1

Introductions

- Instructor
- Participants

2

Description

- Discusses the development history of the IEBC
- Discusses critical concepts of the 2018 International Existing Building Code® (IEBC ®).
- 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
  - Case study
  - Real world applications

3

Goal

- To identify and describe key provisions of the 2018 IEBC.
- To assure an understanding of the intent of these key provisions of the 2018 IEBC.

4

Objectives

Upon completion, participants will be better able to:

- Recognize the limitations and extent of the codes related to existing buildings.
- Recognize how the IEBC offers alternatives and incentives to building owners to maintain their buildings and to continue to initiate upgrades towards compliance with more contemporary editions of the codes.
- 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.

5

Objectives, Cont.

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.
- Identify thresholds that trigger additional requirements for the existing building

6

Part I

Code Administration and Enforcement

7

7

Part 1

- Chapter 1 – Introduction to Building Codes
- Chapter 2 – Legal Aspects, Permits, and Inspections
- Chapter 3 – History of Rehabilitation Codes

8

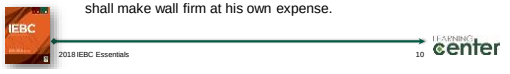
Chapter 1 – Introduction to Building Codes

- History of the Codes
- Code Development
- Construction Codes
- Existing Building
- Using the IEBC

9

History of the Codes

- 1760 BC - First Known Building Code, “Code of Hammurabi” – six rules
  - Payment – two shekels for each SAR built
  - Poor Quality of Construction, i.e., work is not sound and has fallen:
    - If owner is killed, builder put to death;
    - If owner’s son is killed, builder’s son put to death;
    - If slave of the owner is killed, builder shall give slave for slave;
    - If caused the loss of goods, builder shall render back what was destroyed and shall re-build the house at at his own cost.
    - If builder has not keyed his work, and wall has fallen, builder shall make wall firm at his own expense.



10

History of Codes

- One of the first modern building codes – “The Building Code”, recommended by the National Board of Fire Underwriters
  - Provided uniform language from respected organization
  - Provided a “Model Code” that could be adopted without having to write a “home grown” code
- Starting in 1920’s, several organizations started to develop model codes
- By the end of twentieth century there were three model code groups, each with their family of codes: BOCA, ICBO, SBCCI

11

History of Codes

- BOCA, ICBO and SBCCI agreed to develop one model code for the U.S.
  - The first International Building Code was published in 2000
  - The three model code organizations consolidated, creating the International Code Council in 2002.
  - The ”I” Codes are used in every state in the U.S. and many countries.

12

Code Development

- The family of "I" Codes is revised, updated and new editions published every three years:
  - To keep updated with construction technology, methods, materials, equipment and processes that are constantly evolving
  - Revised through an open "Governmental Consensus Process" which provides for:
    - Openness
    - Transparency
    - Balance of Interests
    - Due Process
    - Appeals Process
    - Consensus

13

Code Development

The ICC Code Development Process:

- Committees Created – CSC recommend to ICC Board
- Code Change Submission and Review – Anyone can submit
- Committee Action Hearings (CAH) – approve, approve/mod, or disapprove
- Pubic Comment Submission and Review – Anyone can submit a public comment on the results of the CAH.
- Public Comments Hearings (PCH) – Eligible voters discuss and vote on code change proposals. Only Government officials can vote.
- Online Governmental Consensus Vote – Only eligible voters - Validation Committee reviews and ICC Board confirms
- New Edition Published

14

Construction Codes

The International Building Code

- Applies to the construction, alteration, movement enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building, or structure, or appurtenances connected to such buildings or structures. Section 101.2 Scope
- Establishes the minimum requirements to provide for safety, public health and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire, explosion and other hazards attributed to the built environment. Section 101.3 Intent

15

Construction Codes

International Residential Code

- Designed to be a completely stand alone code including building, m.e.p's, fuel gas, and energy.
- Scope and Intent is similar to the IBC but applies only to one and two family dwellings and townhouses:
  - not more than three stories above grade plane in height, and;
  - with a separate means of egress and;
  - their accessory structures not more than three stories above grade plane in height.

16

Construction Codes

The International Fire Code

- Developed to provide for a reasonable level of life safety and property protection from the hazards of fire, explosion, or dangerous conditions in new and existing buildings and construction
- It also provides regulations for the safety of firefighters and emergency responders.

17

Construction Codes

- **The International Plumbing Code** – provides regulations for the design, installation, alteration and maintenance of plumbing systems. It governs materials, sizing and installation of potable water systems and d.w.v. systems.
- **The International Mechanical Code** – provides regulations for the design, installation, alteration and maintenance of mechanical systems. It covers all H.V.A.C systems installed in buildings.
- **The International Fuel Gas Code** – Is intended to be a companion code to the IMC specifically for fuel gas systems and appliances. It regulates the design, installation, alteration and maintenance of appliance utilizing natural gas, gaseous hydrogen systems and related accessories
- **The International Swimming Pool and Spa Code** – provides regulations for the design, installation of aquatic recreation facilities, swimming pools and spas that are either permanent or temporary and include those connected to a circulation system, **intended** for swimming, bathing, or wading.

18

Construction Codes (Environmental)

The International Energy Conservation Code

- Has been developed to regulate the energy use in all buildings that are heated or cooled.

The International Green Construction Code

- Is considered to be an "above code" code intended to safeguard the environment, public health, safety and general welfare through regulations that reduce the negative impact on the natural environment and building occupants

19

Maintenance Codes

The International Property Maintenance Code

- This code is intended solely for the purpose of providing regulations for the maintenance of existing buildings. It provides minimum requirements for and standards for premises, structures, equipment and facilities for light, ventilation, space, heating, sanitation, protection from elements, life safety and safety from fire and other hazards and for safe and sanitary maintenance.

20

Introduction to the IEBC

- Each of the legacy building codes had a separate chapter that dealt with existing buildings
- In 2003, the International Existing Building Code (IEBC) was introduced as a member of the ICC family of Codes
- At the time, existing buildings included in scope of both codes

21

Introduction to the IEBC

- Intent to have a comprehensive set of regulations for existing buildings consistent with and inclusive of the scope of the existing legacy codes.
- Technical content from the legacy codes, as well as other rehabilitation codes, was used as the basis for the development

22

Introduction to Existing Building Codes

- The IEBC is founded on the following principles"
  - To encourage the use and reuse of existing buildings that adequately protect public health, safety and welfare;
  - Do not unnecessarily increase construction costs;
  - Do not restrict the use of new materials, products, or methods of new construction;
  - Do not give preferential treatment to particular types of classes of materials, products or methods of construction

23

Introduction to the IEBC

- Is a regulatory model 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.

24

Introduction to Existing Building Codes

- The Legacy Codes each had a single chapter dealing with existing buildings
- The International Existing Building Code was introduced into the ICC family of codes in 2003
- Technical content of legacy codes promulgated by BOCA, ICBO, and SBCCI, as well as other rehab codes, was utilized as the basis for the development

25

Using the IEBC

- Most Existing Buildings do not comply with the most currently published codes for new construction
- The IEBC is intended as an alternative approach to repairs, alterations, additions and changes in occupancy to existing buildings.
- To expect compliance with the codes for new construction is unreasonable from both a physical perspective and is cost prohibitive.

26

Using the IEBC

- Regulating construction within existing buildings presents opportunities to ensure that new construction complies with currently adopted building codes and:
- At a minimum, the current level of compliance is maintained or are improved, incrementally, to meet basic safety levels
- To accomplish this, the IEBC allows for options for controlled departure from full compliance with the “I” Codes for new construction

27

Using the IEBC

- The Code provides for three main options for the owner/designer when dealing with alterations of existing buildings:
  - Option #1 – Prescriptive Compliance Method – Chapter 5 – This was formerly Chapter 34 of the IBC (2012 and earlier editions)
  - Option #2 – Work Area Compliance Method – Chapters 6-12
  - Option #3 – Performance Compliance Method – Chapter 13 – Was a provided in former chapter 34 of the IBC (2012 and earlier editions)
- Section 301 provides a summary of these options and will be discussed in more detail later in the presentation.

28

Using the IEBC

Section 301.3 Exception

- Allows alterations to be done under the code adopted at the time of the original construction of the building or portion of the building
  - New Structural members must comply with IBC
  - Does not apply to alterations that constitute substantial improvement in flood hazard areas
  - Does not apply to structural alterations in the Prescriptive Compliance Method or the Work Area Compliance Method.

29

Arrangement and Format

Chapters	Subjects
1-2	Administrative Requirements and Definitions
3	Provisions for all Compliance Methods
4	Repairs
5	Prescriptive Compliance Method for Existing Buildings
6-12	Work Area Compliance Method for Existing Buildings
13	Performance Compliance Method for Existing Buildings
14	Relocated Buildings
15	Construction Safeguards
16	Referenced Standards
Appendix A	Guidelines for Seismic Retrofit of Existing Buildings
Appendix B	Supplementary Accessibility Requirements for Existing Buildings
Appendix C	Guidelines for Wind Retrofit of Existing Buildings
Appendix D	Guidelines on Fire Ratings of Archaic Materials and Assemblies

30

Chapter 2 – Legal Aspects, Permits, and Inspections

- Code Adoption
- Authority
- Permits – Submittal and Plan Review
- Inspections
- Board of Appeals

31

Code Adoption

Adoption

- The IEBC is a "model" code
  - Can be adopted by a governmental agency and become law
  - Adopted by federal, state and local government agencies
  - Adopted through legislation or delegate to a board or state agency
  - Adopting legislation or ordinance is required to go through a public hearing process
  - Most if not all jurisdictions develop amendments to the code

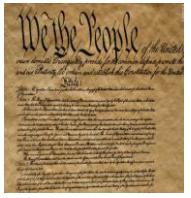
32

Code Adoption

- A sample adoption ordinance is included in the front of the 2018 IEBC.
- The jurisdiction must adopt a specific edition of the code.
- Any appendix must specifically be adopted.
- The code official is responsible for assuring substantial compliance with the adopted code and any state laws dealing with construction issues.

33

Code Adoption



- U.S. Constitution creates:
  - States that have constitutions that create:
  - Legislatures that pass laws signed by the governor that create:
  - Local governments that pass ordinances
- The Tenth Amendment to the U.S. Constitution.
  - States are granted authority to adopt laws to protect health, safety, morals and general welfare of its citizens. These are known as our ***"Police Powers"***

34

Standards Used in the IEBC

- The Family of International Codes references over 1400 Standards
- Standards developed by other agencies other than ICC
- Since standards are referenced by the code, once the code is adopted, the standards are part of the code as identified in Section 102.4
- What is the difference between a code and a standard?

35

Standards used by the IEBC

- The IEBC References approximately 30 separate standards and are contained in Chapter 16
  - Includes Section numbers where the specific standard is referenced
- Where there are conflicts between the code and standard, the code applies in accordance with Section 102.4.1

36

Standards used by the IEBC

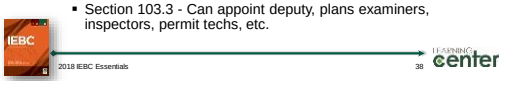
NOTE

- Use Referenced standard example and graphic used in IBC Essentials book, page19

37

Authority

- When IEBC is adopted through a governance process:
  - It becomes a law
  - Like any other law, the building code needs to be enforced
- The IEBC establishes the Department:
  - Section 103.1 – Department of Building Safety is established
    - Section 103.2 - Code official is appointed – executive official in charge of department and enforcement
    - Section 103.3 - Can appoint deputy, plans examiners, inspectors, permit techs, etc.



38

Authority

- Section 104 – Duties and Powers of Code Official is established – Directed to Enforce the provisions of the code which includes:

  Section 104.1 – To interpret, adopt policies and procedures
  - Must be in compliance with the "intent" and "purpose" of the code
  - Cannot waive requirements

  Section 104.2 – Receive applications, review construction documents and issue permits, conduct inspections to determine and assure compliance.

39

Duties and Powers of Code Official—Section 104

Section 104.2.2 – 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.

40

Authority

- Alternate materials and methods of construction – Section 104.11
- The IEBC is not intended to prohibit any type of material or design
- Responsibility to approve is with the Code Official
  - Must comply with the purpose and intent of code
  - Must be determined to be equivalent to the code in quality, strength, effectiveness, fire resistance, durability, and safety.
  - Accomplished by reviewing testing information and research reports
  - ICC Evaluation Services

41

Authority

- **Section 104.10 -** Instances when there are practical difficulties with complying with the code so IEBC allows for modifications
  - Based on individual cases – does not set precedent
  - Owners or authorized agents must apply for modification with explanation of practical difficulty
  - Must provide information as to how their modification is in compliance and intent of the code.
  - Modification does not lessen health, accessibility, life and fire safety or structural safety
  - The Code Official must review and decide if modification is granted

42

Permits

Section 105 – **Permits**

- A building permit must be obtained when a property owner wants to repair, make alterations relocate, build an addition to, demolish or change the occupancy of any building.
- Further, to repair, install, add, alter, remove, convert, or replace any electrical, gas, mechanical, or plumbing system, which is regulated by the IEBC, an application for a permit must be obtained.

43

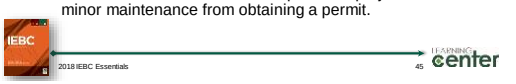
Permits

- The Application for a permit initiates the process for code compliance:
  - Application is made Section 105.3
  - Plan review is initiated Section 106.3
  - Permit is issued
  - Inspections are scheduled Section 109
  - Certificate of Occupancy is issued Section 110

44

Permits

- The Building Permit:
  - Is the legal license to initiate construction
  - Ensures the work is completed properly and to the requirements of the code, which,
  - Ensures the safety of the occupants of the building
  - Work executed and completed without a permit jeopardizes the safety of the occupants of the building
  - Working without the proper permits may subject individuals to criminal prosecution and the work to be corrected or removed
  - Section 105.2 – The code exempts small projects and minor maintenance from obtaining a permit.



45

Permits

- Submittal Requirements
  - Must include the application, set of construction documents and specifications.
  - Construction documents and specifications must show how the project will comply with the applicable portions of the codes
  - Section 106.1 Requires two or more sets of construction documents, must be sealed by licensed design professional and, at a minimum, must show:

Fire Protection Systems	Means of Egress
Exterior Wall Envelope	Exterior Balconies and elevated walking surfaces
Site Plan	

46

Permits

Plan Review

- **Section 106.3** – The Code requires plans be reviewed for compliance with the code and in with applicable laws of the jurisdiction.
- **Section 106.2.1** – The plans must show the designated "work areas".
- If discrepancies are found during the review, a report is generated and provided to the applicant; corrections are made and plans resubmitted
- If changes are made after the permit is issued, revisions must be submitted for approval.

47

Inspections

- Once the permit is issued, the work is required to be inspected for compliance with the IEBC in accordance with Section 109.
- **Section 109.3 -** The Code requires the following specific inspections in accordance with Sections 109.3.1 – 109.3.10:

Footing and/or foundations	Weather-exposed balconies
Concrete Slab or under floor	Fire and smoke-resistant penetrations
Lowest Floor elevation	Special Inspections
Frame	Final Inspections
Lath or gypsum	

48

Inspections

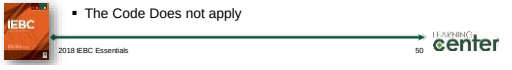
Section 109.4 – Third party inspections.

- The Code Official can accept such inspections provided the agency conducting the inspections satisfies the qualifications and reliability requirements.

49

Board of Appeals

- **Section 112**
  - The Code official is responsible for interpreting the code
  - Such interpretations are subject to challenge
  - A hearing can be requested
  - The Board of Appeals is usually made up of professionals in the construction industry and appointed by the local authority and is a quasi-judicial entity
  - The Board can hear:
    - An Appeal – disagreement on code interpretation
    - A variance – An alternative as been advanced and the code official has denied it
    - The Code Does not apply



50

Definitions

- Chapter 2 of the IEBC Contains all definitions
- Defined terms are italicized in the text of the code

51

Chapter 3 – History of Rehabilitation Codes

- The origin of the IEBC started with the “Code for Rehabilitation of Existing Buildings” developed by the State of New Jersey
- Much reliance in developing the New Jersey code was placed on
  - Article 32 of the Massachusetts building code
  - The Uniform Code for Building Conservation (ICBO)
  - Chapter 34 of the BOCA National Building Code

52

History of Rehabilitation Codes

In developing the code in New Jersey there was three criteria:

- Timeliness (few projects handled as special cases)
- Predictability (due process-no surprises-people need to know the law applicable to them and free of arbitrary treatment)
- Reasonableness (provide a reasonable level of safety without imposing excessive additional costs)

53

History of Rehabilitation Codes

- H.U.D. publishes the Nationally Applicable Recognized Rehabilitation Provisions (NARRP) in 1997
- NARRP used by many states in the development of their rehab codes
- NARRP used as one of the source documents for the IEBC

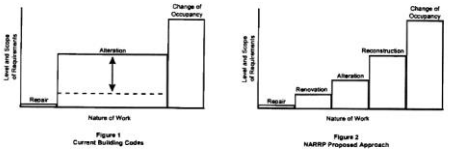
54

History of Rehabilitation Codes

- Intent is to clarify requirements when different types if work is performed
- The work is initiated voluntarily by owner and by enforcement
- Additional improvements required as work increases proportionally.
- Expanded the term ”alteration” into multiple categories

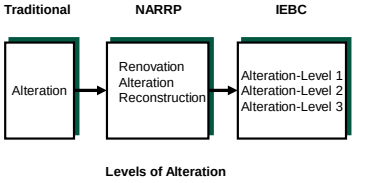
55

History of Rehabilitation Codes



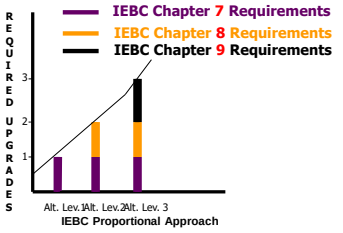
56

Classification of Work



57

Classification of Work



58

Administration

- Read the following scenarios. Determine if a permit is required or not required" box, whichever is applicable.

Scenario 1

- A technician is installing a temporary system required to service electrical equipment.

Scenario 2

- A contractor is installing a window awning supported by an exterior wall of a Group R-3 occupancy.

59

Administration

Scenario 3

- A contractor is installing a driveway that is a slab-on-grade, is not over a basement or story below and is not part of an accessible route.

60

Administration

- 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

61

Administration

- Name the six attributes provided for in the Governmental Process for the Development of Codes:

Openness	Transparency
Due Process	Balance of Interests
Appeals Process	Consensus

62

Administration

- States are granted the authority to Adopt Codes by what law?

The 10 Amendment to the United States Constitution

63

Administration

- What is the main Difference between a Code and a Standard?
  - A Code specifies where and when an action needs to occur
  - A Standard specifies the details of how to install or construct something

64

Administration

- Can an Appointed Board of Appeals grant an appeal that is clearly in conflict with the adopted building code?

  No. The Board of Appeals can only interpret, approve an alternative method or material or determine if the code applies to a specific situation. Only the elected governance body, when setting in a public forum, can amend or change a code as it is an adopted law.
- What is the legal document allowing the construction of a building or structure?

  A building permit

65

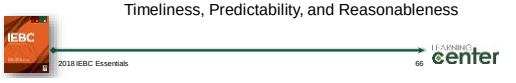
Administration

- The Work Area Method uses an _____ approach to alterations and changes of occupancy.

  Incremental Approach
- Can a designer use provisions from each of the three compliance alternatives in combination with each other?

  No. Section 301.3 specifically states that the compliance alternatives shall not be applied in combination with each other.
- When developing the IEBC, what were the three criteria used by New Jersey as critical in the development?

  Timeliness, Predictability, and Reasonableness



66

Part Two

General

67

67

General

- **Chapter 4 – Compliance Alternatives**
- **Chapter 5 – Essentials**

68

Chapter 4 - Compliance Alternatives

- General Considerations
  - The IEBC is to be used only for buildings, or portions thereof, that have been previously used for its intended purpose – Section 104.4.1
  - A fundamental premise of the IEBC is that the building is in compliance with the IFC and the IPMC. – Section 101.7
    - Any existing violation of the IFC or IPMC should not hold up a permit being issued under the IEBC. Corrections should be handled separately

69

Compliance Alternatives

- General Considerations
  - Structural Considerations are treated in more detail due to the fact that most jurisdictions do not address existing structural conditions
  - For example: Alterations Level 1 has no specific requirements for fire protection and means of egress other than maintaining the current level of safety. However, there are substantial provisions that address various structural items including re-roofing

70

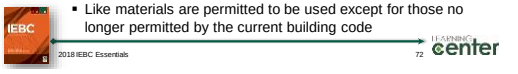
Compliance Alternatives

- General Considerations
  - In addition to the specific compliance options addressed in the IEBC, owners and design professionals always have the option of the using the IBC

71

Compliance Alternatives

- The Code Official can allow the Building Code, in existence a the time the building, or portion thereof, was originally built, to be used to determine compliance, in accordance with the exception to Section 301.1.
  - When using the option, it needs to be determined what code, if any, was in effect at the time of the original construction
  - The building is still required to comply with the current IFC and IPMC
  - If the owner chooses to do nothing, the building is acceptable
  - Any new work must comply with the IBC
  - Like materials are permitted to be used except for those no longer permitted by the current building code



72

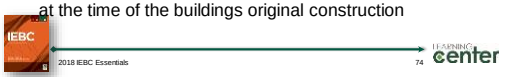
Compliance Alternatives

- A further option applies only to Historic Buildings
  - Chapter 12 is included in the work area compliance method
  - Additional compliance options which recognize the need to maintain the historical aspects of the building as identified in reports required by Section 1201.2

73

Compliance Alternatives

- Options for the Owners and their design team
- **Section 301.3 –** of the IEBC directly allows for three options for the building owners and their designers when proposing alterations, additions, or changes of occupancy;
  - Prescriptive Compliance Method – Chapter 5
  - Work Area Compliance Method – Chapters 6-12
  - Performance Compliance Method – Chapter 13
- **Section 301.3, Exception** – Allows for a fourth option, i.e. alterations can be made under the code as adopted at the time of the buildings original construction



74

Compliance Alternatives

Section 301.3

- Clearly identifies that the applicant (owner or owners representative) has the choice of methods: not the code official
- Prohibits the use of various methods to be used in combination with each other.

75

Structural Provisions

- **Section 303** – Structural Conditions are evaluated where additions or alterations take place regardless of the compliance option
  - **Section 303.2** – Snow Loads in accordance with ASCE 7
  - **Section 303.3.1** – Reference is made to ASCE 7 and ASCE 41 Tier 3 where specific projects trigger compliance with full seismic forces, reference Table 303.3.1

76

Structural Provisions

[BS] TABLE 303.3.1
PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH FULL SEISMIC FORCES

RISK CATEGORY (Based on IBC Table 1604.5)	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1N EARTHQUAKE HAZARD LEVEL	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-2N EARTHQUAKE HAZARD LEVEL
I	Life Safety (S-3)	Collapse Prevention (S-5)
II	Life Safety (S-3)	Collapse Prevention (S-5)
III	Damage Control (S-2)	Limited Safety (S-4)
IV	Immediate Occupancy (S-1)	Life Safety (S-3)

77

Structural Provisions

- **Section 303.3.2** – Where reduced seismic forces are allowed, conditions must comply with:
  - 75% of IBC prescribed forces
  - IEBC Appendix A
  - ASCE 41, using the performance objective in Table 303.3.2 for the applicable risk category

78

Structural Provisions

[BS] TABLE 303.3.2
PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH REDUCED INTERNATIONAL BUILDING CODE-LEVEL SEISMIC FORCES

RISK CATEGORY (Based on IBC Table 1604.5)	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1E EARTHQUAKE HAZARD LEVEL	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-2E EARTHQUAKE HAZARD LEVEL
I	Life Safety (S-3) See Note a	Collapse Prevention (S-5)
II	Life Safety (S-3) See Note a	Collapse Prevention (S-5)
III	Damage Control (S-2). See Note a	Limited Safety (S-4). See Note b
IV	Immediate Occupancy (S-1)	Life Safety (S-3). See Note c

For Risk Categories I, II and III, the Tier 1 and Tier 2 procedures need not be considered for the BSE-1E earthquake hazard level.

For Risk Category III, the Tier 1 screening checklists shall be based on the Collapse Prevention, except that checklist statements using the Quick Check provisions shall be based on MS-factors that are the average of the values for Collapse Prevention and Life Safety.

For Risk Category IV, the Tier 1 screening checklists shall be based on Collapse Prevention, except that checklist statements using the Quick Check provisions shall be based on MS-factors for Life Safety.

79

Accessibility

- The various provisions for accessibility has been consolidated into Section 305.
- **Section 305.3** – It is not the intent of the IEBC to:
  - require more accessibility than is required for new buildings, nor;
  - to reduce the current level of accessibility in the existing building.
- **Sections 305.4.2 & 305.6** – Technical infeasibility is critical in existing buildings, typically in situations where building structural elements will be impacted.

80

Accessibility

Section 305.5 – **Additions**

- An addition is a new building and must comply totally with the accessibility requirements for new buildings in accordance with the IBC.
- If an addition impacts an area of primary function to the existing building then the primary route to that primary function must be made accessible.

81

Accessibility

Section 305.6 – Alterations

- Must comply with chapter 11 of the IBC unless technically infeasible. If determined to be technically infeasible, must comply to the maximum extent that is technically feasible.

Section 305.7 – Primary Function must maintain a primary route.

- Exceptions:
  - Accessible means of egress
  - Dwelling units Type A and B
  - Alterations to windows, doors, hardware, M.E.P. systems, fire protection systems, etc.
  - Alterations undertaken for the sole purpose of increasing accessibility to the facility

82

Change of Occupancy

Section 305.4.2 Complete Change of Occupancy – must comply with Sections 305.6 Alterations, 305.7 Alterations affecting an area containing a primary function, and scoping for alterations and must have all of the following:

- At least one accessible route and;
- At least one accessible route from building entrance to primary function areas and;
- Signage complying with Section 1111 of the IBC and;
- Accessible parking where parking is provided and;
- At least one accessible passenger loading zone, where such zones are provided and;
- At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

83

Scoping for Alterations

- **Section 305.8 Scoping for Alterations –** Identifies accessibility requirements for 15 separate elements:

Entrances
Platform Lifts
Ramps
Type A Dwelling or Sleeping Units
Jury Boxes and Witness Stands
Additional Toilet and Bathing Facilities
Fuel Dispensers
Amusement Rides
Elevators
Stairways and Escalators
Accessible Dwelling or Sleeping Units
Type B Dwelling or Sleeping Units
Toilet Rooms
Dressing, Fitting and Locker Rooms
Thresholds

84

Scoping for Alterations

- **Example:** Ramps and Table 305.8.5

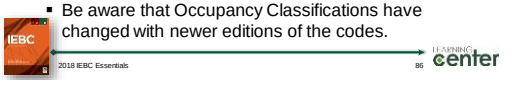
TABLE 305.8.5 RAMPS

SLOPE	MAXIMUM RISE
Steeper than 1:10 but not steeper than 1:8	3 inches
Steeper than 1:12 but not steeper than 1:10	6 inches

85

Compliance Alternatives

- Of the five options allowed by the IEBC, the exception to Section 301.1 allowing the use of the code in effect at the time the building was constructed could be the most problematic.
  - The building would still be required to be in compliance with the current editions of the IFC or IPMC.
  - Continued use of materials not permitted by current code.
  - Be aware that Occupancy Classifications have changed with newer editions of the codes.



86

Compliance Alternatives

- **Section 305.9 Historic Buildings –** This section gives general guidance for Historic Buildings when dealing with alterations or changes of occupancy.
  - If it is determined that the proposed alteration or change in occupancy will threaten or destroy the historical significance of the facility related to accessible routes, entrances or toilet facilities, alternatives are granted.
- The IEBC contains a specific chapter (Chapter 12) that applies to Historic Buildings related to the Work Area Method.

87

Compliance Alternatives

- No specific methodology for choosing compliance alternative however the following considerations may assist in choosing best approach for a given project:
- Is the building a relatively new building? If so, the Prescriptive Compliance Method may be applicable due to the requirements are based on more recent editions of the IBC/IRC
- Is the proposed work limited to specific areas in the building? If so and there are items in the building that are not in compliance with recent editions of IBC/IRC the Work Area Compliance method may be more appropriate. It more prescriptively identifies what extent the building must comply with the IBC/IRC and the extent of compliance is proportional to the work proposed.

88

Compliance Alternatives

- Are there significant areas that do not comply with current building code requirements? Of the three options in the IEBC, the Performance Compliance Method may be desirable since it generally highlights more options for compliance.

89

Chapter 5 – Essentials

- Prescriptive Compliance Method
- Changes of Occupancy Classification
- Construction Safeguards

90

Essentials

Prescriptive Compliance Method – Chapter 5

- Not included in original rehabilitation codes
- Was originally contained in Chapter 34 of the IBC
- ICC Board of Directors decided to delete Chapter 34
- Was retained as an optional compliance method in IEBC
- Was not coordinated with Work Area Compliance method

91

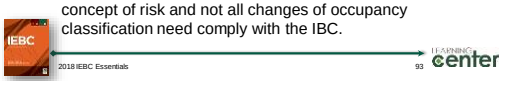
Essentials

- Prescriptive Compliance Method
  - When using this method the level of work being performed is critical when choosing this option
  - The following areas are addressed with this method
    - Additions – Section 502
    - Alterations – Section 503
    - Fire Escapes – Section 504
    - Windows and Emergency Escape Openings – Section 505
    - Changes of Occupancy – Section 506
    - Historic Buildings – Section 507

92

Essentials

- **Prescriptive Compliance Method**
  - All alterations shall comply with the IBC – Section 503.1
  - The question is to what extent does the alteration need to comply with the IBC.
  - This question can be more clearly determined if using the work area method.
  - Changes of Occupancy requirements of the IBC apply to the extent the code official determines the level of safety – Section 506.1
  - Whereas the Work Area Compliance method utilizes the concept of risk and not all changes of occupancy classification need comply with the IBC.

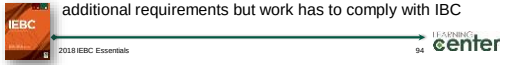


93

Essentials

Work Area Method

- Incorporates the concept of ”work area” – reference Definition in Chapter 2
- Work area is that portion of the building which the owner desires to do the work:
  - Must be clearly identified on the construction documents
  - No requirements applied outside of work area (except for supplemental requirements for Alterations level 2 and Alterations level 3)
  - Incidental work outside work area does not trigger additional requirements but work has to comply with IBC



94

Essentials

- Changes of Occupancy Classification
- Not a new concept from the legacy codes
- What is new is the concept of determining the level of risk associated with the various occupancy classifications

95

Essentials

- Chapter 10 contains three risk categories:
- **Means of Egress – (Table 1011.4)** – Relative hazard was primarily based on travel distance; further distinction between levels 3 and 4 based on certain characteristics such as density, familiarity with surroundings, being awake or asleep, age, and potential impairments
- **Heights and areas – (Table 1011.5) –** original table published in NARRP based on BOCA National Building Code for type 2A construction – Now has five hazard levels

96

Essentials

- **Exterior Walls – (Table 1011.6) –** relative hazard based on the exterior wall requirements contained in Chapter 6 of the IBC
  - based on a comparable table in NARRP
  - was based on the fire resistance ratings in the BOCA National Building Code at a fire separation distance of 5 feet.

97

Essentials

- Applying Chapter 10 Change of Occupancy
- Must understand the concepts of “Change of Use” (Section 1001.2.1) vs. ”Change of Occupancy Classification” (Section 1001.2.2)

98

Essentials

- Construction Safeguards
- Regulated by both IBC and IFC
- The IEBC contains same requirements as the IBC
- Construction safeguards during rehab projects are more complex due to the fact that portions of the building are occupied.

99

General

When using the exception to Section 301.3 and alterations are being allowed under the code which was being enforced at the time of the original construction, would the alterations still have to comply with the current IFC and IPMC?

- Only those requirements of the IFC and IPMC which are retroactive such as the provisions of chapter 11 of the IFC. It needs to be understood that the exception to 301.3 states "the laws in existence" at the time the building was built which would also include any fire and property maintenance codes. The code official would still have to approve the proposal

100

General

Name the options that the IEBC makes available to the designer when proposing to make alterations to a building or structure:

Prescriptive Compliance Method
Work Area Compliance Method
Performance Compliance Method
The Codes that were in use at the time the building was originally constructed if approved by the Code Official
The Codes for new construction i.e., the IBC or IRC

101

General

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.

102

General

- **Can the legal occupancy of any building, existing on the date of adoption of the code, be permitted without change**

  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.

- **Where reduced seismic forces are allowed, conditions must comply with __75%__ of IBC prescribed forces.**

103

General

- If an addition impacts an area of _____ to the existing building then the primary route to that _____ must be made accessible.

  Primary Function

- Who determines the location of the work area?

  The Designer

- Name the three risk categories contained in Chapter 10, Change of Occupancy

  Means of Egress
  Heights and Areas
  Exposure of Exterior Walls

104

Part IV

Compliance Methods

105

Compliance Methods

- Repairs
- Alteration Level 1
- Alteration Level 2
- Alteration Level 3
- Change of Occupancy
- Additions
- Relocated or Moved Buildings

106

Compliance Methods

General

- Previous Editions of the IEBC provided for three methods of building rehabilitation
  - Prescriptive Compliance
  - Work Area Compliance
  - Performance Compliance

107

Compliance Methods

General, Cont.,

- The Prescriptive compliance method utilizes requirements of the IFC and requires all aspects of the existing building to be in full compliance with the IFC.
- It is the most conservative of the compliance methods and used by most jurisdictions prior to the publication of the IEBC
- Any new construction associated with this method must comply with the IBC/IRC

108

Compliance Methods

General Cont.,

- The Performance Method:
  - Is a point based system
  - Evaluates 21 safety parameters for equivalency to the IBC
  - Was included in Chapter 34 of the IBC
  - Was removed in the 2015 Edition of the IBC
  - Dates back to BOCA National Building Code and incorporated in the 2000 IBC when the three legacy organizations merged into ICC

109

Compliance Methods

General, Cont.,

- The Work Area Compliance Method:
  - Did not exist prior to the creation of the building Rehabilitation Code
  - Follows an incremental approach to gaining compliance
  - Usually, the greater percentage of building being rehabilitated, the more requirements of the IBC that are triggered.
  - In some cases the requirements of the IBC are lessened while at the same time enhancing the safety of the existing building.

110

Compliance Methods

General, Cont.,

- ”Work Area” is a legal term and, as such, is defined in the Chapter 2 Definitions of the IEBC.
  - “That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code. ”

111

Compliance Methods

General, Cont.,

- A key word in the definition is “reconfigured”.
- Either a space, component or system is being reconfigured in order to apply the work area method.
- Any lack of clarity in defining the Work Area can have significant impacts on the level of overall compliance with new construction requirements of the IBC.

112

Compliance Methods

General, Cont.,

- Accessibility requirements have now been removed from the various Work Area Level chapters and relocated to Section 305 of Chapter 3, “Provisions for All Compliance Methods”.
- The relocation makes it clear that Accessibility requirements universally apply to each of the methods of building rehabilitation.

113

Repairs

- Previous editions of the IEBC included Repairs as a part of the Work Area Compliance Method.
- In the 2018 edition of the IEBC, Repairs are now an independent chapter, Chapter 4, attached to none of the compliance methods.
- Chapter 4 defines when “Repairs” can be made with like materials and methods or must comply with the IBC/IRC.

114

Repairs

General

- **Section 401.2** – A guiding principle when making repairs is the work cannot make the building less compliant than it was before the repair was made.

115

Repairs

- **Section 402.1 –** Replacement glazing must comply with Section 2406 of the IBC
- **Section 403.1 –** Fire Protection – repairs must be done in a manner that maintains the level of fire protection provided
- **Section 404.1 –** Repairs must maintain the level of means of egress provided by in the building.

116

Repairs

- **Structural –** structural damage to a building can occur to buildings for a number of reasons, i.e., wind, earthquake, fire, flooding, falling trees, cars running into the building, etc.
- **Section 405.2.1 –** Repairs to buildings with less than substantial structural damage can restore structural elements to pre-damaged condition
- **Section 405.2.1.1 –** damage due to snow loading must be repaired in accordance with Section 1608 of the IBC

117

Repairs

- **Substantial Structural Damage –** anyone of three conditions as defined in Chapter 2
- **Vertical Elements of Lateral Force Resisting System –** Section 405.2.3
  - Building in SDC D, E, or F that experience " disproportionate earthquake damage" must be evaluated by a registered design professional.
  - Buildings in SDC A, B, C or One and Two family dwellings do not require evaluation or retrofitted for load combinations that include earthquake effects

118

Repairs

119

Repairs

- Evaluation by Design Professional determines:
- Building complied with load combinations of the IBC, damaged structural elements can be restored to pre-damaged condition, Section 405.2.3.2
- Building did not comply with the load combinations of IBC, then entire building must be retrofitted to comply, Section 405.2.3.3

120

Repairs

- **Section 405.2.3.3 – Repairs for non-compliant buildings**
  - Wind loads for the repair and retrofit must comply with the building code in effect at the time of the original construction except if damage was caused by wind, then must comply with IBC
  - Seismic loads for retrofit design shall be those in effect at the time of the original construction but cannot be less than the reduced seismic forces

121

Repairs

Substantial Structural Damage to Gravity Load-Carrying Components – Section 405.2.4

- Structural damage to gravity load-carrying components must be rehabilitated to comply with dead and live loads of the IBC.
- If damage caused by or related to snow load effects, snow load requirements of the IBC must be incorporated into rehabilitation
- If damage caused by wind or seismic effects, an evaluation must be executed by design professional and submitted to Code Off. Except for buildings in SDC A, B or C where damage was not caused by earthquakes – Section 405.2.4.1

122

Repairs

- **Section 405.2.4.1 Lateral force-resisting system**
  - If substantial structural damage to gravity load-carrying components them building must be evaluated in accordance with Section 405.2.3.1
  - If evaluation determines non-compliance them must comply with Section 405.2.3.3

123

Repairs

- **Flood Hazard Areas**
  - As defined by chapter 2
- Buildings that have sustained substantial structural damage must be brought into compliance with flood loads of the IBC Section 1612.

124

Repairs

- **Section 406.1 – Existing electrical wiring and equipment can be repaired or replaced with like material**
  - **Section 406.1.1 –** Receptacles shall comply with Section 406.4 (D) of NFPA 70 – indicates the various types of receptacles that must be used where mandated by the NEC
  - **Section 406.1.2 –** Plug Fuses
  - **Section 406.1.3 –** Non-grounding-type receptacles
  - **Section 406.1.4 –** Group I-2 receptacles
  - **Section 406.1.5 –** Grounding of Appliances

125

Repairs

Section 407 – Mechanical

- Repairs cannot make the building less compliant
- Mechanical Draft system used with manually fire appliances and fireplaces:
  - Draft device must be listed and installed per manufacturer's instructions
  - Must provide audible and visible warning upon loss of power or failure of the system. Battery Back-up required on warning device
  - Smoke detector or smoke alarm must be installed in the room containing the appliance or fireplace and detection device must have battery backup

126

Repairs

Section 408 – Plumbing

- Materials and supplies prohibited by IPC cannot be used
- Replacement water closets must have a maximum water consumption of 1.6 gallons per flushing cycle
  - Except for blow-out design water closets having a maximum water consumption of 3.5 gallons per flushing cycle

127

Alterations – Level 1

- Work areas that involve removal and replacement or the covering of existing materials, elements, equipment or fixtures using new materials, elements, equipment or fixtures that serve the same purpose.
- Requirements for Level 1 Alterations are found in Chapter 7

128

Alterations – Level 1

General Requirements for Level 1 Alterations

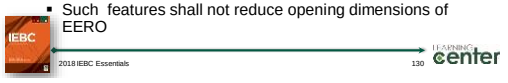
- The Guiding Principle – Work cannot make building less compliant – Section 701.2
- Differs from other levels of Alterations - only involves replacement of components
- Does not include reconfiguration of rooms or spaces
- No area limitations
- Alterations, typically, must comply with new construction requirements of IBC/IRC

129

Alterations – Level 1

General Requirements, Cont.

- In flood areas, if alteration constitutes substantial improvement, all work must comply with Section 1612 if the IBC or Section R322 of IRC – Section [BS] 701.3
- **Section 701.4 – Emergency Escape and Rescue Openings (EERO),** when required:
  - Must be openable from the inside and;
  - Security features must be openable from the inside and;
  - Require no greater force or tool for normal operations and;
  - Such features shall not reduce opening dimensions of EERO



130

Alterations – Level 1

Section 702 – Building Elements and Materials

- Newly installed interior finish materials and trim must comply with Chapter 8 of IBC.
- Materials must comply with ASTM E84 or UL 723
- Three Categories
  - Class A: Flame spread index –25; Smoke Developed index of 0-450
  - Class B: Flame spread index 26-75; smoke developed index of 0-450
  - Class C: Flame spread index 76-200; smoke developed index of 0-450

131

Alterations – Level 1

- **Foam Plastics, textiles, vinyl, HDPE, polypropylene require additional testing or have additional requirements:**
  - Some foam plastics cannot be used as an interior finish except as met additional testing of NFPA 286, FM 4880, UL 1040, tested on a foam plastic assembly
  - Some textiles can only be used where sprinkler systems are installed

132

Alterations Level - 1

Floor Finishes

- Evaluated using a radiant panel in accordance with NFPA 253
- Traditional floor coverings are exempt from testing requirements
- If building has NFPA 13 or 13R sprinkler system, floor finishes with a reduced rating are approved.

133

Alterations – Level 1

- **Floor finishes are categorized into three levels of radiant flux:**
  - **Class I:** Critical radiant flux of 0.45 watts/cm2 or greater – required in most Group "I" Occupancies unless suppressed.
  - **Class II:** Critical radiant flux of 0.22 watts/cm2 or greater - required in all other occupancies except for F, R-3, R-4 and U
  - **DOC FF-1** "pill test" (CPSC 16 CFR Part 1630)

134

TABLE 803.11
INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[a]

GROUP	SPRINKLERED[f]			NONSPRINKLERED		
	Interior exit stairways, interior exit ramps and exit passageways[b, c]	Corridors and enclosures for exit access stairways and exit access ramps	Rooms and enclosed spaces[d]	Interior exit stairways, interior exit ramps and exit passageways[b, c]	Corridors and enclosures for exit access stairways and exit access ramps	Rooms and enclosed spaces[d]
A-1 & A-2	B	B	C	A	A[g]	B[g]
A-3[e], A-4, A-5	B	B	C	A	A[g]	C
B, E, M, R-1	B	C	C	A	B	C
R-4	B	C	C	A	B	B
F	C	C	C	B	C	C
H	B	B	C[g]	A	A	B
I-1	B	C	C	A	B	B
I-2	B	B	B[g,i]	A	A	B
I-3	A	A[i]	C	A	A	B
I-4	B	B	B[g,i]	A	A	B
R-2	C	C	C	B	B	C
R-3	C	C	C	C	C	C
S	C	C	C	B	B	C
U	No restrictions			No restrictions		

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929m².

a. Class C interior finish materials shall be permitted for wainscoting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.10.1.

b. In other than Group I-3 occupancies in buildings less than three stories above grade plane, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.

c. Requirements for rooms and enclosed spaces shall be based upon spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered enclosing spaces and the rooms or spaces on both sides shall be considered one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall not be less than Class B materials.

e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.

f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

g. Class B material is required where the building exceeds two stories.

h. Class C interior finish materials shall be permitted in administrative spaces.

i. Class C interior finish materials shall be permitted in rooms with a capacity of four persons or less.

j. Class B materials shall be permitted as wainscoting extending not more than 48 inches above the finished floor in corridors and exit access stairways and ramps.

k. Finish materials as provided for in other sections of this code.

l. Applies when protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

135

Alterations – Level 1

Glazing

- Replacement Glazing in hazardous locations – Comply with IBC Section 2406 – Section 702.6
  - Doors and sidelights
  - Guards and Railings
  - Rooms or areas with wet surfaces
  - Adjacent to stairs

136

Alterations – Level 1

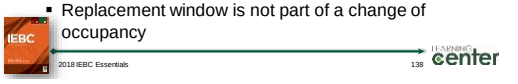
Replacement Windows

- **Section 702.4** – Must include opening control devices complying with ASTM F2090 where all of the following apply:
  - Window is operable, and
  - Replacement includes replacement of the sash and frame, and
  - In R-2 and R-3 occupancies, top of the sill of the window opening is <36" above the finished floor; in 1 & 2 family, sill is <24" above finished floor
  - Window will allow a 4" sphere to pass to pass through when window is in largest opened position
  - Height of top of the sill of the window opening above exterior grade immediately outside of window is >72"

137

Alterations – Level 1

- **Section 702.4, Exceptions**
  - Operable windows with fall protection complying with either ASTM F2006 or ASTM F2090
- **Section 702.5 – Replacement Window EERO's**
  - In R-2, R-3, 1 & 2 family dwellings and townhouses, replacement window must be the largest standard size window that will fit within the exiting frame or rough opening
  - Replacement window is not part of a change of occupancy

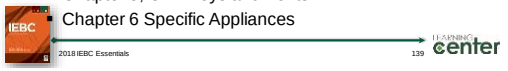


138

Alterations – Level 1

Section 702.6 – **Materials and Methods**

- All new work must comply with the applicable "I" Codes related to material standards, installation details , connections, penetrations, joints and continuity
- IEBC limits level of compliance with IFGC to:
  - Chapter 3, General Requirements except 303.7 & 306
  - Chapter 4, Gas Piping, except 401.8 and 402.3
  - Chapter 5, Chimneys and Vents
  - Chapter 6 Specific Appliances



139

Alterations – Level 1

- **Section 703** – **Fire Protection –** Any alterations must maintain level of protection provided
- **Section 704 – Means of Egress –** Any alterations must maintain level of protection provided for means of egress

140

Alterations - Level 1

Reroofing – Section 705

- Recovering or replacement of existing roof coverings must comply with Chapter 15 of the IBC
  - Minimum slope requirements are not required to meet the 2% slope requirement provided they have positive roof drainage
  - Existing secondary drainage and scuppers acceptable if they have been properly maintained; if replaced they must comply with Section 1502 of IBC
  - Structural roof components must be capable of supporting replacement covering system and material and equipment loads during installation

141

Alterations – Level 1

- **Roof Replacement –** typically includes removal of all existing layers of coverings, exposing roof deck, except for existing ice barrier. Such ice barrier must be covered with a new ice barrier membrane
- New Roof Covering over an existing roof covering is permitted where any of the following conditions are present:
  - New covering is installed per the manufacturer's instructions, or
  - Complete and separate roofing systems designed to transmit loads directly to building's structural system, or
  - Metal panels, metal shingles, concrete and clay tile installed over existing wood shakes, or
  - Roof protective coatings

142

Alterations – Level 1

Section 705.3.1.1 –
A roof cover is not permitted were any of the following conditions exist:

- The existing roof or covering is water soaked or deteriorated to such a point it will not function as the base for additional covering, or
- The existing roof covering is slate, clay cement, or asbestos-cement tile, or
- The existing roof has two or more layers of any type of roof covering

143

Alterations – Level 1

Section 705.4 – Roof Recovering

- Where application of a new roof covering occurs over an existing wood shingle or wood shake creates a concealed combustible space:
  - Existing roof covering surface must be covered with approved noncombustible material securely fastened in place prior to application of new roof covering
  - Can be gypsum board, mineral fiber, glass fiber or similar product

144

Alterations - Level 1

Structural – **Section 706**

- **Section 706.2** – Structural elements shall be replaced in accordance with IBC if any alteration increases design dead, live or snow load >5%, except:
  - Buildings of R occupancies with not more than 5 dwelling or sleeping units that complies with conventional light frame construction in accordance with IBC or IRX
  - Where increased dead load is due entirely to the addition of a second layer of roof covering weighing < 3lbs/sq.ft.

145

Alterations – Level 1

Structural, Cont.

- **Section [BS] 706.3 –** Additional Requirements for reroof permits
- **Section 706.3.1 –** Additional analysis is required to evaluate unbraced parapets in SDC D, E, or F:
  - Where > 25% of roof covering is replaced and parapets are unreinforced masonry, work shall include installation of bracing
  - Reduced seismic forces are permitted

146

Alterations - Level 1

- **Section [BS] 706.3.2 – Roofing materials must be replaced or strengthened in accordance with IBC where:**
  - > 50% of roofing materials are removed from the roof diaphragm, and
  - The building is located where the ultimate wind design is >115 mph, and
  - The diaphragm and building connections are not capable of resisting 75% of those wind loads

147

Alterations – Level 1

Energy Conservation

- IEBC does not require entire building to comply with IECC when level 1 alterations are being conducted.
- The work associated with level 1 alterations must comply with IECC if applicable such as replacing windows or replacement of light fixtures.

148

Alterations – Level 2

- This level alteration are work areas that involve reconfiguration of rooms or areas
- The aggregate area of work areas of level 2 alterations must be < 50% of the overall building area.
- Requirements for Alteration level 2 are found in Chapter 8 of the IEBC

149

Alterations – Level 2

General

- **Section 801.2 –** Requirements of level 1 alterations are to be complied with when conducting level 2 alterations (incremental approach)
- **Section 801.1, ex.** Reconfiguration work that is solely for accessibility compliance only need comply with level 1 alterations

150

Alterations - Level 2

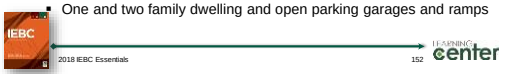
General, Cont.

- **Section 801.3 –** The Guiding Principal for Level 2 Alterations is that new work will comply with the IBC, except:
  - Where windows are added-not required to meet light and ventilation
  - Newly installed electrical equipment shall comply with Section 807
  - Length of dead-end-corridors only required to meet Section 805.7
  - Ceiling height of newly created habitable areas and corridors can be 7'
  - Newly installed escalators in below-grade transportation stations can have a clear width of 32"
  - New Structural members and connections shall be permitted to comply with Section 302

151

Alterations – Level 2

- **Section 802 – Building – Elements and Materials**
- **Section 802.2.1 – Vertical Openings**
- All existing vertical openings connecting two or more floors must be enclosed with approved assemblies of one-hour fire-resistance-rated construction and approved protected openings.
- Includes 14 exceptions:
  - When not required by IBC
  - Most exceptions for installation of fire protections systems; height and area limitations, etc.
  - One and two family dwelling and open parking garages and ramps



152

Alterations – Level 2

Section 802.2.2 – Supplemental Shaft and Floor Opening Enclosure Requirements

- Work area on any building story exceeds 50 percent of that gross floor area,
- Enclosure requirements of IEBC Section 803.2 apply to all vertical openings throughout the entire floor
- Apply only to portion of vertical openings on the floor where work area is located
- Does not apply to Stairways or vertical openings in tenant spaces entirely outside the work area.

153

Alterations – Level 2

Section 802.2.3 – Supplemental Stairway Enclosure Requirements

- When the work area on any building story exceeds 50 percent of that gross floor area, stairways serving mean of egress for the work area must:
  - Be enclosed with smoke tight construction.
  - Must be enclosed on highest work area story and all stories below.
  - Openings must be smoke protected assemblies but not fire protection rated.
  - Such Protectives must be self closing upon activation of fire alarm system.

154

Alterations – Level 2

Section 802.3 – Smoke Compartments

- I-2 Occupancies - long term health care occupancies work areas
- Work area is located on a building story used for sleeping rooms
- More than 30 patients
- Story must be divided into at least two smoke compartments
- Must be divided with smoke barriers in accordance with Section 407.5 of the IBC

155

Alterations – Level

Smoke Compartments, cont.

- Area limitations
  - 22,500 gsf for Group I-2 Condition 1 (long term care)
  - 40,000 gsf for Group I-2 Condition 2 (acute care facilities)
  - 200 ft travel distance limitation to an exit access door in accordance with IBC

156

Alterations – Level 2

Section 802.4 – Interior Finish on walls and ceilings within exits and corridors in any work area must:

- Comply with interior finish requirements of the IBC.
- Materials that do not comply shall be permitted to be treated with an approved fire-retardant coating.
- Treatment must comply with the manufacturer's instructions.

157

Alterations – Level 2

Section 802.4.1 – **Supplemental Interior Finish Requirements**

- Aggregate of work areas on any building story >50\% of the gross floor area of that story.
- Interior finish requirements of Section 803.4 apply to all exits and corridors, throughout the entire story containing the work area.
  - Except for interior finish within occupied tenant spaces on that story that are entirely outside of the work areas.

158

Alterations – Level 2

Section 802.5 – Guards

- Requirements for guards are found in Section 802.5 & 805.11 (means of egress)
- **Section 802.5.1 –** Guards shall be provided where portions of a Level 2 Alterations work area:
  - Are more than 30 inches above the floor or exterior grade, and
  - Do not have a guard, or
  - The existing guards are considered to be in danger of failure

159

Alterations – Level 2

Guards, Cont.

- **Section 802.5.2 –** Guards must comply with the prescriptive requirements of the IBC for new guards, including height, baluster spacing and impact resistance
- **Section 805.11 – Guards –** requirements of 802.5 are extended to all means of egress paths leading from all work areas to, and including the level of exit discharge

160

Alterations – Level 2

Section 802.6 – Fire Resistance Ratings

- Where a complete automatic, supervised sprinkler system installed in accordance with NFPA 13 or NFPA 13R, as applicable, has been added;
  - Where approved by the code official.
  - Required fire-resistance ratings of the existing structural elements of the building are deemed to meet the requirements of the current building code.
  - Construction documents shall be submitted to indicate which building elements and materials that the applicant wants the code official to evaluate for compliance with the fire resistance requirements of the IBC.

161

Alterations – Level 2

Section 803 – Fire Protection – General

- **Section 803.2.4** – Where fire suppression systems are installed for level 2 alteration projects, they must be supervised by one of the following methods in accordance with NFPA 72:
- Approved central station, or
- Approved proprietary system, or
- Approved remote station system of the jurisdiction, or
- Approved local alarm service where approved by the code official

162

Alterations – Level 2

Exceptions to Section 803.2.4

- Supervision is not required for the following systems since these systems are not required to be supervised by the IBC:
  - Underground gate valve with roadway boxes
  - Halogenated extinguishing systems
  - CO2 extinguishing systems
  - Dry and wet-chemical extinguishing system

163

Alterations – Level 2

Section 803.1.1 – Corridor Rating

- Rating of the corridor can be reduced in accordance with IBC if an automatic fire sprinkler system is installed throughout the floor.
- Sprinkler coverage throughout the story must also extend coverage to the stairway landings at the floor and intermediate landing immediately below.

164

Alterations – Level 2

Section 803.2.1 – Automatic Sprinkler Systems in High-Rise Buildings

- Automatic Sprinkler System shall be added where work areas:
  - Have exits or corridors shared by more than tenant
  - Having exits or corridors serving an occupant load of more than 30
  - Are located on a building story that has an adequate water supply from an existing standpipe or sprinkler riser serving that story
- **Section 803.2.1.1 – Supplemental Requirements**
  - Work Area >50% of aggregate area of floor
  - Sprinkler protection must be provided throughout the entire story
  - Occupied Tenant Spaces outside work area are exempt

165

Alterations – Level 2

Section 803.2.2 – Groups A, B, E, F-1, H, I, R-1, R-2, R-4 and S occupancies – Automatic Fire Sprinkler System required for Alterations level 2, where the work area:

- Includes Work areas involving exits and corridors shared by multiple tenants and having an occupant load of >30
- Work area is required to have automatic sprinkler protection where required by the IBC for new construction, and
- The work area or aggregate of the work areas exceeds 50 percent of the gross floor area of that specific story

166

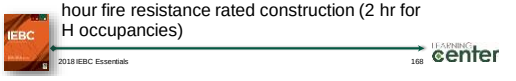
Alterations – Level 2

- **Exception to Section 803.2.2**
  - The building does not have adequate water supply available without the installation of a fire pump
  - If an automatic fire suppression system cannot be installed, the work area must be provided with a complete automatic smoke detection system
  - The automatic smoke detection system must be installed throughout all occupiable spaces except for sleeping units or individual dwelling units

167

Alterations – Level 2

- **Section 803.2.2.1 –** Automatic Sprinkler systems in Mixed Occupancies
- Work areas with different occupancies and one or more are required to be protected with automatic fire sprinkler system in accordance with Section 803.2.2:
  - Protection is not required throughout the work areas provided the protected occupancies are separated from the other occupancies not protected with a 1 hour fire resistance rated construction (2 hr for H occupancies)



168

Alterations – Level 2

Section 803.2.3 – Windowless stories

- Work areas in windowless stories that are required to be protected in accordance with the IBC, must be sprinklered provided the building has sufficient water supply without the installation of a fire pump.

169

Alterations – Level 2

Section 803.3 – Standpipes

- Standpipe systems are required where work areas:
  - Involve exits or corridors shared by multiple tenants
  - Are located on a building story more than 50 ft (15.24 m) above or below the lowest level of fire department vehicular access
  - The standpipe system must have hose connections from the highest story containing a work area down to the lowest level of fire department access
  - Conversely the standpipe system must have hose connections from the lowest story containing a work area up to the lowest level of fire department access where work areas are more than 50 ft. below lowest level of fire department access

170

Alterations – Level 2

Standpipe design

- Fire pump is not required provided the standpipe installed can:
  - accept the delivery by fire department apparatus of not less than 250 gpm at 65 psi to the topmost floor in buildings equipped with an automatic fire sprinkler system, or
  - Not less than 500 gpm at 65 psi to the top most floor in all other buildings
  - Interconnection of multiple risers shall not be required

171

Alterations – Level 2

Section 803.4 – Fire Alarm and Detection

- Fire alarm systems are driven by type of occupancy
- Requirements of alterations level 2 are limited to work areas but may extend beyond the work areas
- General – Smoke detectors must be used unless prohibited by their listing – boiler rooms
- Must be installed in accordance with NFPA 72

172

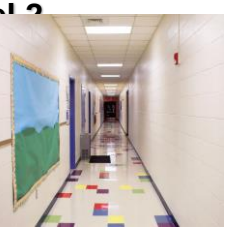
Alterations – Level 2

Section 803.4.1 – Occupancy Requirements

- Existing previously approved fire alarm systems are allowed to remain.
- That portion of an existing fire alarm system within the Level 2 Alterations work areas must comply with current requirements of the IBC and NFPA 72.
- Existing alarm-notification devices shall be automatically activated throughout the building
- When the existing building is not provided with a fire alarm system, but the requirements of IEBC Section 803.4.1 require occupant notification within the work area, alarm notification devices shall be provided.

173

Alterations – Level 2



Sections 803.4.1.1 – Section 803.4.1.6

- Group E, I-1, I-2, I-3, R-1, and R-2 – Fire Alarm Systems shall be installed in work areas in accordance with the International Fire Code.
- The International Fire Code contains retro active requirements of Chapter 11 of that code

174

Alterations – Level 2

Section 803.4.2 – Supplemental Fire Alarm System Requirements

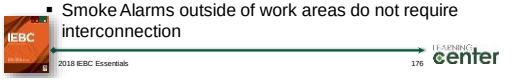
- When a fire alarm system is required, and
- The aggregate of Level 2 Alterations work areas on a floor exceed 50 percent of the gross area of that specific floor, then
- The fire alarm system must be provided throughout that entire story
  - Except for occupied tenant spaces located entirely outside of the work area.

175

Alterations – Level 2

Section 803.4.3 – Smoke Alarms are required in work areas in group R occupancies and I-1 care/assisted living facilities in:

- Individual sleeping areas
- Individual dwelling units
- Smoke Alarms must be installed in accordance with IFC
- Interconnection of smoke alarms within living units is required
- Smoke Alarms outside of work areas do not require interconnection



176

Alterations – Level 2

Section 804 – Carbon Monoxide Detection

- Carbon monoxide is colorless, tasteless, and odorless and is a product of combustion
- Effects of carbon monoxide poisoning can include:
  - Headaches, confusion and dizziness in lower concentrations
  - Loss of consciousness and potential death in higher concentrations
  - Dangerous levels exceed 100 parts per million

177

Alterations – Level 2

- Carbon monoxide detection requirements are new to the 2018 IEBC.
- Must be installed in Level 2 Alterations work areas in institutional health care and residential facilities where required by the IFC for existing Group I-1, I-2 and R occupancies.

178

Alterations – Level 2

Section 805 – Means of Egress

- Means of egress are driven by the type of occupancy.
- These requirements are limited to Level 2 Alterations work areas that include exits or corridors shared by more than one tenant
- **Section 805.2 General**
  - IEBC allows provisions of NFPA 101 Life Safety Code as an alternative
  - Where permitted by the local code official, means of egress complying with the requirements of the building code under which the building was constructed is permitted

179

Alterations – Level 2

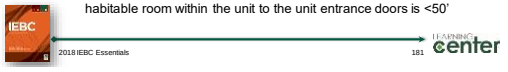
Section 805.3 – Number of Exits

- # of Exits in every story where work areas are located must comply with IBC Chapter 10:
  - Based on Occupancy, and
  - Occupant Load of that story
  - Existing conditions outside of work area can remain provided it is an existing approved condition

180

Alterations – Level 2

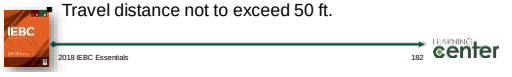
- **Section 805.3.1.1 – Single Exit Buildings** – can be permitted spaces, any story, or any occupied roof the following exists:
  - Compliance with Tables 805.3.1.1(1) and 805.3.1.1 (2)
  - In R-1 or R-2 non-sprinklered occupancies, individual single-story dwelling or sleeping units where:
    - Occupant load is <10 and exit access travel distance within unit is <75 feet
    - The Building is not more than three stories
    - All third story space is part of dwelling unit with an exit access doorway on second story
    - The portion of the exit access travel distance from door to any habitable room within the unit to the unit entrance doors is <50'



181

Alterations – Level 2

- Group R-2 Occupancy, a single exit is permitted from the basement, first or second story above grade provided every sleeping room has an EERO of:
  - At least 5 sq. ft. with
  - A minimum height of 24 inches with
  - A minimum width of 20 inches
  - A maximum sill height of 44 inches above finished floor
  - Travel distance not to exceed 50 ft.



182

Alterations – Level 2

Section 805.3.1.1 – Single Exit Buildings, cont.

- R-2 occupancies of any number of stories with <4 dwelling units/floor
- Served by an interior stairway
- With a smokeproof enclosure or an exterior stairway as an exit
- Where the portion of of the exit access travel distance from the dwelling unit entrance door to the exit is < 20 feet

183

Alterations – Level 2

Section 805.3.1.2 – Fire Escapes

- Fire escapes are allowed for means of egress except for health care occupancies – only when two or more exits are required
- Not permitted for new construction/have not been in IBC since its creation
- Newly constructed fire escapes only allowed when an exterior stair cannot be constructed due to existing alleys, sidewalks or property lines

184

Alterations – Level 2

Section 805.3.2 – Mezzanines

- Located in work areas and having an occupant load of >50 people or where travel distance >75'
- Must have access to at least two remotely located means of egress
- Travel distance can be increased to 50' where a sprinkler system is installed per NFPA 13 or 13 R where applicable
- IEBC does not have different thresholds for different occupancies like IBC

185

Alterations – Level 2

- **Section 805.3.2 – Main Entrance – Group A occupancies**
- Assembly occupancy with >300 occupant load
- Main entrance must be capable of providing 50% of total occupant load
- If main exit is not defined, exits must be distributed around perimeter of building and must provide 100% of required total capacity

186

Alterations – Level 2

Section 805.4 - Egress Doorways

- Includes requirements when two exits are required
- Limited to work areas that include exits or corridors shared by more than one tenant
- Section 805.4.1.1 - Two exits required when works areas include rooms or spaces with an occupant load of more than 50 people or where the travel distance to reach an exit exceeds 75 ft
- Storage rooms only require one exit when occupant is <10

187

Alterations – Level

Section 805.4.1.2 – Group I-2 – In buildings containing a health care occupancy

- Patient sleeping room or patient sleeping suite greater than 1,000 ft2 (93 m2) within a Level 2 Alterations work area requires a remotely located second means of egress from the room or suite.

188

Alterations – Level 2

Section 805.4.2 – Door Swing

- Any doors located in level 2 Alterations work area and along the path of travel from the work areas to the exit discharge, serving an occupant load >50 people, must swing in the direction of egress
- Section 805.4.2.1 – Supplemental Requirements

189

Alterations – Level 2

Section 805.4.3 – Door Closing

- Any doors located within a Level 2 Alterations work area and opening into an exit enclosure (exit passageway, exit ramp, or exit stairway) must be self-closing or automatic-closing by listed closing devices.
  - Except occupied tenants outside work area
- **Section 805.4.3.1 – Supplemental Requirements**

190

Alterations – Level 2

Section 805.4.4 – Panic Hardware

- Egress doors in Assembly occupancies with latching devices in level 2 Alterations work area, in the path of travel to the exit discharge, with an occupant load >100 must have panic hardware
- **Section 805.4.4.1 - Supplemental Requirements and exception**

191

Alterations – Level 2

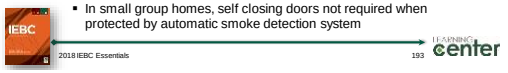
Section 805.5 – Openings in Corridor Walls

- Requirements are triggered where work areas include exits or corridors shared by more than one tenant
  - **Section 805.5.1 –** Doors shall not be constructed of hollow core wood and shall contain louvers
  - Doors to dwelling units and sleeping units in work areas in residential occupancies (Group R-1 and R-2) and large assisted living facilities (Group I-1) must not be less than 1 3/8-inch (35 mm) thick solid wood core door or equivalent construction.
  - Glazing must be approved glazing or wired glass in metal frames
  - Doors must be self closing

192

Alterations – Level 2

- Doors, cont.
  - Any replacement corridor doors must not be less than 1 ¾-inch (44 mm) thick solid wood core door or equivalent construction unless the existing door frame can only accept a 1 3/8-inch (35 mm) thick door.
  - Doors having a minimum 20-minute fire protection rating are considered equivalent construction
  - Except:
    - Existing corridor doors that provide fire protection rating of not less than 15 minutes
    - Existing corridor doors when building protected with automatic sprinkler system
    - In small group homes, self closing doors not required when protected by automatic smoke detection system



193

Alterations – Level 2

Section 805.5.2 – Transoms –

- In shared exit access corridors, existing transoms in work areas in R-1 and R-2 occupancies and large assisted living facilities of I-1 and health care occupancies of I-2 occupancies:
- Must have fixed glazing with the same fire protection rating as required for corridors, or
- Transom opening must be sealed with materials consistent with the corridor construction

194

Alterations – Level 2

Section 805.5.3 – Other Corridor Openings

- In any work area, any other sash, grille, or opening in a corridor shall be sealed with materials consistent with the corridor construction
- Supplemental requirements with exception

195

Alterations – Level 2

Section 805.6 – Dead end corridors – in Level 2 Alterations work areas:

- Cannot exceed 35 feet unless permitted by IBC
- In other than H occupancies and Assembly occupancies
  - An existing dead-end corridor can be a maximum of 50 ft if building is equipped with throughout with an automatic fire alarm system installed n accordance with the IBC
  - An existing dead corridor can be a maximum of 75 ft (21.36 m) if the building is equipped throughout with an automatic sprinkler system installed in accordance with the IBC.

196

Alterations – Level 2

Section 805.7 – Means of Egress lighting - Level 2
Alterations work areas must have means of egress lighting in accordance with the IBC for new construction

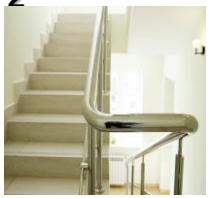
- Supplemental Requirements with exception

- Section 805.8 – Exit Signs - Level 2 Alterations work areas must have exit signs in accordance with the IBC for new construction
- Supplemental Requirements with exception

197

Alterations – Level 2

- **Section 805.9 –** Handrails - Every existing exit stairway that serves as a means of egress to a Level 2 Alterations work area and has at least three risers must have a minimum of one handrail.
- Where existing stairways do not have a handrail or the existing handrails are considered to be in danger of failure, not less than one handrail complying with the prescriptive requirements of the IBC for new handrails must be provided.



198

Alterations – Level 2

Section 805.10 – Refuge Areas – Ambulatory care, health care and institutional occupancies that follow a defend-in-place strategy use smoke compartments to provide a refuge area for horizontal movement of occupants in the event of a fire.

- Reconfigured work areas uses as refuge areas cannot reduce capacity as required by IBC

199

Alterations – Level 2

Section 806 – Structural

- Existing Structural Elements Resisting Lateral Loads - The Building Structure must meet Section 1609 and 1612 of the IBC when level 2 Alteration work areas causes:
  - An increase in design lateral loads, or
  - The alteration creates prohibited structural irregularity as defined in ASCE 7, or
  - Where the alteration decreases the existing capacity of any lateral load-carrying structural element,
  - Reduced seismic loads are allowed using the evaluation of the demand-capacity ratios

200

Alterations – Level 2

Section [BS] 806.4 – Voluntary Lateral Force-Resisting System Alterations

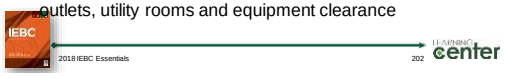
- Voluntary structural work intended to improve existing lateral force-resisting system, is not required to meet the IBC provided:
- The capacity of existing structural systems is not reduced, and
- Any new structural elements, whether connecting to existing or new structural elements, must comply with the IBC for new construction, and
- New or relocated non-structural elements, whether connecting to existing or new structural elements, must comply with the IBC for new construction, and
- The alterations cannot create a structural irregularity as defined by ASCE 7 or make any existing structural irregularity more severe

201

Alterations – Level 2

Section 807 – Electrical

- New electrical equipment and wiring related to Level 2 Alteration work areas must comply with the applicable requirements of the NEC (NFPA 70)
- Existing wiring in A-1, A-2, A-5, H, and I occupancies shall be upgraded to comply with Chapter 7 requirements for materials and methods
- Requirements for certain residential occupancies (Group R-2, R-3 and R-4) that are regulated by the International Residential Code (IRC); kitchens, laundry areas, lighting outlets, utility rooms and equipment clearance



202

Alterations – Level 2

Section 808 – Mechanical

- Alteration level 2 work areas where spaces are reconfigured into habitable or occupiable spaces must provide natural or mechanical ventilation in accordance with the IMC

203

Alterations – Level 2

Section 809 – Plumbing

- When the occupant load of a building story is increased by more than 20 percent as a result of Level 2 Alterations work
- Plumbing fixtures for that story only must be provided as required by the International Plumbing Code (IPC) based on the increased occupant load.

204

Alterations – Level 2

Section 810 – Energy Conservation

- Level 2 Alterations to existing buildings do not require the entire building to comply with the energy requirements of the International Energy Conservation Code (IECC) or IRC.
- The work associated with the Level 2 Alteration project must comply with the IECC for new construction

205

Alterations – Level 3

General

- Alterations Level 3 – Work areas that are > 50% of the overall building area,
- Requirements are found in Chapter 9,
- Additional Building Features are triggered beyond the actual work areas and other parts of the building where no alterations are planned,
- Guiding principle is that level 3 Alterations will comply with the IBC but remainder of the building can remain as it,

206

Alterations – Level 3

General, Cont.

- It is presumed that the existing building is an approved structure

Section 901.2 – Compliance

- The requirements of Level 1 Alterations (Chapter 7 of the IEBC) and Level 2 Alterations (Chapter 8 of the IEBC) are also required to be met, as applicable
- The requirements of IEBC Sections 802 (Building Elements and Materials), 803 (Fire Protection) and 804 (Carbon Monoxide Detection) apply within all Level 3 Alterations work areas regardless if they share means of egress with other tenants and regardless of occupant load.

207

Alterations – Level 3

Section 902 - Special Use and Occupancy

- **Section 902.1 – High Rise Buildings –** Recirculating air or exhaust systems with a capacity of >15,000 CFM shall be equipped with smoke or heat detection devices in accordance with the IMC
- **Section 902.1.2 –** Elevators for public use serving work areas – with a travel distance in excess of 25', above or below main floor or the level for emergency response and access-shall be provided with emergency operations in accordance with ASME A17.3.
- New Elevators shall be provided with Phase I and Phase II operations

208

Alterations – Level 3

Special Use and Occupancy, Cont.

Section 902.2 – Boiler and Furnace Equipment Rooms

- Must be enclosed with a minimum of 1hr. rated fire resistance construction in I-1, I-2, I-4, R-1, R-2 and R-4 occupancies, except:
- Steam boiler equipment operating at pressures of 15 psig or less (103.4 kPa) is not required to be enclosed, or
- Hot water boilers operating at pressures of 170 psig or less (1171 kPa) are not required to be enclosed, or
- Furnace and boiler equipment with capacity of 400,000 Btu (4.22 x 108 J) per hour input rating is not required to be enclosed, or
- Furnace and boiler rooms protected with automatic sprinkler system are not required to be enclosed.

209

Alterations – Level 3

Section 903 – Building Elements and Materials

- **Section 903.1 – Existing Shafts and Vertical Openings**
  - Existing stairways that are part of the building means of egress must be enclosed as required by IEBC Section 802.2.1 (Existing Vertical Openings) from the highest story containing a work area down to, and including, the level of exit discharge and all floors below the level of exit discharge.

210

Alterations – Level 3

- **Section 903.2 – Fire Partitions in Group R-3**
  - Where work area is in any attached dwelling unit or multiple single-family dwelling (townhouse)
  - Walls separating dwelling units that are not continuous from foundation to underside of roof sheathing
  - Shall be constructed to provide such separation using construction materials consistent with existing wall or must comply with requirements for new construction
  - Work shall be performed on the side of the dwelling unit wall

211

Alterations – Level 3

- **Section 904** – **Fire Protection**
- **Section 904.1 – Automatic Sprinkler Systems** are required in Alterations Level 3 as required for Level 2. In addition, Automatic Sprinkler Systems shall be provided:
  - In High Rise buildings when the building has sufficient water supply for the design and installation of the system, to the site. Section 904.1.1
  - In Rubbish and Linen Chutes located within the work area if required for rubbish and linen chutes by the IBC. Section 904.1.2
  - In work areas in occupancy groups where upholstered furniture and mattresses are manufactured, stored or displayed for display or sale

212

Alterations – Level 3

- **Section 904.2 – Fire Alarm and Detection**
  - Fire alarm and detection systems must be provided in compliance with IBC 907 (Fire Alarm and Detection Systems) as required for new construction.
  - **Section 904.2.1 – Manual Fire Alarm Systems** – Where required by the IBC for a specific occupancy, must be provided throughout the work areas.
  - The fire alarm system is not required to be extended into existing occupied tenant spaces on those floors that are located entirely outside of the work areas

213

Alterations – Level 3

Section 904.2.2 – Automatic fire detection

- When required by the IBC for new construction, automatic fire detection must be provided throughout the work area

214

Alterations – Level 3

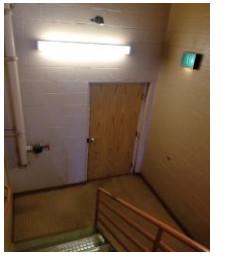
Section 905 – Means of Egress

- The means of egress in a Level 3 Alterations project must comply with IEBC Section 805 (Means of Egress) for Level 2 Alterations and apply within all Level 3 Alterations work areas
  - regardless if they share means of egress with other tenants and regardless of occupant load

215

Alterations – Level 3

- **Section 905.2 – Means of Egress Lighting**
  - Is required from the highest work area floor to the floor of exit discharge within the exit enclosure in accordance with IBC.
- **Section 905.3 – Exit Signs**
  - Is required in the Means of Egress from the highest work area floor to the floor of exit discharge in accordance with IBC.



216

Alterations – Level 3

- **Structural** – **Section 906.2 – Existing Structural Elements resisting lateral loads**
  - When Substantial Structural Alterations are being made, the lateral load-resisting system of the altered building must be evaluated and shown to comply with IBC Sections 1609 (Wind Loads) and 1613 (Earthquake Loads). Reduced seismic forces are allowed to be used as part of the design. Except:
    - Residential buildings where <5 dwelling or sleeping units are altered using the light-frame construction methods of the IBC or complying with the provisions of the IRC.
    - If the intended alteration only involves the lowest story of a building, only the lateral load-resisting components of this story and below need to comply. The remaining upper portion of the building can remain as is.

217

Alterations – Level 3

- **Section 906.3 – SDC F –** is the most severe seismic classification and consequently, buildings are at a high risk for damage in a seismic event.
  - the lateral load-resisting system of the altered building must be evaluated and shown to comply with IBC Sections 1609 (Wind Loads) and 1613 (Earthquake Loads). Reduced seismic forces are allowed to be used as part of the design.

218

Alterations – Level 3

Section 906.4 – Anchorage for Concrete and Masonry Buildings

- Alteration Level 3 work areas in buildings located in SDC D, E, or F, and the building has a structural system incorporating concrete or reinforced masonry walls with a flexible roof diaphragm, must include installation of additional anchors at the roof line and floor lines

219

Alterations – Level 3

- **Section 907 – Energy Conservation**
- Level 3 Alterations to existing buildings do not require the entire building to comply with the energy requirements of the International Energy Conservation Code (IECC).
- The work associated with the Level 3 Alteration project must comply with the IECC for new construction.

220

Change of Occupancy

Chapter 10 – Change of Occupancy – General

- The requirements of Chapter 10 are typically in addition to the requirements of Chapters 7, 8, and 9 (Incremental Approach)
- **Section 1001.2.1** – Change of Use is typically repurposing a space within the same occupancy group or classification – Must Comply with Sections 1002 - 1010
- **Section 1001.2.2** – Change of Occupancy Classification or Group is usually easier to comprehend. It is a change in either classification or group – Must Comply with Sections 1002 - 1011

221

Change of Occupancy

General, Cont.

- **Section 1001.2 – Change of Occupancy** within a building that results in a different fire protection system requirement of Chapter 9 of the IBC – Requires Approval of the Code Official and a new Certificate of Occupancy issued once requirements are met
- **Section 1001.3 –** A new certificate of occupancy shall be issued once requirements associated with the new change of occupancy classification have been met.

222

Change of Occupancy

Section 1002 – Special Use and Occupancy –

- The IEBC requires compliance with the IBC for any building or portion of a building that changes to one of the special uses identified in Chapter 4 of the IBC which include:

Covered or open malls	Special Amusement Buildings
Atriums Incidental Use Areas	Hazardous Materials
Motor Vehicle-related occupancies	Ambulatory Care Facilities
Motion picture projection rooms	Group I-2 Occupancies
Stages and Platforms	Underground Buildings

223

Change of Occupancy

- **Section 1003.1 – Building Elements and Materials –** Buildings or portions thereof, undergoing a Change of Occupancy Classification must comply with Section 1011.
- **Section 1004.1 – Fire Protection – Buildings or Portions** thereof, undergoing a Change of Occupancy Classification, must comply with Section 1011 or
- Where there is a change of occupancy within a space where there is a different fire protection threshold of chapter 9 of the IBC, must comply with Section 1011

224

Change of Occupancy

Section 1005.1 – Means of Egress

- A building or a portion of a building undergoing a Change of Occupancy classification must comply with IEBC Section 1011 (Change of Occupancy Classification

225

Change of Occupancy

- **Section 1006 – Structural –** For purposes of Structural Requirements, Change of Occupancy Classification is considered a Change of Occupancy
- **Section 1006.1 – Live Loads**
  - Structural Elements carrying live loads must comply with design live loads of the IBC Section 1607 for new occupancy
  - Design Live loads for remainder of building not included in the Change of Occupancy can continue as previously approved
  - Structural elements whose demand-capacity ratio based on the Change of Occupancy is <5 percent greater than the demand-capacity ration based on the previously approved design live loads are allowed to remain as is and do not need to comply with IBC Section 1607.

226

Change of Occupancy

Section [BS] 1006.2 – Snow and Wind Loads

- When a Change of Occupancy results in the building being assigned to a higher risk category (Section 1604.5 of IBC), the building structure must comply with IBC Section 1608 (Snow Loads) and Section 1609 (Wind Loads) based on the new risk category.
  - There is an exception for when the area of the new occupancy is less than 10 percent of the building area; the existing building structure is allowed to remain as is.

227

Change of Occupancy

Section [BS] 1006.3 Seismic Loads

- When a Change of Occupancy results in the building being assigned to a higher risk category, the building structure must comply with IBC Section 1613 (Earthquake Loads) based on the new risk category. Except:
  - The area of the new occupancy is <10% of building area and risk category is not level IV, existing building can remain as is
  - When Change of Occupancy results in the building being reclassified from Risk Category I to Risk Category II or from Risk Category II to Risk Category III and the seismic coefficient SDS is less than 0.33,
  - Unreinforced masonry bearing wall buildings assigned to Risk Category III and Seismic Design Category A or B can use Appendix A1 of the IEBC

228

Change of Occupancy

Section 1007 – Electrical

- The IEBC requires compliance with the applicable requirements of the NEC (NFPA 70) for a building or a portion of a building that changes to one following special use or occupancy categories:
- Places of Assembly Theaters, motion picture and TV studios
- Bulk Storage Plants Spray Application, dipping and coating
- Commercial Garages Gasoline dispensing and service stations
- Aircraft Hangars Hazardous locations Healthcare facilities
- Motion Picture projection rooms Agricultural Buildings

229

Change of Occupancy

- **Section 1007.2 Unsafe conditions –** Whenever the occupancy of a building is changed all unsafe electrical conditions shall be corrected in accordance with NFPA 70
- **Section 1007.3 – Service Upgrades –** Whenever the occupancy of a building is changed, the service shall be upgraded to meet the requirements of NFPA 70
- **Section 1007.4 – Number of Electrical Outlets** – Whenever the occupancy of a building is changed, the number of electrical outlets shall comply with NFPA 70 for the new occupancy

230

Change of Occupancy

- **Section 1008.1 – Mechanical –** A building or a portion of a building undergoing a Change of Occupancy classification or undergoing a Change of Occupancy where there is an increased kitchen exhaust requirement or an increased mechanical ventilation requirement must comply with the respective chapters of the IMC based on the new occupancy.

231

Change of Occupancy

- **Section 1009 – Plumbing –** When the plumbing fixture account is increased or the water supply requirements are increased due to a change in occupancy or change in occupancy classification, the new occupancy shall comply with the IPC
- **Section 1009.2 – Food Handling occupancies –** If the new occupancy is a food-handling facility, all existing sanitary waste lines located above preparation or storage areas must be panned or otherwise protected to prevent leaking or condensation from contaminating the food and/or drink.

232

Change of Occupancy

Section 1009.2 – Food Handling occupancies, cont.

- New drainage lines must not be installed above preparation or storage areas and must be protected per the IPC for new construction. I
- **Section 1009.3** – If the facility will produce grease or oil-laden wastes, interceptors must be provided in compliance with the IPC.
- **Section 1009.4 – Chemical Waste –** piping must be compatible with the chemical waste or waste must be neutralized prior to entering the drainage system

233

Change of Occupancy Classification

General – Change of Occupancy Classification

- Change of Occupancy classification is a change from one IBC group or sub-group to another group or sub-group.
- **Section 1011.1.1.1** – Change of occupancy classification for a portion of the existing building without separation in accordance with IBC Section 508.3, the entire building must comply with Chapter 9 of the IBC and IEBC Section 1011

234

Change of Occupancy Classification

- **Section 1011.1.1.2** – Where a portion of an existing building is changed to a new occupancy classification and the building follows a separated mixed-use approach as detailed in IBC Section 508.4, only the new occupancy areas must comply with the applicable occupancy requirements of Chapter 9 based on the new occupancies present in the building and with the requirements of IEBC Section 1011.
- Remainder of the building must be separated with fire barriers and/or rated horizontal assemblies per the IBC Table 508.4

235

Change of Occupancy Classification

- **Section 1011.2 – Fire Protection Systems –** A building or portion of a building undergoing a change of occupancy classification must comply with the fire protection thresholds for the new occupancy as required by Chapter 9 of the IBC and installed throughout the new occupancy

236

Change of Occupancy Classification

Section 1011.2.2 – Fire Alarm and detection

- Where there is a change of occupancy classification, and there is a different threshold for the new occupancy in accordance with Chapter 9 of the IBC for fire alarm and detection systems to be added, such system shall be provided throughout the area where there is a change of occupancy.
- Any existing fire alarm appliances must be automatically activated throughout the building

237

Change of Occupancy Classification

- **Section 1011.3 – Interior Finish** – In areas of a building undergoing a Change of Occupancy classification, the interior wall and ceiling finishes and floor finishes must comply with interior finish requirement Chapter 8 of the IBC based on the new occupancies.

238

Change of Occupancy Classification

Section 1011.4 – Means of Egress – General

- All of the occupancy classifications are grouped based on their relative risk with regards to the requirements for means of egress and must comply with IEBC Table 1011.4.
- Occupancies with hazardous materials and defend-in-place protocols are the greatest risk
- Non-residential occupancies with minimal fuel loads are and low density occupant loads are considered the lowest risk

239

Change of Occupancy Classification

Means of Egress Hazard Categories

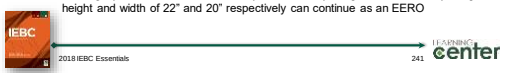
Relative Hazard	Occupancy Classification
1 (Highest Hazard)	H
2	I-2, I-3, I-4
3	A, E, I-1, M, R-1, R-2, R-4 Condition 2
4	B, F-1, R-3, R-4 Condition 1, S-1
5	F-2, S-2, U

240

Change of Occupancy Classification

Means of Egress – Change of Classification to a Higher Hazard

- **Based on Table 1011.4 –** Means of egress requirements must comply with chapter 10 of the IBC for the new occupancy, except
  - Enclosure of Stairways is permitted to comply IEBC Sect. 903.1
  - When approved by Code Official – Existing Stairways, including guards and handrails, complying with Chapter 9 of IEBC can continue
  - New stairways slope and pitch, rise and tread, when restricted by existing construction, can remain as previously constructed
  - Existing corridor walls of wood lath and plaster can remain or ½" gypsum wallboard
  - Existing Corridor openings can remain where permitted by IEBC Section 805.5
  - Existing dead-end corridors only need to meet requirements of IEBC Section 805.6
  - Existing operable windows with >4 sq. ft. of clear opening and minimum opening height and width of 22" and 20" respectively can continue as an EERO

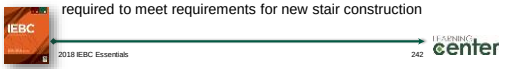


241

Change of Occupancy Classification

Section 1011.4.2 – Means of Egress for a change of use to an equal or lesser hazard – Based on Table 1011.4

- The existing means of egress components that are proposed to remain must meet the requirements of IEBC Section 905 for the new occupancies.
- Newly constructed or reconfigured means of egress for the new occupancy areas must comply with Chapter 10 of the IBC for new construction.
- Exception: where the pitch and slope cannot be made code compliant with new requirements due to the existing building construction is not required to comply with the IBC. The stair riser heights and tread depths can remain as is and are not required to meet requirements for new stair construction



242

Change of Occupancy Classification

- **Section 1011.4.3 – Egress Capacity –** Egress capacity for the building must meet or exceed the calculated occupant load of the new occupancies and the existing occupancies based on the requirements of the IBC

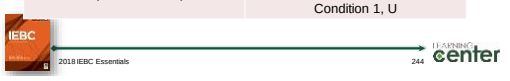
243

Change of Occupancy Classification

- **Section 1011.5** – **Height and Areas –** Hazard categories due to height and area shall be in accordance with Table 1011.5.

TABLE 1011.5
Heights and Areas Hazard Categories

RELATIVE HAZARD	OCCUPANCY CLASSIFICATION
1 (Highest Hazard)	H
2	A-1, A-2, A-3, A-4, I, R-1, R-2, R-4, Condition 2
3	E, F-1, S-1, M
4 (lowest hazard)	B, F-2, S-2, A-5, R-3, R-4, Condition 1, U



244

Change of Occupancy Classification

- **Section 1011.5.1 – Height and Area for a change to a higher hazard category**

- The building height and area requirements for the new occupancy areas must comply with Chapter 5 (General Building Heights and Areas) of the IBC for new construction

245

Change of Occupancy Classification

- **Section 1011.5.1.1 – Fire Wall Alternative**
- In occupancies other than H, F-1, and S-1, Fire Barriers and horizontal assemblies constructed in accordance with Sections 707 and 711 respectively of the IBC are permitted in lieu of a structurally independent fire walls to create building separations where all of the following are conditions are met:
  - The buildings must be completely sprinkler protected per NFPA 13 as referenced by IBC Section 903.3.1.1, and
  - Maximum areas between rated fire barriers or horizontal assemblies cannot exceed allowable area of chapter 5 of the IBC
  - The fire resistance ratings of the fire barriers and horizontal assemblies must not be less than that required for fire walls in the IBC

246

Change of Occupancy Classification

Section 1011.5.2 – Height and Area for a Change to an Equal or Lesser Hazard

- When a Change of Occupancy classification to an equal or lesser hazard occurs based on IEBC Table 1011.5, the existing height and area of the building is considered code compliant

247

Change of Occupancy Classification

Section 1011.5.3 – Fire Barriers

- Change of Occupancy Classification to a higher hazard based on Table 1011.5 , Fire Barriers in separated mixed occupancies must comply with the fire resistance requirements of the IBC
- When fire barriers are required to have a 1 hour fire resistance rating, existing wood lath and plaster, in good condition or existing ½ inch thick gypsum wallboard are permitted

248

Change of Occupancy Classification

Section 1011.6 – Exterior wall fire-resistance ratings

- Hazard Categories in regard to fire resistance ratings of exterior walls shall be in accordance with Table 1011.6

TABLE 1011.6
EXPOSURE OF EXTERIOR WALLS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATION
1 (Highest Hazard)	H
2	F-1, M, S-1
3	A, B, E, I, R
4 (Lowest Hazard)	F-2, S-2, U

249

Change of Occupancy Classification

Section 1011.6.1 – Exterior Wall Rating Change of Occupancy to a Higher-Hazard Category – based on Table 1011.6

- Exterior wall fire-resistance rating requirements for the new occupancy areas must comply with IBC.
- Includes Openings in exterior walls

250

Change of Occupancy Classification

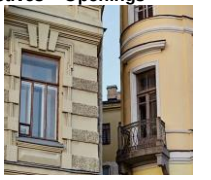
Section 1011.6.2 - Exterior Wall Rating for a Change of Occupancy to an Equal or Lesser Hazard:

- The existing exterior walls, including openings within those walls, is considered code compliant.

251

Change of Occupancy Classification

- **Section 1011.6.3 – Opening Protectives – Openings in Exterior Walls:**
- Shall be protected as required by IBC Section 705.8 when there is a change of occupancy classification to a higher hazard category
- When openings are required to be protected because of their fire separation distance, the sum of the opening areas must not exceed 50 percent of the respective wall area on a per story basis



252

Change of Occupancy Classification

- **Exceptions to Section 1011.6.3 – Opening Protectives**
  - Where IBC Table 705.8 allows openings in excess of 50 percent, the percentage of protected openings is allowed to match the percentage permitted by the IBC for new construction, or
  - In residential buildings that are three stories or less in height and are located 3 feet (0.91 m) or more from a lot line, or
  - In buildings protected throughout with an automatic sprinkler system complying with NFPA 13, or
  - When the Change of Occupancy classification is to an equal or lower hazard classification per IEBC Table 1011.6.

253

Change of Occupancy Classification

Section 1011.7 – Enclosure of Vertical Shafts

- Vertical Shafts shall be designed to meet the IBC for atriums or requirements of Section 1011.7 of the IEBC
- Section 404 of the IBC provides requirements for Atriums
- Section 1011.7.2 of the IEBC provides requirements for interior stairways or Section 1011.7.3 for other shafts

254

Change of Occupancy Classification

Section 1011.7.2 – Stairways

- When a change of occupancy classification is made to a higher-hazard category as shown in Table 1011.4, interior stairways shall be enclosed in accordance with the IBC, Section 1023

255

Change of Occupancy Classification

- **Exceptions to Section 1011.7.2 – Stairways**
  - Stairways connecting <2 stories so long as the stairway is not open to corridors or stairways on other floors: Does not apply to "I" occupancies
  - Existing unenclosed stairways are not required to be enclosed in a continuous vertical shaft if each story of the building is separated from other stories by minimum 1-hour fire-resistance rated construction or approved wired glass set in steel frames and all exit access corridors are sprinkler protected. Openings between corridor and occupant spaces must have a sprinkler head above each opening on the tenant side
  - Existing penetrations of stairway enclosures can remain so long as they are protected in accordance with the applicable subsections of IBC Section 714 (Penetrations).

256

Change of Occupancy Classification

Section 1011.7.3 – Other Vertical Shafts

- When there is a change of occupancy to higher hazard category identified in Table 1011.4 vertical shafts such as elevator hoistways, and utility shafts shall be enclosed in accordance with the IBC, except:
  - In other than institutional occupancies (Group I), a shaft enclosure is not required for an existing vertical opening connecting not more than five stories so long as the entire building is provided with an automatic sprinkler system complying with NFPA 13, or
  - Existing 1-hour fire-resistance rated shaft enclosures are allowed to remain as is, even when a higher rating is otherwise required

257

Change of Occupancy Classifications

Section 1011.7.4 – Openings

- Openings in existing shaft enclosures must be protected by minimum 1-hour fire protection rated assemblies.
- These opening protectives must be self-closing or automatic-closing upon actuation of a local smoke detector.
- Except for stairway enclosures, existing fusible link-type automatic door-closing devices are permitted to remain so long as the fusible link rating does not exceed 135°F

258

Additions

General Requirements for Additions are found in Chapter 11 of the IEBC

- Additions being constructed must comply with the IBC except as provided in the IEBC
- The Existing building can remain without any alterations provided the addition does not impact the existing building.
- The guiding principal for Additions is that an Addition project cannot create or extend any code deficiency in the existing building

259

Additions

Section 1102 – Height and Areas

- An Addition cannot increase the height of an existing building beyond that permitted by Chapter 5 of the IBC.
- An Addition cannot increase the area of an existing building beyond that permitted by the IBC for new construction unless fire separation is constructed in accordance with the IBC.
- in-filling of existing floor openings and non-occupiable appendages, such as elevator hoistways and stairway shafts, is permitted beyond the area limitationst allowed by the IBC

260

Additions

- **Example: The Church in the picture was constructed in 1972 and exceeds the height and area limitations of the IBC.**
- The addition in the picture was allowed due to the fact that it is only an exit stairway connecting the sanctuary on the upper level to the parish hall on the lower level.

261

Additions

Section 1102.3 - Fire Protection Systems

- Where existing fire areas are increased by an Addition, the resulting fire area must comply with the fire protection requirements of IBC Chapter 9 (Fire Protection Systems) as applicable

262

Additions

Section 1103.1 – Structural

- When Addition work includes alterations that cause an increase in design dead, live or snow load, including snow drift effects, of >5%, the existing affected gravity load-carrying element(s) must be replaced or modified to carry the gravity loads required by the IBC for new construction.
- Any existing gravity load-carrying element(s) whose load-carrying capacity is decreased as part of the Addition work is considered an altered structural element and is subject to the requirements of IEBC Section 806.2.

263

Additions

Section 1103.1 – Structural, Cont.

- Any existing gravity load-carrying element(s) that will form part of lateral load path for any of the Addition work is considered an existing lateral load-carrying structural element and is subject to the requirements of IEBC Section 1103.3
- There is an exception for existing Group R occupancies with 5 or less dwelling or sleeping units designed to comply with conventional light-frame construction of the IBC.

264

Additions

Section 1103.2 – Lateral Force-Resisting Systems

- If the Addition is structurally independent of the existing building, the existing lateral load-carrying elements can remain as is.
- When the Addition is not structurally independent of the existing building, the existing building and the Addition acting as a single structure must meet IBC Sections 1609 (Wind Loads) and 1613 (Earthquake Loads) using of full seismic forces.

265

Additions

- **Exceptions to Section 1103.2**
  - Existing Group R occupancies with <5 dwelling or sleeping units designed to comply with conventional light-frame construction of the IBC, or
  - Existing lateral load-carrying structural elements whose demand-capacity ratio with the Addition included is <10 percent greater than its current condition without the Addition, can remain as is.

266

Additions

- Section [BS] 1103.3 – Flood Hazard Areas – Additions and foundations in flood hazard areas must comply with the following requirements as applicable:
  - Horizontal additions, structurally connected, that meet the definition of substantial improvement by itself must comply with IBC Section 1612 (flood loads)
  - Horizontal additions, not structurally connected, meeting the definition of substantial improvement, the existing building and addition must comply with Section 1612

267

Additions

Section [BS] 1103.3 – Flood Hazard Areas –

- Additions and foundations in flood hazard areas must comply with the following requirements as applicable: (cont.)
  - For vertical Additions and all other proposed work, when combined, constitute substantial improvement as defined in IEBC Chapter 2, than the existing building must comply with IBC Section 1612, or
  - For a raised or extended foundation, if the foundation work and all other proposed work, when combined, constitute substantial improvement as defined in IEBC Chapter 2, than the existing building must comply with IBC Section, or
  - For a new or replacement foundation, the foundation must comply with IBC Section 1612.

268

Additions

Section 1104 – Smoke Alarms in Occupancy Groups R-1 & I

- When an Addition is made to a residential style occupancy (Group R or I-1), the existing building must be provided with smoke alarms where required by IFC Section 11

269

Additions

Section 1105 – Carbon Monoxide Alarms

- When an Addition is made to a residential style or healthcare occupancy (Group R, I-1, I-2 or I-4), the existing building must be provided with carbon monoxide alarms where required by IFC Section 1103.9.

270

Additions

Section 1106 – Storm Shelters

- Where an Addition having an occupant load of >50 people is made to an existing education occupancy (Group E) located in an area where the shelter design wind speed for tornados is 250 mph (402 kmh) or greater, the Addition must have a storm shelter constructed in accordance with ICC 500 (Standard on the Design and Construction of Storm Shelters).
  - Exception to the storm shelter requirement - if the facility is a daycare facility or is accessory to a place of religious worship

271

Additions

Section 1106.1.1 – Required occupant capacity for storm shelters

- The storm shelter must be sized for either the aggregate occupant load of classrooms, vocational rooms and offices or occupant load of indoor assembly space; whichever is greater.
- Where existing storm shelters are already present on the property, the new storm shelter can be reduced in capacity when permitted by the local code official.
  - Exception that if the Addition itself is not capable of sheltering all occupants on the property, then the storm shelter only needs to be sized for the occupant load of the Addition itself

272

Additions

Section 1106.1.2.1 – Location of Storm Shelters

- Storm shelters can either be located in the building they serve, or they can be standalone provided they are located on the property so their entrance door is not more than 1,000 feet (305 m) from not less than one exterior door of each building they serve

273

Additions

Section 1107 – Energy Conservation

- Additions to existing buildings must comply with the energy requirements of the International Energy Conservation Code (IECC) for new constru

274

Relocated Buildings

Requirements for Relocated Buildings are found in Chapter 14

- **Section 1401.2** – The Building shall comply with the IFC and IPMC
- Any field fabricated construction must comply with the IBC or IRC as applicable

275

Relocated Buildings

Section 1402 Requirements

- **Section 1402.1 –** Location on the lot & Section [BS] 1402.2 – Foundation – The location of the building and new foundation, including connections between the foundation and relocated structure, all must comply with the IBC or IRC as applicable
- **Section [BS] 1402.3 Wind loads –** The relocated buildings must comply with the IBC or IRC as applicable, except for:
  - 1 & 2 family dwellings and group U where wind loads at new location less than or equal to those at the previous location
  - Structural elements whose stress is not increased by >10%

276

Relocated Buildings

- **Section [BS] 1402.4 – Seismic Loads**
- Relocated buildings or structures must comply with the seismic provisions of the IBC as applicable, except for:
  - Structures in SDC's A and B and 1 & 2 family dwelling in SDC's A, B, and C, where seismic loads at new location are not higher than the previous location
  - Structural elements whose stress is not increased by >10%

277

Relocated Buildings

Section [BS] 1402.5 Snow Loads

- Relocated buildings or structures must comply with the snow provisions of the IBC as applicable where snow loads at the new location are greater than the snow loads at the previous location, except:
  - Existing buildings or structures of any occupancy type where the new location does not increase the snow load stresses by more than 5 percent.

278

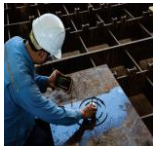
Relocated Buildings

Section [BS] 1402.6 – Flood Hazard Areas

- Any building or structure relocated or moved into a flood hazard area must comply with IBC Section 1612 (Flood Loads) as applicable

279

Relocated Buildings



Section [BS] 1402.7- Required Inspection and Repairs

- The IEBC allows the code official to have additional inspection of the structural elements of the relocated building conducted to ensure that no structural elements or connections have been damaged as a result of the relocation.
- Any structural repairs needed as a result must be completed prior to Use & Occupancy is granted.

280

General

Which is the most conservative compliance method used by most jurisdictions?

The Prescriptive Compliance Method

What is the number of safety parameters identified in the Performance Compliance Method?

21

What is the key word within the definition of Work Area?

Reconfigured

All of the general accessibility requirements have be relocated to what section of the IEBC?

Section 305

One of the guiding principles of the IEBC is that any alterations, additions, repairs or change of occupancy cannot make the building _____ than it was before the work was done.

less safe

281

General

Replacement water closets must have a maximum water consumption of _____ gallons per flushing cycle.

1.6

To be considered an alteration level 2, the aggregate area of work areas must be ____ of the overall building area.

< 50%

Reconfiguration work that is solely to meet accessibility compliance only need to comply with _____.

level 1 alterations

Supplemental Requirements only apply to which level of alterations?

Alterations level 2

282

General

Supplemental Requirements are triggered when the work area exceeds _____.

50% of the story on which the work area is located

Explain the three types of Change of Occupancy.

1. A Change of Occupancy Classification
2. A Change from one group to another group within an occupancy classification
3. Any change in use within a group for which there is a change in application of the requirements of the code

283

Part V

Key Concepts of Performance Compliance Method

284

Performance Compliance Method

- **General – General –** Requirements located in Chapter 13
- This is a point based system that evaluates twenty-one safety parameters
- This evaluation is intended to determine the equivalency of the existing building with the prescriptive requirements of the IBC
- The purpose of the this method is to evaluate those observable features that are critically important to the fire protection and life safety of building occupants.
- This method provides both designers and code officials with a rational means of establishing safety using a holistic approach

285

Performance Compliance Method

- **General, Cont.**
  - **Section 1301.1 – Scope –** This method is applicable to alterations, additions, change of occupancy, including historic buildings.
  - It is intended that this method will maintain or increase the current degree of the building when permitting alterations, additions, or change of occupancy, while not requiring full compliance with chapters 6-12

286

Performance Compliance Method

Section 1301.2 – Applicability

- Work involving additions, alterations, or changes of occupancy shall conform to the Performance area requirements or the Work Area method identified in chapters 6-10
- The provisions of the Performance Compliance Method cannot be applied to H, I-1, I-3, or I-4 occupancies

287

Performance Compliance Method

General, Cont.

Section 1301.2.2 – Partial change in occupancy

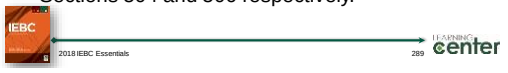
- With proper separation , only the changed portion shall comply with the Performance Compliance Method
- Without proper separation, the entire building must comply with the Performance Compliance Method using the most stringent requirement of the occupancies involved.

288

Performance Compliance Method

Section 1301.2.3 – Additions

- Must comply with the IBC
- When a fire wall is constructed in accordance with the IBC Section 706, the addition is considered a separate building
- If fire wall is not provided the total area of both the existing building and addition must comply with the height and area calculations of the IBC Sections 504 and 506 respectively.



289

Performance Compliance Method

Section 1301.2.4 – Alterations

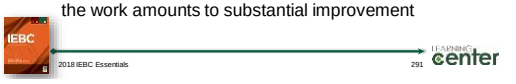
- A guiding principle is that alteration cannot reduce the current levels of safety and sanitation provided in the existing building.
- If any alteration is proposed to reduce the level of safety, such alteration shall comply with the IBC

290

Performance Compliance Method

Section 1301.3 – Acceptance

- Any building or structure being evaluated using the Performance Compliance method shall:
  - Shall Comply with the IFC and IPMC in accordance with Section 2301.3.2
  - Abate any unsafe condition, accordance with Section 115, as required per Section 1301.3.1
  - Comply with Section 1612 of the IBC as applicable if the building is located in a flood hazard area and if the work amounts to substantial improvement



291

Performance Compliance Method

Section 1301.4 – Investigation and Evaluation

- **[BS] 1301.4.1 -** A structural analysis of the existing building or structure must be completed. The building or structure ,with the work completed, must be capable of resisting the applicable loads specified in IBC Chapter 16.
- **Section 1301.4.2 –** Results of evaluation, with compliance alternatives, must be submitted to the Code Official
- **Section 1301.4.3 –** The Code Official determines compliance

292

Performance Compliance Method

Section 1301.5 – Evaluation – Composed of three safety categories as follows:

- **1301.5.1 -Fire Safety (FS**) – Included within the fire safety category are the structural fire-resistance, automatic fire detection, fire alarm, automatic sprinkler system and fire suppression system features of the facility.
- **1301.5.2 - Means of Egress (ME)** – Included within the means of egress category are the configuration, characteristics, and support features for means of egress in the facility.
- **1301.5.3 - General Safety (GS)** – Included within the general safety category are the fire safety parameters and means of egress parameters

293

Performance Compliance Method

TABLE 1301.7
SUMMARY SHEET—BUILDING CODE

294

Performance Compliance Method

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1301.6.1 Building height 1301.6.2 Building Area 1301.6.3 Compartmentation			
1301.6.4 Tenant and dwelling unit separations 1301.6.5 Corridor walls 1301.6.6 Vertical openings			
1301.6.7 HVAC Systems 1301.6.8 Automatic fire detection 1301.6.9 Fire alarm system			
1301.6.10 Smoke Control 1301.6.11 Means of Egress 1301.6.12 Dead Ends	******** ******** ********		
1301.6.13 Maximum exit access travel distance 1301.6.14 Elevator Control 1301.6.15 Means of Egress emergency lighting	******** ********		
1301.6.16 Mixed Occupancies 1301.6.17 Automatic Sprinklers 1301.6.18 Standpipes 1301.6.19 Incidental use 1301.6.20 Smoke Compartments 1301.6.21.1 Patient Ability for self-preservation 1301.6.21.2 Patient Concentration (a) 1301.6.21.3 Attendant-to-patient ratio (a)	******** ******** ********	********	
Building Total Value			

* * * *No applicable value to be inserted.
a. Only applicable to Group I-2 occupancies.

295

Performance Compliance Method

Section 1301.6 – Evaluation Process

- A single occupancy building not requiring smoke compartmentation may only need a single evaluation.
- A mixed occupancy building with fire-resistance rated occupancy separations will have multiple evaluations, but not less than one evaluation per occupancy type.

296

Performance Compliance Method

Section 1301.6, Cont.

- Mandatory Safety scores are based on occupancy classification
- In order for the building to pass the Performance Compliance method, each of the three safety factors must be equal to or greater than the respective mandatory safety score

297

Performance Compliance Method

- **Section 1301.6.1.1 – Building Height**
- There are two formulas used to determine the point value used for this safety parameter:
  - Height value in ft = (IBC allowable height – existing building height) 125
  - Height value in stories = (IBC allowable stories – existing building stories) x CF
- The lesser of the two values is used for this safety parameter, and the maximum point value permitted is 10. The point value is assigned to each of the three safety categories in IEBC Table 1301.7 on the Building height row

298

Performance Compliance Method

Section 1301.6.2.2 – Area Formula

- The IBC Formula of Section 506 is used on a floor by floor basis
- Separated Mixed occupancies will include the fraction of actual area/allowable area for each occupancy type present on that specific floor and are added together consistent with IBC approach:
  - Area value = IBC allowable area/1200 x [1 – (actual area/IBC allowable area + …)]

299

Performance Compliance Method

- **Section 1301.6.2.2 – Area Formula, cont.**
- Non-Separated Mixed Occupancies calculation is based on the smallest fraction of actual area/allowable area of the occupancies present in the building and that value is used for the entire building, consistent with the non-separated mixed-use approach of the IBC
  - Area value = IBC allowable area/1200 x [1 – (actual area/IBC allowable area)]
  - If the area value is positive, it cannot be more than 50 percent of the mandatory fire safety score in IEBC Table 1301.8 for the respective occupancy type

300

Performance Compliance Method

Section 1301.6.3 – Compartmentation – Creating fire areas is beneficial and limit the spread of the fire

- Compartmentation is based on the use of minimum 2 hr. rated walls and floors complying with IBC sections 707 and 711 respectively.
- The integrity of the compartments includes protection of openings as required by the IBC.
- The smaller the fire area, the greater the benefit of compartmentation, which results in a larger point value that can be used for this safety parameter.

301

Performance Compliance Method

Section 1301.6.4 – Tenant and dwelling unit separations

- Separation between patient sleeping rooms in health care Occupancies are evaluated
- Recognizes fire separation with <2 hr. rated assemblies to slow the spread of fires between tenant and dwelling units
- Openings must be protected

302

Performance Compliance Method

Section 1301.6.5 – Corridor Walls

- Fire-resistance rated corridor walls is paramount for safe and protected egress for occupants egressing from a building.
- Protected openings meeting requirements of the IBC
- The penalty for having no fire-resistance rated enclosure of exit access corridors is significant
- Note a is to ensure that all building occupants have reasonable access to existing substantially constructed corridors that otherwise exceed the corridor requirements for new construction.

303

Performance Compliance Method

Section 1301.6.6 – Vertical Openings

- Vertical openings include stairs, multi-story ramps, hoistways, escalators, atria, and other shaft enclosures.
- Safety Parameter addresses the enclosure including a multiplying factor based on construction type
- The penalty for having no fire-resistance rated enclosure (un-enlcosed) of vertical openings is significant, i.e., (-2 value x no. of connected stories)
- Enclosed with <1 hr. rating are assessed a 1 value x no. of connected stories

304

Performance Compliance Method

Section 1301.6.6.1 – Vertical Opening Formula

- VO(vertical openings 0 = PV(protection value) x CF (Construction type factor)

305

Performance Compliance Method

Section 1301.6.7 – HVAC Systems

- Safety parameter addresses limiting the spread of smoke and fire to remainder of building
- This section does not evaluate smoke control systems
- Must be appropriately protected
- When an existing building has multiple HVAC system arrangements, they are evaluated separately and the lower point value must be used.

306

Performance Compliance Method

Section 1301.6.8 – Automatic Fire Detection

- Addresses the location and operation of smoke detectors
- Detectors are required to be connected to audible alarms installed in accordance with IBC Section 907 and IMC Section 606
- Emphasis on the presence of complete smoke detection throughout the building
- Emphasis on higher occupancy concentrations such as A & R occupancies and higher fuel loads such as F, M, and S occupancies

307

Performance Compliance Method

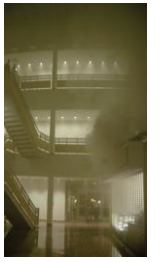
Section 1301.6.9 – Fire Alarm Systems

- Addresses the capability of a fire alarm system.
- Includes manual initiation of an alarm and dedicated circuits for notification appliances i.e., horns, bells, speakers and strobes.
- Must be installed in accordance with IBC.
- Emphasis on emergency voice/alarm communication systems, particularly in occupancies with higher fuel load (Group F, M, S).
- Penalty for Groups A, B, E, R with no fire alarm system.

308

Performance Compliance Method

Section 1301.6.10 – Smoke Control



- Addresses the ability of natural or mechanical venting, exhaust or pressurization system to control the movement of smoke
- Due to the defend-in-place nature of health care facilities, there is a practical need to vent or exhaust smoke
- Emphasis is placed on the need for sprinkler protection to limit fire growth and associated smoke production

309

Performance Compliance Method

Section 1301.6.11 – Means of Egress Capacity and number

- Does not address any other aspects of means of egress, i.e., dead-end-corridors, common path of travel, or travel distance
- Emphasizes increases above the minimum requirements of the IBC for higher occupant load densities (Groups A, E, and I-2)
- Penalizes the use of fire escapes even though recognized by IEBC

310

Performance Compliance Method

Section 1301.6.11 – Means of Egress Capacity and number, cont.

- In order to take credit for exits in Category d, they must meet the remote requirements of the IBC, which is not less than half the distance of the greater diagonal dimension of the building story they are located on.
- In existing buildings that are sprinkler protected, the remoteness of the exits in Category d can be reduced to not less than 1/3 the distance of the greater diagonal dimension of the building story.

311

Performance Compliance Method

Section 1301.6.12 – Dead Ends

- Addresses the presence of and length of dead-end corridors.
- Places equal emphasis on dead-end corridors regardless of occupancy type in most instances.
- Penalizes the presence of excessively long dead-end corridors, especially for health care occupancies (Group I-2).

312

Performance Compliance Method

Section 1301.6.13 – Maximum exit access travel distance to an exit

- Addresses the length of exit access travel to reach an exit
- Places equal emphasis on travel distance regardless of occupancy type
- Penalizes exit access travel distance that exceeds that allowed in the IBC for the applicable occupancy types present in the existing building or structure

313

Performance Compliance Method

Section 1301.6.13 – Maximum exit access travel distance to an exit, cont.

- The following equation is used to determine the value used for exit access travel distance based on the maximum allowable travel distance as indicated in IBC Table 1017.1:
  - Points = 20 x (IBC maximum allowable travel distance – maximum actual travel distance)
    IBC maximum allowable travel distance

314

Performance Compliance Method

Section 1301.6.14 – Elevator Control

- Specifically addresses the presence of Phase I emergency elevator recall and Phase II emergency in-car operation for passenger elevators.
- Freight elevators are not evaluated since they may not be in locations readily accessible by emergency responders.
- The Performance compliance method does not allow elevators with a travel distance of 25 ft (7.62 m) or more above or below the primary level of elevator access for emergency responders to be without Phase I and Phase II emergency operation.

315

Performance Compliance Method

Section 1301.6.14 – Elevator Control, cont.

- The Performance compliance method penalizes multi-story buildings with no elevators and emphasizes the presence of at least one elevator complying with new construction requirements if it serves all floors of the building.
- Baseline value for elevators with < 25' of travel distance to reach the primary level for emergency responder access is category b.
- Baseline value for elevators with ≥ 25' of travel distance to reach the primary level for emergency responder access is category c.

316

Performance Compliance Method

Section 1301. 6.15 – Means of Egress emergency lighting

- Addresses the presence of emergency power for illumination of the means of egress and exit signs within an existing building or structure.
- Emphasizes the need for emergency power for illumination of the means of egress and exit signs when the required number of exits per story of a building is two or more.

317

Performance Compliance Method

Section 1301. 6.15 – Means of Egress emergency lighting, cont.

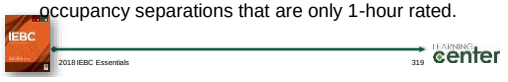
- For buildings permitted to have a single exit, the base line value is Category a.
- For buildings requiring two or more exits, the base line value is Category b.

318

Performance Compliance Method

Section 1301.6.16 – Mixed Occupancies

- Specifically addresses the presence of rated vertical and horizontal separation between different occupancy types
- Emphasizes the need for fire-resistance rated separation that is twice the rating required by the IBC when multiple occupancy types are present in an existing building.
- Penalizes a building with fire-resistance rated occupancy separations that are only 1-hour rated.



319

Performance Compliance Method

Section 1301.6.17 – Automatic Sprinklers

- Addresses the ability to suppress a fire due to the presence of an automatic sprinkler system.
- Is based on the applicable occupancy type requirements of IBC §903.2 as well as the building height and area requirements in Chapter 5 of the IBC (General Building Heights and Area).
- Positive point values are given to an existing building to promote the installation of complete building sprinkler protection.

320

Performance Compliance Method

- As indicated by the significant negative and positive point values associated with the lack of or presence of complete building automatic sprinkler protection, the IEBC strongly encourages the installation of complete building automatic sprinkler protection per NFPA 13 for overall building safety.

321

Performance Compliance Method

Section 1301.6.18 – Standpipes

- Addresses the ability to initiate interior firefighting operations by providing a readily available source of water in accordance with NFPA 14
- Note a for Category a – the standpipe system is limited to Categories b-d

322

Performance Compliance Method

Section 1301.6.19 – Incidental uses

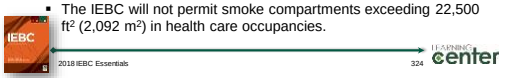
- Addresses the protection, whether passive (enclosure) or active (automatic sprinkler) or a combination of both, of incidental use areas
- No positive points are possible with this safety parameter due to the fact that incidental use areas are generally, considered more hazardous than the occupancy types present in the existing building.

323

Performance Compliance Method

Section 1301.6.20 – Smoke compartments

- Addresses the presence of smoke barriers on each story of an existing building or structure and to provide 1-hour rated barriers to restrict the passage of smoke per the IBC.
- The only occupancy type requiring smoke compartments is health care occupancies (Group I-2) due to their defend-in-place nature.
  - This performance compliance method does not permit an I-2 occupancy without smoke compartments.
  - The IEBC will not permit smoke compartments exceeding 22,500 ft^2 (2,092 m^2) in health care occupancies.



324

Performance Compliance Method

Section 1301.6.21 – Patient Ability, Concentration, Smoke compartment location and ratio to attendant

- To determine the safety factor:
  - Enter the values of each of the safety parameters into Table 1301.7
  - Multiply the three safety factors together
  - If the sum is ≥ 9, compliance has failed

325

Performance Compliance Method

Section 1301.6.21.1 – Patient ability for self preservation

- Patient ability is broken down into the following three categories:
  - Category a – Patients are capable of self-preservation without assistance (1 point)
  - Category b – Patients rely on assistance for evacuation or relocation (2 points)
  - Category c – Patients that cannot be evacuated or relocated (3 points)

326

Performance Compliance Method

Section 1301.21.2 – Patient Concentration

- Patient concentration is broken down into the following three categories:
  - Category a – Smoke compartment has 1 – 10 patients (1 point)
  - Category b – Smoke compartment has 11 – 40 patients (2 points)
  - Category c – Smoke compartment has more than 40 patients (3 points)

327

Performance Compliance Method

Section 1301.6.21.3 – Attendant-to-Patient Ratio

- Attend-to-patient ratio is broken down into the following three categories:
  - Category a – Attend-to-patient ratio is 1:5 (1 point)
  - Category b – Attend-to-patient ratio is 1:10 (2 points)
  - Category c – Attend-to-patient ratio is greater than 1:10 or no patients (3 points)

328

Performance Compliance Method

Section 1301.7 – Building Score

- Scores from the 21 Safety Parameters are entered into the summary sheet
- The point values for each safety category are added to provide for an overall building safety score for Fire Safety, Means of Egress, and General Safety

329

Performance Compliance Method

TABLE 1301.8
MANDATORY SAFETY SCORES(a)

OCCUPANCY	FIRE SAFETY (FS)	MEANS OF EGRESS (MME)	GENERAL SAFETY (GS)
A-1	20	31	31
A-2	21	32	32
A-3	22	33	33
A-4, E	29	40	40
B	30	40	40
F	24	34	34
I-2	19	34	34
M	23	40	40
R	21	38	38
S-1	19	29	29
S-2	29	39	39

330

Performance Compliance Method

Section 1301.9 – Evaluation of Building Safety

- The finals scores are determined using the evaluation formulas in IEBC Table 1301.9 as follows:
  - Fire Safety FS – MFS
  - Means of Egress ME – MME
  - General Safety GS – MGS

331

Performance Compliance Method

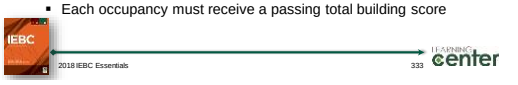
- If the final score fails, the designer or owner can choose one or more of the 21 safety parameters to bring into compliance to achieve a positive score without bringing the remainder of the building into compliance with the IBC or IEBC chapters 5-12.

332

Performance Compliance Method

Section 1309.1 – Mixed Occupancies

- No rated separation present in accordance with Section 1301.6.16, the mandatory safety scores for the occupancy with the lowest MGS in table 1301.8 must be used.
- Occupancy separation in accordance with Section 1301.6.16 is present;
  - The mandatory safety scores for each occupancy must be used. A total building score for each occupancy must be calculated using the formulas in Section 1301.9
  - Each occupancy must receive a passing total building score



333

General

Which occupancies does the Performance Compliance Method not apply to ?

H, I-1, I-3, I-4

The Performance Compliance Method is intended to determine the equivalency of the existing building with the prescriptive requirements of _____.

The IBC

If _____ is not provided between the existing building and a new addition, the _____ of both the existing building and addition must comply with the _____ calculations of the IBC.

a fire wall

total area

height and area

334

General

If any alteration is proposed to reduce the level of safety, such alteration shall comply with _____.

The IBC

The Performance Compliance Method consists of what three safety categories?

Fire Safety, Means of Egress and General Safety

What is the basic intent of the Compartmentation Category?

Create fire areas to limit the spread of the fire

What is the basic intent of the HVAC safety parameter?

Addresses limiting the spread of smoke and fire to remainder of building

335

What will you take away?

- **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?

336

International Code Council is a Registered Provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

337

Copyright Materials

338

Thank you for participating!

To schedule a seminar, contact:
The Learning Center™
1-888-ICC-SAFE (422-7233) Ext. 33821
or
E-mail: learn@iccsafe.org

339