For example, with few exceptions, if a Group R-2 occupancy is to be changed to an Group I-2 occupancy, the entire means-of-egress system in the area of the change of occupancy would need to meet the requirements of Chapter 10 of the IBC.

- Chapter 10 of the IBC contains means-of-egress requirements for new construction.

Change of Occupancy Classification—Section 1012

Section 1012.2 – Fire protection systems

- Where a change of occupancy classification is proposed that would require a fire sprinkler system and/or fire alarm and detection system based on the new occupancy in accordance with the IBC, a fire sprinkler system and/or fire alarm and detection system is required throughout the area where the change of occupancy occurs.

- Note that these systems are only required where the change of occupancy occurs and not throughout the entire building.
Change of Occupancy Classification—Section 1012

Section 1012.3 – Interior finish
- The requirements for interior finishes in the IBC are applicable to the interior finishes throughout the area where the change of occupancy classification occurs.
- Note: that regardless of the change of occupancy or alterations, the IFC has retroactive requirements for interior finish.

Section 1012.4.1 – Means of egress for change to higher hazard category
- Whenever a change of occupancy classification is made to a higher hazard category, the means of egress shall comply with Chapter 10 of the IBC.
- Exceptions:
  1. Stairway enclosures shall comply with Section 903.1.
  2. Existing stairways that comply with Chapter 9 can be allowed upon approval from the code official.
  3. A new stairway replacing an existing stairway can be built to the previous slope or pitch that impacts the rise height and tread depth if the existing construction that supports or encloses the stairway is such that it makes it impractical to comply with the rise and tread requirements of the IBC.

Section 1012.4.2 – Means of egress for change of use to equal or lower hazard category
- When a change of occupancy classification is made to an equal or lesser hazard, the existing elements of the means of egress shall comply with the requirements of Section 905 for the new occupancy classification.
- All new construction shall comply with Chapter 10 of the IBC.
- A new stairway replacing an existing stairway can be built to the previous pitch and slope that impacts the riser height and tread depth if the existing construction that supports or encloses the existing stairways is such that it makes it impractical to comply with the rise and tread requirements within the IBC.
Change of Occupancy Classification—Section 1012

Section 1012.4.3 – Egress capacity
- If the change of occupancy classification is to a higher hazard category, then the egress capacity shall comply with Chapter 10 of the IBC.
- If the change of occupancy is to an equal or lesser hazard category, then the existing capacity would be acceptable.

Section 1012.5.1 – Height and area for change to higher hazard category
- When a change of occupancy classification is made to a higher hazard category, heights and areas of buildings and structures shall comply with Chapter 5 of the IBC for the new occupancy.
- There is a single exception provided for high-rise buildings.
- The exception does not require compliance with the more restrictive height and area restrictions of the current IBC for buildings greater than 420 feet.
- This relieves the more restrictive column limitations.
- In order for the exception to be applicable the building must be previously permitted with older requirements.

Section 1012.5.1.1 – Fire wall alternative
- In recognition of the difficulties in constructing fire walls in an existing building to allow for larger building areas, the exception this to this section permits fire barriers to be equivalent to fire walls with respect to allowable areas, as long as the building is equipped throughout with an NFPA 13 automatic sprinkler system.
- The continuity and structural requirements of fire barriers result in a more reasonable installation, while still providing a high-level of protection against migration of fire and products of combustion.

Section 1012.5.2 – Height and area for a change to an equal or lesser hazard category
- The existing height and area of an existing building is acceptable when changing the use to an equal or lesser hazard.
Change of Occupancy Classification—Section 1012

Section 1012.5.3 – Fire barriers
- Fire barriers in separated mixed use shall comply with the IBC when changing the occupancy classification to a higher hazard category.
- Existing wood lath, plaster or ½-inch (13 mm) gypsum is acceptable in lieu of a one-hour fire-resistance rating.

Section 1012.6.1 – Exterior wall rating for change of occupancy classification to a higher hazard category
- Exterior walls shall have a fire-resistance rating and exterior opening protectives in accordance with the requirements of the IBC, except for walls built at right angles to the property line.
- When the building does not exceed three stories in height and is of an occupancy Group of A-2 and A-3 with occupant loads of less than 300, or Groups B, F, M or S, a two-hour rating is allowed.

Section 1012.6.2 – Exterior wall rating for change of occupancy classification to an equal or lesser hazard
- The existing rating of the exterior walls and openings would be acceptable.

Section 1012.6.3 – Opening protectives
- Openings must be in accordance with the IBC, and the sum of the area of the openings shall not exceed 50 percent of the total area in each story.
- Exceptions:
  1. Where the IBC permits openings greater than 50 percent.
  2. Group R buildings less than four stories in height and not less than 3 feet (914 mm) from the property line do not require protected openings.
  3. Sprinklers may substitute for protectives.
  4. Not required if the occupancy group is on equal or lower classification.
Change of Occupancy Classification—Section 1012

Section 1012.7 – Enclosure of vertical shafts
- Vertical shafts must meet the requirements for atriums as specified in the IBC or the requirements in Sections 1012.7.1 (Stairways), 1012.7.3 (Other vertical shafts) and 1012.7.4 (Openings).

Section 1012.7.2 – Stairways
- When a change of occupancy is to a higher hazard in accordance with Table 1012.4, the interior stairways must be enclosed in accordance with the IBC.
- Exceptions:
  1. For all occupancies other than Group I, an enclosure is not required for stairs serving one adjacent floor and not connected with corridors or stairs from other floors.
  2. Stairways that were previously unenclosed are not required to be enclosed if each story has a one-hour separation (or wired glass in steel frames), and all exit corridors are sprinklered.
  3. Existing penetrations of stair enclosures are acceptable if protected as required by the IBC.

Section 1012.7.4 – Other openings
- When a change of occupancy is to a higher hazard in accordance Table 1012.4, all shafts (other than stairs) must be enclosed in accordance with the IBC.
- Exceptions:
  1. Shafts that have a one-hour fire rating are acceptable if a higher rating is required.
  2. Fully sprinklered buildings, other than Group I, are not required to have openings enclosed, provided they connect less than six stories.

Section 1012.8 – Accessibility
- Where a change of occupancy occurs that includes a Level 3 alteration, the sleeping units or dwelling units being altered or added must comply with Section 1107 of the IBC for Type B Units.
- This applies only to the units being altered or added (Section 906.2).
Change of Occupancy Classification—Section 1012

Section 1012.8.1 – Partial change in occupancy

- Accessibility requirements for partial changes in occupancy need to comply with the requirements for alterations in Sections 705, 806 and 906, as applicable.
- These sections approach the application of accessibility provisions to a facility that is altered by broadly requiring full conformance to new construction, meaning full accessibility is expected (Section 705.1.13).
- Exceptions are then provided to indicate the conditions under which less than full accessibility is permitted.

Section 1012.8.2 – Complete change in occupancy

- The following items must be provided when buildings undergo a complete change of occupancy:
  - Minimum one accessible building entrance.
  - Minimum one accessible route from the access building entrance to the primary function area. Signage in accordance with Section 1110 of the IBC.
  - Accessible parking (if provided).
  - Minimum one access passenger loading zone (when provided).
  - Minimum one access route connecting access parking and access passenger loading zones to an access entrance.
- The exception would not require an accessible route for Type B accessible units.

- A homeowner plans to convert a two-car garage to a bedroom.
- This is a change of occupancy classification from a Group U to R-3.

- Emergency escape. An operable window or door must be provided directly to the outside. If there is an existing operable window with a minimum opening dimensions of 4 square feet \((0.37 \text{ m}^2)\) in area, 22 inches \((559 \text{ mm})\) high and 20 inches wide \((508 \text{ mm})\) that will be acceptable. Otherwise, a window with minimum opening dimensions of 5.7 square feet \((0.52 \text{ m}^2)\) in area, 24 inches \((610 \text{ mm})\) high and 20 inches \((508 \text{ mm})\) wide must be provided. In either case, the bottom of the opening must be a minimum of 44 inches \((1118 \text{ mm})\) measured from the floor (Section 1012.4.1, Exception 7 and Table 1012.4).
- Light ventilation. Light and ventilation must be provided for the new bedroom in accordance with the IBC (Section 1011.1).
Section 1012.8.2 – Complete change in occupancy
- Smoke alarms. Smoke alarms are required in the bedroom and outside in its vicinity. These new smoke alarms are not required to be interconnected with the smoke alarms already existing in other parts of the house (Sections 804.4.3, 901.2 and 1012.1.1, and IFC Section 907.2.11.1.2).
- Exposure of exterior walls. Fire resistance and opening protection in accordance with the IBC (see Table 1012.6 and Section 1012.6.1).

Sprinklers would also be required within the space where the change of occupancy occurs.
- The IBC requires sprinklers in all group R occupancies.
- Note that the IRC would not require sprinklers in existing buildings making alterations or additions.
- When a change of occupancy is to a higher hazard in accordance with Table 1012.4, all shafts (other than stairs) must be enclosed in accordance with the IBC.

1. What must be issued where a change of occupancy occurs that results in a different occupancy classification as determined by the IBC?
   A certificate of occupancy.

2. Buildings subject to a change of occupancy where such a change in the nature of the occupancy results in higher uniform or concentrated loads based on Table 1607.1 of the IBC must comply with which provisions of the IBC?
   Gravity load provisions.

3. Where the occupancy of existing building or part of an existing building is changed such that the new occupancy is subject to different kitchen exhaust requirements, the new occupancy must comply with the intent of which I-Code?
   IMC

4. An existing building must comply with all of the applicable requirements of Chapter 10 when an occupancy classification of a building changes, including a change of occupancy classification within a group (i.e., A-3 to A-2).
   a. True
   b. False
Chapter 11 Additions

Introduction

- An addition
  - Is an extension or increase in floor area, number of stories or height of a building.
  - Is treated as been traditionally <INSERT>.
  - Considered new construction and must comply with the respective I-Codes.
  - May be vertical or horizontal.
- The construction of the addition is not allowed to create or extend any nonconformity in the existing building related to accessibility, structural strength, fire safety, means of egress, or the capacity of the mechanical, plumbing or electrical systems.
- When an addition is made to an existing single-family building, the existing building must comply with the IBC or the IRC for the installation of smoke alarms, as applicable.

Heights and Areas—Section 1102

1102.1 – Height limitations

- The addition cannot increase the height beyond that allowed by Chapter 5 of the IBC.

Section 1102.2 – Area limitations

- An addition shall not increase the height and area of an existing building beyond that allowed by the IBC.
- Exception: If there is an alteration within a building that includes the closing of floor openings, such as elevator shafts or exit stair shafts, these are not be considered additions even though technically there is an increase in floor area.
- The area of these increases are usually insignificant as it relates to egress, fire loading, etc.
- Furthermore, if a nonoccupiable appendage, such as a new exit stairway or elevator shaft, is being added by connecting to the existing exterior wall of an existing building, this would not be considered an addition as it relates to the height and area requirements.
- The construction would still be considered new construction and comply with the IBC or all other requirements, such as structural strength.
Heights and Areas—Section 1102

Section 1102.3 – Fire protection systems
- If existing fire areas are increased by an addition, those areas shall comply with Chapter 9 of the IBC.

Structural—Section 1103

Section 1103.2 – Additional gravity loads
- Existing structural elements supporting additional gravity loads or snow drift loads shall comply with the requirements of the IBC, unless the stress is not increased by more than five percent or in Group R buildings with not greater than five dwelling units or sleeping units.
- The existing building and addition shall comply with the conventional light-frame construction method in the IBC or the IRC.

Section 1103.3 – Lateral force resisting system
- Lateral force resisting systems need to comply with vertical and horizontal addition requirements as applicable.
- Voluntary additional of structural elements for the purposes of lateral force resistance need to comply with this section.
- There are two exceptions as follows:
  - Group R occupancies with five or less dwelling or sleeping units in buildings that comply with the light frame construction requirements of the IRC or IBC.
  - Where the demand capacity ratio with the addition considered is not more than 10 percent greater than with the addition ignored.
### Structural—Section 1103

#### Section 1103.3.1 – Vertical addition
- Where the addition of a story or an increase in height imposes additional loads, either vertical or lateral, on portions of the existing lateral-force-resisting system, this section requires that those members meet two specific lateral load requirements; the wind load requirements of the IBC and the IBC level seismic provisions as specified in Section 301.1.4.1.
- Section 301.1.4.1 provides scoping language for using the IBC and ASCE 41 for seismic evaluation and design, which provides alternative options for compliance consistent with the overall goal of the code.
- Any element not meeting these provisions requires replacement, reinforcement or other measures in order to comply.

#### Section 1103.3.2 – Horizontal addition
- A horizontal addition that is isolated from the existing structure is self-supporting and, therefore, has no impact on the existing structure.
- Where this is not the case, portions of the existing lateral-force-resisting system affected by the addition are required to meet two specific lateral load requirements; the wind load requirements of the IBC and the IBC level seismic provisions as specified in Section 301.1.4.1.
- This is similar to the requirements for vertical additions in Section 1103.3.1.

#### Section 1103.3.3 – Voluntary addition of structural elements to improve the lateral-force-resisting system
- Any addition of structural elements that are done voluntarily to improve the lateral-force-resisting system are only required to comply with the requirements in Section 807.6.

#### Section 1103.4 – Snow drift loads
- Generally any existing structural element due to the addition is subject to additional loads from snow drift must comply with the IBC.
- Any additions where the lateral-force story shear is not increased by more than five percent are not required to comply with the IBC.
- A Group R building with not more than five dwelling or sleeping units that complies with the conventional light-frame construction method also is not required to comply with the IBC.
**Structural—Section 1103**

Section 1103.5 – Flood hazard areas
- Additions to buildings that, when combined, constitute substantial improvement must comply with Section 1612 of the IBC.

**Smoke Alarms in Occupancy Groups I–1 and R–1104**

Section 1104.1 – Smoke alarms in existing portions of a building
- When an addition is made to an existing building, smoke alarms are required throughout the existing building in accordance with the IBC or the IRC.
- This is specifically addressed for existing buildings in the IFC.

**Accessibility—Section 1105**

Section 1105.1 – Minimum requirements
- Additions must comply with accessibility requirements for new construction.
- If the addition affects the accessibility to or contains a primary function area, the provisions in Sections 705.2, 806 and 906 must apply (see Figure 4).

Section 1105.1 – Minimum requirements
- The diagram is a drawing of an addition.
- The following Chapter 11 requirements apply.
- Only the addition, and not the existing building, must comply with requirements of the I-Codes for new construction.
  - **Height.** The building height must not exceed the limitation in Chapter 5 of the IBC (see Section 1102.1). The building height must be less than 40 feet (1219 mm).
  - **Area.** The building first-floor area [9,000 square feet (836m²)] meets the area limitation of Table 503 for Group B, Type VB construction.
  - **Structural.** Existing structural elements supporting any additional gravity load must comply with the code (Sections 1103.2 and 1103.3) and IBC (Section 1103.2).
Accessibility—Section 1105

Section 1105.1 – Minimum requirements
- Lateral-force-resisting system. Check lateral-force-resisting system (Section 1103.3).
- Snow drift loads. Any existing structural elements subject to additional loads because of snow drifts must comply with the IBC (Section 1103.4).
- Flood hazards. If applicable (Section 1103.5).
- Smoke alarms. Not applicable (Section 1104).
- Accessibility. The addition must comply with the requirements for new construction. If the addition affects the accessibility to or contains an area of primary function, the existing building must comply with Section 705.2 for accessible routes (Section 1105).

Additions

3. Existing structural elements supporting any additional gravity loads, as a result of additions must comply with the IBC, except when the structural elements’ stress is not increased by more than what percent?

5 percent

4. If an addition to a Group A2 occupancy with an occupant load of 80, which will be increased to an occupant load of 120, will an automatic sprinkler system be required?

Yes, since the fire area has been increased and a fire area containing more than 10 occupancies would require an automatic sprinkler system in accordance with Section 903.2.1.2 of the IFC and IBC.
Introduction

- The work performed in historic buildings is permitted and must comply with the Chapter 12 requirements for repair, alteration and change of occupancy.
- Chapter 12 attempts to strike a balance between the historic nature of the structure and requirements for fire safety elements and systems, accessibility, change of occupancy and structural requirements.
- Historic Buildings are defined as any building or structure that is one or more of the following:
  1. Listed, or certified as eligible for listing, by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, in the National Register of Historic Places.
  2. Designated as historic under an applicable state or local law.
  3. Certified as a contributing resource within a National Register, state designated or locally designated historic district.

Repairs—Section 1202

- Repairs are permitted with original or like materials as long as hazardous materials, such as asbestos and lead-based paint, are not used.
- Unsafe conditions are required to be remedied.
- The foundations of relocated historic buildings shall comply with the IBC.
- Otherwise, compliance with Chapter 12 is sufficient.
- The building must be sited so that exterior wall and opening requirements of the IBC are met.
- Replacement glazing in hazardous locations shall comply with Chapter 24 of the IBC.

General—Section 1201

Section 1201.2 – Report

- All historic buildings undergoing repair, alteration or change of occupancy are required to be investigated and evaluated.
- If the building is intended to meet the requirements of Chapter 12, a written report (subject to the opinion of the code official) must be prepared and filed by a registered design professional.
- The report must identify each required safety feature that is in compliance with this chapter and where compliance with other chapters of these provisions would be damaging to the historic features.
- If the building is in seismic design category D, C or F, a structural evaluation minimally of the vertical and horizontal elements of the lateral force resisting system is necessary.

Fire Safety—Section 1203

Section 1203.2 – General

- Historic buildings that constitute a distinct hazard are required to be sprinklered.
- Sprinklers can not be used as an alternative to the required number of exits.
**Fire Safety—Section 1203**

**Section 1203.3 – Means for egress**
- Allows narrower openings and when approved by the code official based upon actual use.
- Doors can swing the opposite direction if other approved means of egress provides sufficient capacity.

**Section 1203.4 – Transoms**
- Fully sprinklered Groups R-1, R-2 and R-3 with existing transoms can remain in corridors and rated walls if they are closed and sprinklers are located on both sides of the transom.

**Section 1203.5 – Interior finishes**
- Historic finishes are allowed but they need to be demonstrated to be historic.

**Section 1203.6 – Stairway enclosure**
- In historic buildings, three stories or less stairway enclosures are only required to be enclosed by smoke-tight doors and solid building elements.
- Fire-resistance-rated construction is not required.
Fire Safety—Section 1203

Section 1203.7 – One-hour fire resistant assemblies
- Wood or metal lath and plaster in good condition can be considered equivalent to one-hour fire-resistance-rated construction.

Fire Safety—Section 1203

Section 1203.8 – Glazing in fire-resistance-rated systems
- Historic glazing materials are permitted in interior walls normally required to have a one-hour fire-resistance-rated construction when approved smoke seals and the area affected is provided with automatic sprinklers.

Fire Safety—Section 1203

Section 1203.9 – Stairway railings
- Grand stairways shall be accepted without complying with the handrail and guardrail requirements.
- Handrails and guards are required to be structurally stable.

Fire Safety—Section 1203

Section 1203.11 – Exit signs
- Alternative signs are permitted with the approval of the code official where exit signs would damage the historic character of the building.
Fire Safety—Section 1203

Section 1203.12 – Automatic fire-extinguishing system
- If a historic building is provided with an approved automatic fire suppression system in accordance with Chapter 9 of the IBC, then the building would be deemed compliant with all of the construction requirements specified within the IBC.

Change of Occupancy—Section 1205
- This section basically states that historic buildings undergoing a change of occupancy shall comply with Chapters 7, 8, 9 and 10 as applicable, unless the provisions of this section allow exceptions to these requirements.
- There are a variety of topics covered, including fire protection, means of egress, stair construction, natural light and accessibility.
- The accessibility requirements of Section 1012.8 apply, unless technically infeasible.
- Compliance with Section 1204.1.1 through 1204.1.4 is permitted.
- In addition, the requirements related to Type B accessible units for dwelling and sleeping units for a Level 3 alterations do not apply to a change of occupancy in a historic building.

Alterations—Section 1204
- The alteration requirements are focused primarily on accessibility.
- Sections 705, 806 and 906 apply, as applicable, unless technically infeasible.
- Type B accessible unit requirements are not applicable for historic structures.

Structural—Section 1206
- The structural aspect of existing buildings should comply with the level of work as classified in Chapter 5.
- There is an exception that allows operational controls to limit live loads.
- Dangerous conditions are required to be remedied.
- Note the report in Section 1201.2 may allow alternative approaches to compliance.
Chapter 13 Relocated or Moved Buildings

- Relocated or moved buildings are not defined in the code.
- Relocated buildings must comply with the requirements of the IBC or the IRC, whichever is applicable, for the location on the lot and foundation.
- With certain minor exceptions, the wind, snow, seismic and flood provisions of the IBC are applicable for the building’s new location.
- Additionally, the building is required to be safe for human occupancy as determined by the IFC and the IPMC.

This section also addresses relocatable buildings.

- Relocatable buildings are defined in Chapter 2 the intent is not to treat them as new buildings every time they are moved, but instead as a relocated building.
- Compliance with other codes may also be necessary for relocated buildings such as retroactive, maintenance and operational requirements found in the IFC and IPMC.
- Any work considered as a repair, alteration or change of occupancy must be dealt with like any other building.

Historic Buildings and Relocated or Moved Buildings

1. What is the intent of Chapter 12 Historic Buildings?
   - To provide means for the preservation of historic buildings while still providing an acceptable level of safety.

2. In addition to Chapter 12, which other chapter of the code must historic buildings undergoing repairs comply with?
   - Chapter 6

3. Relocated or moved buildings must comply with the IBC or the IRC wind provisions, as applicable, except when the stress of structural elements are not increased by more than what percent?
   - 10 percent

4. If relocated or moved into a flood hazard area, structures must comply with what section of the IBC?
   - Section 1612
Module 12

Chapter 14 Performance Compliance Methods

Introduction

- Chapter 14 is termed the performance method. It is intended as an alternative to the prescriptive method (Chapter 4) or work area method (Chapters 6 through 12).
- This chapter recognizes a numerical evaluation system of the preexisting conditions of an existing building related to fire safety, means of egress and general safety, and allows for the improvement of specific individual components of buildings in order to reach a favorable score without necessarily needing to make upgrades other than the intended alterations.

General—Section 1401

There are 20 categories that are evaluated including the following:

- Building height
- Building area
- Compartmentation
- Tenant and dwelling unit separation
- Corridor walls
- Vertical openings
- HVAC systems
- Automatic fire detection systems
- Fire alarm systems
- Smoke control
- Means of egress capacity
- Dead ends
- Maximum exit access travel distance
- Elevator control
- Means-of-egress emergency lighting
- Mixed occupancies
- Automatic sprinklers
- Standpipes
- Incidental use area protection
- Smoke compartmentation (Group I-2 only)

Section 1401.1 – Scope

- The ultimate goal of Chapter 14 is the same as that of Chapters 4 through 13:
  - To maintain or increase the current degree of public safety, health and welfare in existing buildings, while permitting repairs, alterations, additions and changes in occupancy classifications without requiring full compliance with Chapters 4 through 13 or the I-Codes for new construction.
General—Section 1401

Section 1401.2 – Applicability
- The use of this chapter is permitted only for structures built prior to the date established by the jurisdiction.
- This date is intended to coincide with the date that the codes were first established by codification within the jurisdiction.
- The provisions of Chapter 14 do not apply to buildings with occupancy classifications of Group H, I-1, I-3 and I-4.
- Accessibility must comply with either Section 410 (prescriptive method) or Section 705 (work area method).

Section 1401.4 – Investigation and evaluation
- It is the responsibility of the building owner to cause the existing building to be investigated and evaluated in accordance with the compliance alternative tabular evaluation.
- This process is usually done by a registered design professional.
- A structural analysis is also required to demonstrate compliance with IBC Chapter 16.

Section 1401.5 – Evaluation
- The evaluation is comprised of three categories:
  - **Fire Safety.** This includes structural fire resistance, automatic fire detection, fire alarm, and fire suppression system features.
  - **Means-of-Egress.** This category includes the configuration, characteristics and support features of the means of egress.
  - **General Safety.** This category includes both the fire safety and means-of-egress parameters.

Section 1401.6 – Evaluation process
- The evaluation process is required to be followed in its entirety.
- All 20 areas are required to be evaluated, not just a portion of them.
- Note that the 20th category is specific to Group I-2 occupancies and addresses the need for smoke compartments.
- In applying the process to a mixed-use occupancy, if the separation between the mixed uses does not qualify for any category listed in Section 1401.6.16, then the score for each occupancy shall be determined, and the lowest score shall apply to the entire building.
Section 1401.6 – Evaluation process

- Where the separation between the mixed occupancies qualifies for any category listed in Section 1401.6.16, the score for each occupancy shall apply to each portion of the building based on the occupancy of that space.
- In each individual section of Sections 1401.6.1 through 1401.6.19, the section specifically directs the reader as to which of the three categories listed in Table 1401.7 the parameter score is to be entered.

Section 1401.9 – Evaluation of building safety

- The mandatory safety score listed in Table 1401.8 shall be subtracted from the building score entered in Table 1401.7 for each category.
- The building is in compliance if the final score is equal to or greater than zero.
General—Section 1401

Introduction

- The building construction process involves a number of known and unanticipated hazards.
- Reasonable precautions required to protect the public from injury resulting from construction activities, in connection with work requiring a permit, are set forth in this chapter.
- The provisions are also intended to protect adjoining property from damage during the construction and demolition process.
- These regulations are not intended to supersede the federal regulation known as the Occupational Safety and Health Act (OSHA), as well as state laws with parallel intent.
- The provisions of this chapter are almost identical to those in Chapter 33 of the IBC.

Multiple Use Structure

- **Purpose:** The purpose of this case study is to provide you with an opportunity to discuss how the code can be applied in a real-world situation. It also will give you an opportunity to have general discussions concerning the major points of the code. In the case study, you will walk through the phases of site design and development as related to Chapters 6 through 9.
- **Directions:** After you complete an overview of each chapter of the code, you will be provided a situation to analyze concerning the case study as it pertains to the topics covered in the particular chapters. Select two or three individuals and form a team. After you read the information, answer the discussion questions provided using the information within the case study and the code. You should be prepared to share your answers with the entire group.
Multiple Use Structure

Case Study Background Information: An existing three-story, multiple-tenant Group B building in Dublin, Ohio, is being converted into a multiple-use structure. The building is 7,500 square feet per floor (687 m²), constructed with masonry exterior walls and concrete floors supported on open web steel joists. Currently, the building does not have a sufficient water supply for a sprinkler system without the installation of a new fire pump.

Scope of Work: Alterations need to be made to 100 percent of the ground floor; 60 percent of the second floor and 25 percent of the third floor. Additionally, there is a change of occupancy on the entire first floor from Group B to a restaurant (Group A-2).

Classification of Work

What is the classification of work for this building?

Code Compliance Considerations—Alterations

With the Alterations being completed in the building, what code compliance will the owners need to consider?

- Building elements and materials
- Fire protection
- Means of egress
- Accessibility
- Structural
- Energy conservation

Code Compliance Considerations—Change of Occupancy

With the change in occupancy in the building, what code compliance will the owners need to consider?

- Structural
- Electrical
- Mechanical
- Plumbing
- Fire protection systems
- Means of egress
- Building height and area
- Enclosure of vertical shafts
Purpose: To reflect on today’s seminar and document your key points.

Directions: Answer the following questions below. Include additional observations, if you have them.

- What (Happened)? What was the most important thing you learned today?
- So What (Does it Mean to You)? Why is this information important for you to know?
- Now What (Are You Going to Do)? How will you use this information at work?

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