2018 IEBC Essentials

Based on the International Existing Building Code® (IEBC®)

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Instructor
Gil Rossmiller

Over 40 years in the construction industry

IRC Plumbing & Mechanical Code Development Committee 2009-2012

Commercial Energy Code Development Committee 2015-2018

Residential Energy Code Development Committee 2021-2024

Current ICC Code Correlation Committee 2003 – 2016

Building Official
Parker, Colorado

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Description

- 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

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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

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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

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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

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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.

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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.

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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

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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.

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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

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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

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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	

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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.

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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	

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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.

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Definitions

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

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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

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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)

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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

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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

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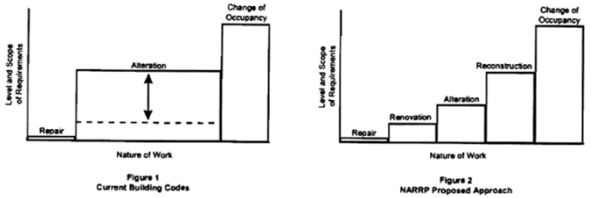
History of Rehabilitation Codes



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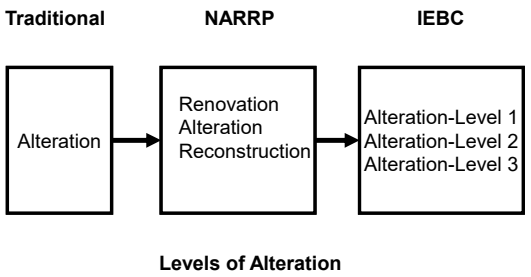
Classification of Work



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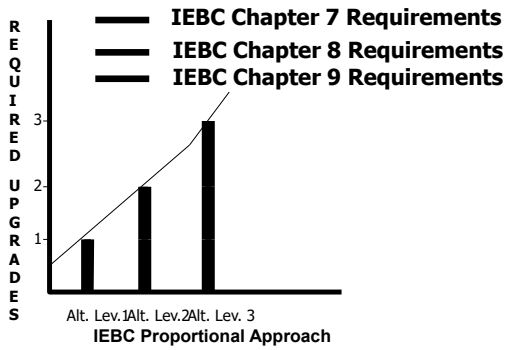
Classification of Work



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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.

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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.

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Administration

- Work that requires a permit shall be subject to inspection by the code official. What inspections shall be performed?

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Administration

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

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Administration

- What is the main Difference between a Code and a Standard?

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Administration

- The Work Area Method uses an _____ approach to alterations and changes of occupancy.
- Can a designer use provisions from each of the three compliance alternatives in combination with each other?
- When developing the IEBC, what were the three criteria used by New Jersey as critical in the development?

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Unsafe Definition

- Buildings, structures or equipment that are unsanitary, or that are deficient due to inadequate means of egress facilities, inadequate light and ventilation, or that constitute a fire hazard, or in which the structure or individual structural members meet the definition of "*Dangerous*," or that are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance shall be deemed unsafe.
- A vacant structure that is not secured against entry shall be deemed unsafe.

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Definition

DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation, or lacks the necessary support of the ground.

2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under service loads.

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Definitions 202

- REPAIR. The reconstruction, replacement or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

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Definitions 202

- ADDITION. An extension or increase in floor area or height of a building or structure.

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Definitions 202

- ALTERATION. Any construction or renovation to an existing structure other than a repair or addition. ~~Alterations are classified as Level 1, Level 2 and Level 3.~~

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Definitions 202

- CHANGE OF OCCUPANCY.
- A change in the use of the building or a portion of a building that results in any of the following:

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 the application of the requirements of this code.

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Definition

- WORK AREA.
  - 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.

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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

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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

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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

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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

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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

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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

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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.

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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

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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)

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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

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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

a. 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.

b. 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.

c. 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.

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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.

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Accessibility

TECHNICALLY INFEASIBLE. An alteration of a facility that has little likelihood of being accomplished because the existing structural conditions require the removal or alteration of a load-bearing member that is an essential part of the structural frame, or because other existing physical or site constraints prohibit modification or addition of elements, spaces or features which are in full and strict compliance with the minimum requirements for new construction and which are necessary to provide accessibility.

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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.

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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

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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.

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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

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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

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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.

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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.

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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.

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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.

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Chapter 5 – Essentials

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

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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

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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

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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.

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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

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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

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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

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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.

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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)

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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.

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Compliance Methods

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

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Compliance Methods

General

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

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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

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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

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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.

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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. ”

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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.

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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.

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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.

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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.

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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.

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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

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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

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Repairs

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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

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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

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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

96

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

97

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.

98

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

99

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

100

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

101

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

102

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

103

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

104

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

105

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

106

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.

107

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)

108

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[a, b]	Corridors and enclosure for exit access stairways and exit access ramps	Rooms and enclosed spaces[c]	Interior exit stairways, interior exit ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and exit access ramps	Rooms and enclosed spaces[c]
A-1 & A-2	B	B	C	A	A[g]	B[e]
A-3[f], 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[d]	A	A	B
I-1	B	C	C	A	B	B
I-2	B	B	B[h, i]	A	A	B
I-3	A	A[j]	C	A	A	B
I-4	B	B	B[h, 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 803.13.1.

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.

109

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

110

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"

111

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

112

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

113

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

114

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

115

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

116

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

117

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

118

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.

119

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

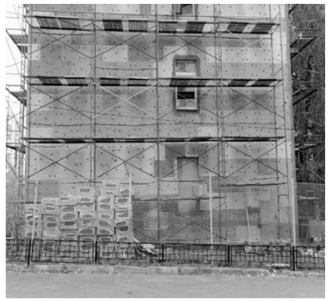
120

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

121

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.

122

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

123

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

124

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

125

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

126

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.

127

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.

128

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

129

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

130

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.

131

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.

132

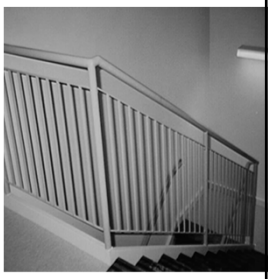
Alterations – Level 2

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

133

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

134

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.

135

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

136

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

137

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.

138

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

139

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

140

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

141

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)

142

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.

143

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

144

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

145

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

146

Alterations – Level 2

Section 803.4.1 – Occupancy Requirements

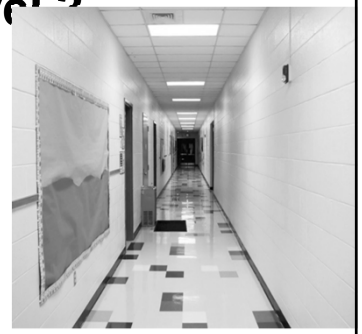
- Existing previously approved fire alarm systems are allowed to remain.
- That portion of an existing fire alarm system within the Level 2 Alterations work areas must comply with current requirements of the IBC and NFPA 72.
- Existing alarm-notification devices shall be automatically activated throughout 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.

147

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



148

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.

149

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

150

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

151

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.

152

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

153

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

154

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'

155

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.

156

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

157

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

158

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

159

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

160

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

161

Alterations – Level

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

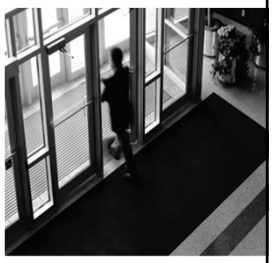
- Patient sleeping room or patient sleeping suite greater than 1,000 ft2 (93 m2) within a Level 2 Alterations work area requires a remotely located second means of egress from the room or suite.

162

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



163

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**

164

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**

165

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

166

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

167

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

168

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

169

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.

170

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

171

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.

172

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

173

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

174

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

175

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

176

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

177

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.

178

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

179

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,

180

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.

181

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

182

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.

183

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.

184

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

185

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

186

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

187

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

188

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

189

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.

190

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.

191

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.

192

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

193

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.

194

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

195

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.

196

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

197

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

198

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

199

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.

200

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.

201

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

202

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 GaragesGasoline dispensing and service stations
- Aircraft Hangars Hazardous locations Healthcare facilities
- Motion Picture projection rooms Agricultural Buildings

203

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

204

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.

205

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.

206

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

207

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

208

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

209

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

210

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

211

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.

212

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

213

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

214

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

215

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

216

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

217

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

218

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

219

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

220

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

221

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

222

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

223

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

224

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.

225

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

226

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.

227

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

228

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

229

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).

230

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

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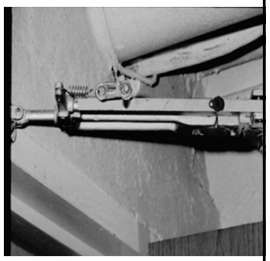
Change of Occupancy Classifications

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



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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

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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 limitations allowed by the IBC

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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.

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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

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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.

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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.

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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.

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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.

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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

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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.

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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

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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.

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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

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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

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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

247

Additions

Section 1107 – Energy Conservation

- Additions to existing buildings must comply with the energy requirements of the International Energy Conservation Code (IECC) as they relate to new construction

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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

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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%

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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%

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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.

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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

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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.

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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

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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

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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

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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.

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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.

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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

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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

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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

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Performance Compliance Method

TABLE 1301.7
SUMMARY SHEET—BUILDING CODE

Existing occupancy: _____		Proposed occupancy: _____	
Year building was constructed: _____		Number of stories: _____ Height in feet: _____	
Type of construction: _____		Area per floor: _____	
Percentage of open perimeter increase: _____ %			
Completely suppressed:	Yes_____ No____	Corridor wall rating: _____ Type: _____	
Compartmentation:	Yes_____ No _____	Required door closers:	Yes_____ No_____
Fire-resistance rating of vertical opening enclosures: _____			
Type of HVAC system: _____, serving number of floors: _____			
Automatic fire detection:	Yes_____ No_____	Type and location: _____	
Fire alarm system:	Yes_____ No_____	Type: _____	
Smoke control:	Yes_____ No_____	Type: _____	
Adequate exit routes:	Yes_____ No_____	Dead ends: _____	Yes _____ No _____
Maximum exit access travel distance: _____		Elevator controls:	Yes _____ No _____
Means of egress emergency lighting:	Yes_____ No _____	Mixed occupancies:	Yes _____ No _____
Standpipes:	Yes_____ No_____	Patient ability for self-preservation: _____	
Incidental use:	Yes_____ No_____	Patient concentration: _____	
Smoke compartmentation lessthan 22,500 sq. feet (2092 m²):	Yes_____ No_____	Attendant-to-patient ratio: _____	

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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.

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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.

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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

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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

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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

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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.

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