2020 Connecticut State Building and Fire Codes

Find the most current schedule at https://portal.ct.gov/DASCodeChange

Completed: 2020 Amendments Drafted and Code Change Proposals Received

- 6/30/19 Committees/Work Groups Review
- 8/31/19 Final Drafts Developed
- 10/31/19 Drafts Reviewed
- 11/13/19 Codes and Standards Drafts Approval
- 2/29/20 Public Comment Period
- 5/31/20 Legislative Review/Approval
- 10/1/20 Code Takes Effect

Existing Building Code – Focus on Performance Compliance

Fall 2019 Career Development Series

James Quish, BO, FM, OEDM Trainer

DAS Office of Education and Data Management

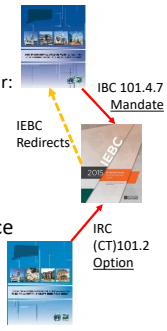
Existing Building Code

- Today's Objectives
  - Understand proper use of the IEBC
  - Review the IEBC general requirements
  - Understand the IEBC / Fire Code relationship
  - Understand the 3.1 IEBC compliance options
  - Understand mechanics of the performance option
  - Detail all components of a simple building summary worksheet
  - Understand the function of ancillary IEBC portions

Existing Building Code

- 101.2 Scope
  - **IBC** 101.4.7 Required reading
    - Existing building Code must be used for:
      - *Repairs* to existing buildings
      - *Alterations* to existing buildings
      - *Addition* impacts upon existing buildings
      - *Change of occupancy* of existing buildings
      - *Relocation* of existing buildings
  - **IRC** (CT)101.2 Option for compliance
    - Build as 'new' per IRC

      OR
    - Use the IEBC



Existing Building Code

- 101.4 Existing Buildings
  - 101.4.1 Existing buildings – never occupied
    - Update not required unless intended occupancy changes
      - Comply with Code under which permit was taken
    - Expired permit will prompt update
      - Current Code will prevail

Existing Building Code

- 101.4 General Issues
  - (CT)101.4.2 Existing previously occupied buildings
    - Stay with the Code – based on permit application date
    - No need for change or updates
      - Unless the State Fire Code specifically says otherwise
      - Unless Building Code specifically says otherwise

Existing Building Code

- (CT)101.4.3 General - Property Maintenance
  - ICC Maintenance Code is **NOT** Adopted
    - Applicable portions of CSFSC & Fire Prevention Code apply
      - Occasional retroactive issues

  - Connecticut State Fire Prevention Code
    - Minimum requirements - frequency of inspections
      - Annual inspections
        - » A-1, A-2,E, H-1, I-1, All R groups, M & H-3 with fireworks
      - 2 year inspections
        - » A-3, H-2, I-2, I-3, I-4 B Medical, B College
      - 3 year inspections
        - » B, H-3, M, S-1, A-4, A-5
      - 4 year inspections
        - » F-1, F-2, H-4, H-5, S-2, U

Existing Building Code

- 101.5 Chapter 15 applies to all work done
  - 1501.1 General to all IEBC Work
    - Storage of materials
      - Fire Safety
        - » Extinguishers
        - » MOE for workers
        - » Standpipes
        - » Sprinkler protection
        - » Fire suppression water supply
      - Pedestrian safety
      - Adjoining property protection
      - Public property encroachment

    - 1501.1 Scope
      - Covers duration of work period
      - Twin of IBC Chapter 33

Existing Building Code

- (CT)101.6 IEBC Appendix A may be used
  - Seismic resistance
    - A-1 Unreinforced masonry bearing walls
    - A-2 Concrete / masonry walls w/ flexible diaphragms
    - A-3 Wood frame cripple walls seismic
    - A-4 Wood frame residential walls
    - A-5 Concrete buildings

$$DCR = 2.1 S_{DS} \Sigma W_{pi} (\Sigma \Sigma v_{xi} D + V_{cb})$$

(Equation A1-11)

  - 301.1.4 Offers A as seismic design compliance option
    - When called for within Code
    - Engineer's 'menu' item
    - BO must understand the option path
      - Need not understand the engineering

Existing Building Code

- (CT)101.7 CT State Fire Code Abatement
  - Conflict resolution – Specific to Existing Buildings
    - State Fire Code – Conditional Superiority
      - Based on written FMO abatement orders
  - By exception:
    - New work must comply with current Building Code
      - Fire protection systems
      - Electrical
      - Plumbing
      - Mechanical
      - Structural

- Simply stated: New structural, electrical, and mechanical work, to abate Fire Code issues, must be done in compliance with current Building Code

Existing Building Code

- Our Fire Code
  - (CT)101.9 Fire Code = 2018 CT Fire Code
    - State Fire Safety Code
      - Part I - Administrative
      - Part II - General
      - Part III – New, altered, renovated, occupancy changed buildings
      - Part IV – Existing Buildings
    - State Fire Prevention Code
      - Maintenance
      - Operational issues
      - Behavioral issues
  - (CT)101.10 MOE in Existing Buildings
    - Must comply with Part IV of 2018 CSFSC
      - Part IV applies only to the unaltered portions of the building

Existing Building Code

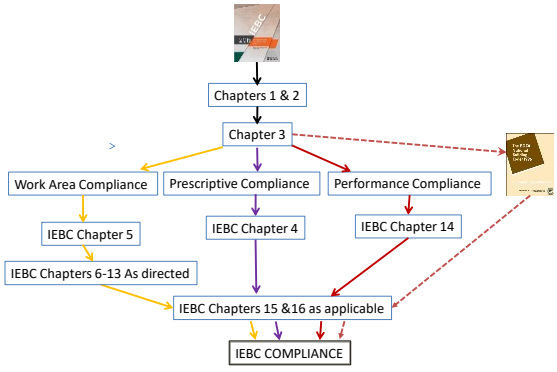
- Why do the Fire Guys Care?
  - IEBC = Fire Code, Part III
    - 2018 CSFSC - Alternative Compliance
      - CSFSC, Part III (CT)101.1.3
        - » IEBC compliance = satisfaction of CSFSC Part III compliance
        - » Specific to:
          - Alterations
          - Additions
          - Change of Occupancy
        - » Untouched building portions remain with Fire Code Part IV

Existing Building Code

- 301.1 Compliance Methodology **3 Primary OPTIONS**
  - Option 1 – **301.1.1 Prescriptive Method**
    - Follow chapters 1, 2, 3, 4, 15
    - Ignore chapters 5-14
  - Option 2 – **301.1.2 Work Area Method**
    - Follow chapters 1, 2, 3, 5, 15
    - As directed by 5, follow chapters 6-13
    - Ignore chapters 4 & 14
  - Option 3- **301.1.3 Performance Method**
    - Follow chapters 1, 2, 3, 14, 15
    - Ignore chapters 4-13, unless 14 sends you there

301.1 NO mixing

Existing Buildings - Code Compliance - 3.1 Options



Existing Building Code

- Chapter 3 – Compliance Methods
  - 301.1 General – Buried 'Special Rule'
    - Exception to the three compliance options
      - Subject to BO *approval*
      - Alterations may comply with 'legacy' Code
      - Applicable to limited structural alteration
        - » 907.4.4 & 907.4.2 definition
        - » 30% maximum floor & roof area over 5 year period
      - Flood area restrictions
      - New components must meet current requirements
      - NOTE: Intended for minor alterations

Existing Building Code

- Chapter 3 – Compliance Methods
  - 301.1 Applicant selects **ONE** compliance method
    - 1. Prescriptive
    - 2. Work Area
    - 3. Performance
    - .1 Legacy Code - minor alterations

  - BO's job is to administer the Code
    - Ensure proper use of Code
    - Ensure proper engineering / documentation
    - Inspect as required
    - Execute Permit & CO duties
    - Coordinate with Local FMO

Existing Building Code

- 301.1.4 Seismic Evaluation
  - 301.1 Applies to ALL compliance methodology
    - Engineering options for seismic hardening
      - As will be called for within the Code
        - » 301.1.4.1 Analysis per IBC
          - Two IBC options
            - IBC Chapter 16
            - ASCE 41
        - » 301.1.4.2 'Reduced' Seismic
          - Three IEBC options
            - 75% of IBC specified resistance
            - Use appropriate portions of appendix A1 – A5
            - ACSE 41 per table 301.1.4.2

  - BO responsibilities
    - 1) Recognize when the Code calls for seismic evaluation
    - 2) Understand path to proper resource
    - 3) Verify credentialing of professionals

Existing Building Code

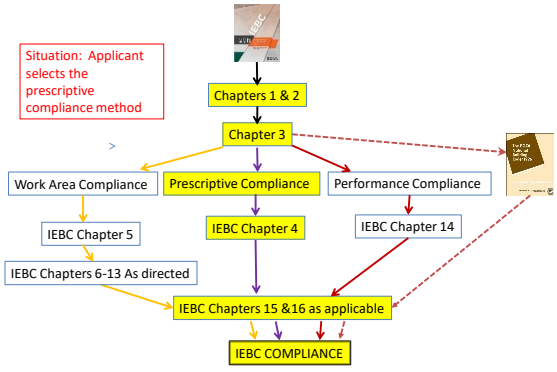
- Chapter 3 – General Provisions
  - 302.2 Hierarchical Order
    - State Existing Building Code is 'king'
      - As applied to work in *Existing Buildings*
        - » Option for residential
    - Subordinate Codes apply as referenced:
      - Energy Conservation Code
      - State Fire Code
      - State Fire Prevention Code
      - Mechanical Code
      - Plumbing Code
      - Electrical Code
    - **Any conflicts submit to this Code**

- Understand: This applies to all compliance methods

Existing Building Code

- Chapter 3 General Provisions
  - 302.3 Existing materials
    - OK unless stupid, unsafe, or 50% fast
  - 302.4 New / replacement materials
    - New work must meet current standards
    - Patch work may use similar materials
      - » Unless hazardous or expressly prohibited in current Code
        - Essentially: as long as the repair isn't stupid

Existing Buildings – PRESCRITIVE IEBC Compliance

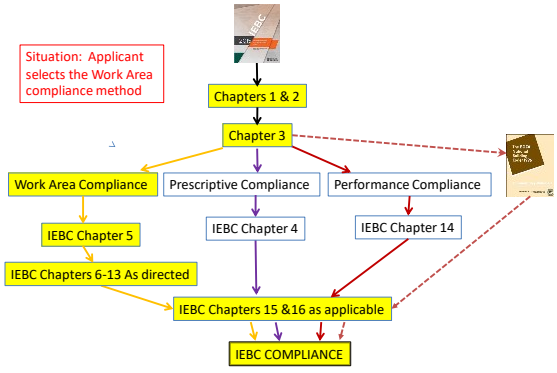


Existing Building Code

- The Prescriptive Option – Chapter 4
  - 401.1 Scope
    - Application to ***existing*** buildings & structures undergoing:
      - Alteration
      - Repair
      - Addition
      - Change of Occupancy
      - *Historic* structures included

  - Key to prescriptive:
    - Follow Section 401
    - Follow Sections 402-410 as applicable to the work

Existing Buildings – WORK AREA Code Compliance

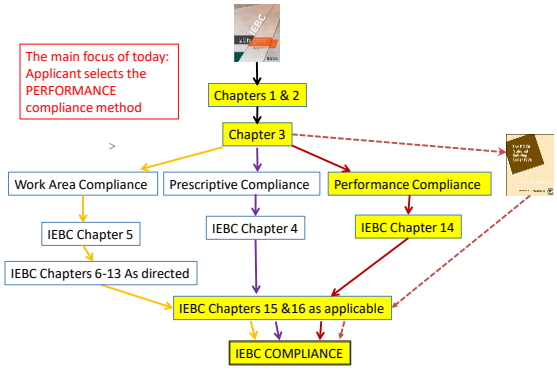


Existing Building Code

- The Work Area Option – Chapter 5
  - 501.1 Scope
    - Application to ***existing*** buildings & structures undergoing:
      - Alteration
      - Repair
      - Addition
      - Change of Occupancy
      - *Historic* structures included
        - » More detail in Section 508

  - Key to work area compliance
    - Go to chapter 5
    - Go to Chapter 6-13 as directed by Chapter 5

Existing Buildings – PERFORMANCE Code Compliance



Existing Building Code

- So, Again; how do we get to the Performance method?
  - 301.1 Applicant selects compliance method
    - BO supervises the process
  - 301.1.3 Applicant selected performance -> Chapter 14
    - Chapters 4 through 13 are rendered 'mute'

Existing Building Code

- The Performance Option – Chapter 14
  - 1401.1 Scope
    - Application to ***existing*** buildings & structures undergoing:
      - *Alteration*
      - *Repair*
      - *Additions impacting existing portions*
      - *Change of Occupancy*
      - *Historic* structures included
      - Moved structures

  - Key to work area compliance methodology
    - Go to chapter 14
    - Ignore 4-13
      - Unless specifically told otherwise by Chapter 14

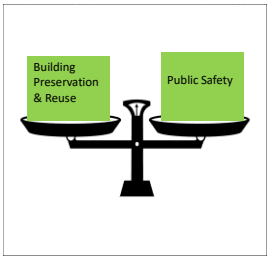
Existing Building Code

- 1401.1 Compliance Alternative
  - Intention of Chapter 14
    - Provide an alternative to full prescriptive compliance
      - Chapters 4-13 are mute
        - » UNLESS…… Chapter 14 specifically sends us there

Based on an old country axiom: You can't make a silk purse out of a sow's ear, no matter how hard you try! But, you can produce a very serviceable wallet

Existing Building Code

- Prelude to Chapter 14 – Performance Evaluation
  - A Comprehensive Look at Building Safety
    - Passive fire protection issues
      - Height & Area
      - Building Hazard Areas
      - Tenant Separation
      - Corridor Walls
      - Vertical Openings
      - Mechanical Systems Arrangement
    - Active fire protection issues
      - Fire Detection & Notification
      - Automatic extinguishing systems
      - Manual extinguishing systems
      - Smoke Control
    - Occupant safety issues
      - MOE arrangement
      - MOE / Emergency Lighting
      - Separation of hazards



Existing Building Code

- (CT)1401.2 Applicability
  - Really, really important stuff about Chapter 14:
    - May be used only for buildings *existing* **prior to 10/1/2018**
      - *Existing* = Legal permit & CO & all pre 10-1-1970 buildings
    - Applies only to Groups: A, B, E, F, I-2, M, R, S
      - Based upon the proposed classification
    - **NOT** used for rendering of a Group H, I-1, I-3, I-4
      - However, could be used occupancy change from one of these groups
    - Application ambiguity regarding group U
      - We'll fix this in a few minutes

Existing Building Code

- 1401.2 Chapter 14 Alternative – Important rules
  - 1401.2.1 Special Rule – Specific to Occupancy Change
    - Judged based upon occupancy being rendered

Example: Existing Fire Station rendering to a large tavern will be judged as Group A-2

Existing Building Code

- 1401.2 Chapter 14 Alternative – Important rules
  - 1401.2.2 Design Option - Partial Change in Occupancy
    - Fire barrier may be used to separate unchanged portion of building
      - Fire barrier separation = Provisions apply only to the portion being changed
      - NO fire barrier = entire building must be evaluated

Altered M group rendered from S-2 group May be individually evaluated	Unaltered, existing S-2 group need **NOT** be part of evaluation based on IBC compliant fire barrier separation

Existing Building Code

- 1401.2 Chapter 14 Alternative – Important rules
  - 1401.2.3 Additions
    - *Additions* are always judged as new construction
      - Floor space increase
      - Addition of stories
      - Installation of habitable mezzanines
    - *Addition*
      - Not permitted to push building in excess of IBC limits
        - » Height
        - » Area
      - However, an existing oversize building may be evaluated
    - Fire Wall per IBC 706
      - 'Addition' no longer
        - » a separate building

TABLE 706.4
FIRE WALL FIRE-RESISTANCE RATINGS

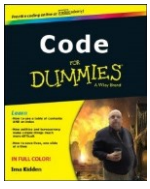
GROUP	FIRE-RESISTANCE RATING (hours)
A, B, E, H-4, I, R-1, R-2, U	3[a]
F-1, H-3[b], H-5, M, S-1	3
H-1, H-2	4[b]
F-2, S-2, R-3, R-4	2

a. In Type II or V construction, walls shall be permitted to have a 2-hour fire-resistance rating.
b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.7 and 415.8.

Existing Building Code

- 1401.2 Chapter 14 Alternative – Important rules
  - 1401.2.4 Alterations & Repairs
    - Cannot reduce building's level of safety or compliance !!!!
    - Any reduction must meet the current Building Code

Really Important Stuff: Do not allow the building to become less safe or sanitary!!!



Existing Building Code

- 1401.2 Chapter 14 Alternative – Important rules
  - 1401.2.5 Accessibility requirements
    - Accessibility is prescriptive
      - Comply with either Section 410 or 705
        - » Prescriptive method
        - » Work area method

Performance option ramp designs?

Existing Building Code

- 1401.3 Acceptance of the Performance Option
  - Building owner's option to exercise this option
    - Therefore, BO must understand this option
  - BO **must** accept option, if exercised
    - BO will verify proper application of this option
    - BO will retain control of the process and documentation
  - Again; limited to *existing* structures:
    - Specified classifications
      - N/A for H group, I-1,1-3,1-4, U
    - Classified work
      - Repairs
      - Alterations
      - Additions
      - Changes of occupancy

Existing Building Code

- 1401.3 Acceptance issues
  - 1401.3.1 Building Hazards Abatement
    - BO must deal with unsafe conditions
      - Section 116 IBC
    - Works with general requirements Chapter 3
      - 302.3 Old materials - safety
      - 302.4 New materials - safety

Existing Building Code

- 1401.3.2 Project must be Fire Code compliant
  - Proposed project must comply with Fire Code:
    - State Fire Code
      - » IEBC compliance **is** Fire Code Part III compliance
      - » CSFSC Part IV applies to untouched existing portions
    - Property Maintenance Code
      - » State Fire Prevention Code
  - BO & FMO must collaborate
    - IBC 105.3.1.2 FMO's OK at permit
    - IBC 111.1.3 FMO's OK before CO

Existing Building Code

- 1401.3 Acceptance
  - 1401.3.3 Flood Hazard Areas
    - This is not a route to escape flood issues
      - *Substantial improvement* = make if right per IBC1612 or IRC322
        - » 50% of pre-improvement value trips the trigger

Performance option?
Water pressure switch operated window openers !

Existing Building Code

- 1401.4.2 Items the BO needs to collect
  - 1. Structural engineering analysis
    - Building's ability to bear proposed loads
      - IBC Chapter 16 current requirements
  - 2. Registered Design Professional Prepared Plans
    - CGS 20-293 unless CGS 20-298 exempt
    - Threshold buildings & additions
  - 3. Completed building analysis
    - Based on properly conducted evaluation process
      - Table 1401.7 Documentation
  - BO's role:
    - Collect required documentation
    - Evaluate information for accuracy

Table 1401.7
The Evaluation Worksheet

Part of the submittal package

Existing Building Code

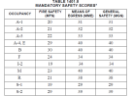
- 1401.5 The Building Evaluation
  - 1401.6 A formal process
    - Based upon Table 1401.7
  - 3 'Safety Parameters'

Existing Building Code

- 1401.5 The Evaluation – 21 Specific Items
  - Height
  - Area
  - Compartmentation
  - Dwelling separation
  - Corridor walls
  - Vertical Openings
  - HVAC Systems
  - Fire detection
  - Fire notification
  - Smoke control
  - Means of egress capacity
  - Dead Ends
  - Exit travel distance
  - Elevator control
  - Emergency lighting
  - Mixed occupancies
  - Fire sprinklers
  - Standpipes
  - Incidental use areas
  - Smoke compartments
  - I-2 Patient Issues

Existing Building Code

- 1401.6 Building Evaluation process
  - Here's the rules of the game……
    - 1. Entire building must be evaluated
      - Separated buildings – each portion individually
      - Non-separated – As a whole
      - We have special rules for I-2 – analyze each smoke compartment
    - 2. The building is formally scored
      - Table 1401.7 is the score sheet
    - 3. The building must attain a minimum score
      - Table 1401.8 sets the minimum acceptable score
        - » In each of the 3 categories
      - Group U is not on the Table
        - » We may use for change from Group U
        - » May NOT use for change to Group U



Existing Building Code

- The Process – Applied to our subject building
  - 1401.6 Building Evaluation Process – An Example
    - Built 1930
    - 3 story former mill
    - No basement
    - 40' height to peak
    - Type IV construction
    - 80' by 200'

  - Building will become a 48 unit apartment building

Existing Building Code

- 1401.6 Type IV Mill to Apartment Building Conversion Proposal
- Leaving Group F to become a Group R-2
  - 1 hour wall for dwelling unit separation
  - 1 hour common corridor construction
  - 1 hour vertical shaft protection
  - 1 hour equivalent rated floor separation
  - Mix of Accessible, A dwelling units, & B dwelling units
  - Phase I & II Elevators, stretcher sized
  - Individual mini-split, 4 zone' HVAC units
  - 16 dwelling units / floor – 48 dwelling unit total
  - Rendered to type V-A construction
    - Concealed spaces created (IBC 602.4)
  - IBC 420.5 compliant NFPA72 Alarm system
    - AC / DC Interconnected smoke detection & notification-common areas
    - AC / DC Smoke alarms in each dwelling unit
    - Manual pull shunts in common corridors & stairs
  - NFPA13 Sprinkler System
    - Per IBC 903.2.8
    - AS water flow is fire alarm system monitored
  - 50' open space separation on all sides of the building, existing small structure impediments will be removed
  - Three exterior wall stairwells with operable windows maintained
  - 4' common corridors with 12' maximum dead-ends
  - 170' maximum travel distance from most remote point in the building
  - Illuminated exit signs with emergency lighting units – 90 minute battery power
  - 40' building height after addition of 'rain roof'
  - 16,000 ft² / floor after filling-in unused shafts

Existing Building Code

- 1401.6.1 Height Formula – Step 1 of 21
  - The lesser value
    - Height in feet
      - Equation 14-1
    - Height in stories
      - Equation 14-2

Important to Note: Regardless of result, maximum score is limited to 10 by Code narrative

1401.6.1.1 Height formula. The following formulas shall be used in computing the building height value.

Height value, feet $= \frac{(AH) - (EBH)}{12.5} \times CF$ **(Equation 14-1)**

Height value, stories $= (AS - EBS) \times CF$ **(Equation 14-2)**

where:

AH = Allowable height in feet (mm) from Section 504 of the *International Building Code*.

EBH = *Existing building* height in feet (mm).

AS = Allowable height in stories from Section 504 of the *International Building Code*.

EBS = *Existing building* height in stories.

CF = 1 if $(AH) - (EBH)$ is positive.

CF = Construction-type factor shown in Table 1401.6.6(2) if $(AH) - (EBH)$ is negative.

Existing Building Code

- 1401.6.1.1 Height Formula – Step 1 of 21
  - IBC permitted height and stories for a R-2, Type V-A with AS
    - IBC Table 504.3 permits an "AH' = 70' overall
    - IBC Table 504.4 permits an 'AS' = 4 Stories

TABLE 504.3*
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION									
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
R	NS[d,h]	UL	160	65	55	65	55	65	50	40
	S13R	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	85	70	60

TABLE 504.4[b]—continued
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
R-2	NS[d,h]	UL	11	4	4	4	4	4	3	2
	S13R	4	4	4					4	3
	S	UL	12	5	5	5	5	5	4	3

Existing Building Code

- 1401.6.1.1 Height Formula – Step 1 of 21
  - IBC permitted height and stories for a R-2, Type V-A with NFPA 13 AS
    - IBC Table 504.3 permits an "AH' = 70' overall
    - IBC Table 504.4 permits an 'AS' = 4 Stories
  - Table 1401.6.6(2) used for CF
    - Only when (AH) – (EBH) is negative

Height value, feet $= \frac{(AH) - (EBH)}{12.5} \times CF$ **(Equation 14-1)**

HV_F= [70-40/12.5]CF

CF = 1 because result is positive

HV_F= 2.4

Height value, stories $= (AS - EBS) \times CF$ **(Equation 14-2)**

HV_S= [4-3] CF

CF =1 because result is positive

HV_S= 1

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1	1	1
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings			
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System			
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Text requires that we enter the lesser value for all three categories.

Again the absolute maximum value to be entered is 10!

Note that building height and area is not limited but will certainly result in many negative points if the building is beyond current IBC limitations.

A designer could control building area with fire separation

Existing Building Code

- 1401.6.2 Area Formula – Step 2 of 21
  - *A_a = IBC Table 506.2 + Frontage Increase*

$A_a = A_t + (NS \times I_f)$ (Equation 14-3)

$A_a = 36{,}000 + (12{,}000 \times .75)$

$A_a = 36000 + 9{,}000$

NOTE: The allowable areas are based on the inclusion of a NFPA 13 sprinkler. This system is beyond the minimum required NFPA 13R system.

A_a = 45,000 ft² per floor based on the sprinklers and open space about the structure

TABLE 506.2[a,b]
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, or SM, as applicable) IN SQUARE FEET

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
R-2	NS[c,b]	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13R	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000

Existing Building Code

- 1401.6.2 Area Formula – Step 2 of 21
  - Calculation is simplified as we are dealing with only one occupancy
    - Second part of equation is used for additional unseparated occupancies

$$\text{Area value } i = \frac{\text{Allowable area}_i}{1{,}200 \text{square feet}}\left[1 - \left(\frac{\text{Actual area}_i}{\text{Allowable area}_i} + \ldots + \frac{\text{Actual area}_n}{\text{Allowable area}_n}\right)\right]$$

(Equation 34-4)

$$\text{Area value } i = \frac{45{,}000}{1{,}200 \text{square feet}}\left[1 - \left(\frac{16{,}000}{45{,}000} + \ldots + \frac{\text{Actual area}_n}{\text{Allowable area}_n}\right)\right]$$

Area value = 37.5[1-(.3555555556)] = 24.2

Area value = 24.2

HOWEVER: 1401.6.2 limits the actual score to 50% of Table 1401.8 value

Therefore; we may take a maximum 50% of 21 or 10.5 points.

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5	1 10.5	1 10.5
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings			
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System			
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Values entered based on permitted maximum of 50% of the 'Fire Safety Score found in Table 1401.8 per 1401.6.2. Note that the lesser of calculated or 50% limitation is applied to all three categories.

Huge points gained based on the voluntary upgrade of the sprinkler from a NFPA 13R to a NFPA 13 system.

NOTE: Installation of a 13R system, as permitted by Code, would have awarded only 4.2 points based on the reduced maximum permitted building area.

Existing Building Code

- 1401.6.3 Fire Area Compartmentation – Step 3 of 21
  - 1401.6.3.1 Walls
    - 2 hour barrier required for consideration
  - 1401.6.3.2 Floor / ceilings
    - 2 hour barrier required for consideration

- NOTE: This section deals with BUILDING compartmentation
  - Compartmentation = Fire walls or barriers
  - No credit for dwelling separation or rated corridors

TABLE 1401.6.3
COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES a Compartment size equal to or greater than 15,000 square feet	b Compartment size of 10,000 square feet	c Compartment size of 7,500 square feet	d Compartment size of 5,000 square feet	e Compartment size of 2,500 square feet or less
A-1, A-3	0	6	10	14	18
A-2	0	4	10	14	18
A-4, B, E, S-2	0	5	10	15	20

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings			
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System			
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

We take the 'goose egg' as our building is not separated into fire compartments by a 2 hour wall. Our compartment is over 15K. Designer could gain 4 points by diving the building into two parts with a fire wall built to IBC Chapter 7 specs.

Existing Building Code

- 1401.6.4 Dwelling Unit Separation – Step 4 of 21
  - Fire rated passive protection between dwelling units
    - a. no fire partition dwelling separation
    - b. partitions of less than 1 hour
      - NOTE: if we were using the prescriptive option, ½ hour would be required with AS per section 420
    - d. One hour & better, less than two hour
    - e. Two hour dwelling unit separation

TABLE 1401.6.4
SEPARATION VALUES

OCCUPANCY	CATEGORIES				
	a	b		d	e
A-1	0	0		0	1
A-2	-5	-3		1	3
A-3, A-4, B, E, F, M, S-1	-4	-3	0	2	4
I-2	0	1	2	3	4
S-2	-5	-2	0	2	4

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0	0	0
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System			
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

We take nothing for the expected one hour rated partition dwelling separation. NOTE possible to lose points for lesser separation

NOTE: Partitioning creates combustible voids within the building. Therefore, 1401.2.4 requires the alterations conform to the IBC as 'new' work. 1 hour separation is a mandate

Existing Building Code

- 1401.6.5 Corridor Wall Rating – Step 5 of 21
  - Note that points can be lost for inadequate protection
    - a. no fire partition
    - b. less than 1 hour
      - NOTE: if we were using the prescriptive option, ½ hour would be required with AS per section 420
    - c. One hour partitions
    - d. Two hour & better

TABLE 1401.6.5
CORRIDOR WALL VALUES

OCCUPANCY	CATEGORIES			
	a	b		d[a]
A-1	-10	-4		2
A-2	-30	-12		2
A-4, B, E, S-2	-5	-2	0	5
I-2	-10	0	1	2

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0	0 0	0 0
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System			
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Again, nothing for the expected rated corridor. Since this work rendered the wide-open building as 'less safe'; 1401.2.4 REQUIRES that the new work conform to the current IBC portion of State Building Code

Existing Building Code

- 1401.6.6 Vertical Openings– Step 6 of 21
  - Protection value multiplied by the construction type factor

TABLE 1401.6.6(1)
VERTICAL OPENING PROTECTION VALUE

PROTECTION	VALUE
None (unprotected opening)	-2 times number of floors connected
Less than 1 hour	-1 times number of floors connected
1 to less than 2 hours	1
2 hours or more	2

TABLE 1401.6.6(2)
CONSTRUCTION-TYPE FACTOR

FACTOR	TYPE OF CONSTRUCTION							
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VB
	1.2	1.5	2.2	3.5	2.5	3.5	2.3	7

- **NOTE**: ALL vertical openings will meet IBC section 713, we will therefore use a Vertical Opening Protection value of **2 per the 1401.6.6 narrative**
  - VO=PV X CF
  - VO=2 X 3.3 = 6.6

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System			
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Picking up points for good shaft protection based on full compliance with existing IBC requirements. Especially important in our void filled, ancient wood framed building.

Note that some very serious point could be lost for poor vertical opening separation

Existing Building Code

- 1401.6.7 HVAC Systems– Step 7 of 21
  - Based on degree of hazard, potential to spread fire / smoke
    - 1401.6.7.1 'categories'
      - a – building cavity plenums
        - » -10 points off
      - b – forced air in MOE
        - » -5 points to the 'bad' side
      - c – A & B combined
        - » -15 points to the negative
      - d – Controlled corridor air movement
        - » 0 points
      - e – Single story HVAC or hydronic
        - » +5 points

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5	5	5
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

We'll take the whole 'pot' for HVAC posing little hazard to the spread of fire or smoke

Existing Building Code

- 1401.6.8 *Fire <u>Detection</u>*– Step 8 of 21
  - We have:
    - Smoke <u>detection</u> in all common areas as part of a fire alarm system
    - *Smoke <u>alarms</u>* in dwelling units don't provide any credit, here
      - Apartment alarms are not part of the common area detection

1. Category a—None.
2. Category b—Existing smoke detectors in HVAC systems and maintained in accordance with the *International Fire Code*.
3. Category c—Smoke detectors in HVAC systems. The detectors are installed in accordance with the requirements for new buildings in the *International Mechanical Code*.
4. Category d—Smoke detectors throughout all floor areas other than individual sleeping units, tenant spaces and dwelling units.
5. Category e—Smoke detectors installed throughout the floor area.
6. Category f—Smoke detectors in corridors only.

Note the potential to lose serious points for poor fire detection

TABLE 1401.6.8
AUTOMATIC FIRE DETECTION VALUES

OCCUPANCY	CATEG				
	a	b	c	e	f
				6	—
A-2	-25	-5	0	5	9	—
A-4, B, E, S-2	-4	-2	0	4	8	—
I-2	NP	NP	NP	4	5	2

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2	5 2	5 2
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Couple of points for a good fire detection scheme

Existing Building Code

- 1401.6.9 *Fire <u>Alarm</u>* Systems – Step 9 of 21
  - Our system meets the prescriptive IBC 907.2.9
    - Common area detection
    - Full building notification
    - Individual smoke alarms in dwelling units

Now we're dealing with the occupant notification portion of fire detection

Cat. A – Nuttin'
Cat. B – Pull box & horns
Cat. C - IBC compliant alarm
Cat. D – Alarm & voice communications

TABLE 1401.6.9
FIRE ALARM SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a	b*		d
F, M, S	0	5	10	15
I-2	-4	1	2	5

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends			
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

System is that which is expected – we make no forward progress in point accumulation.

Again, big points could be lost for poor notification

Existing Building Code

- 1401.6.10 Smoke Control – Step 10 of 21
  - Automatic or manual smoke movement potential
    - a – no system or ventilation provided
    - b -AS + some operable window
    - c – At least 1 enclosed stairs with operable windows
    - d – smoke proof enclosure
    - e – AS + air handler
    - f – 909 compliant system

Our stairs with operable windows give us 3 points. We have meet the requirement imposed by footnote a. No points will be awarded if the building lacks good smoke detection

TABLE 1401.6.10
SMOKE CONTROL VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-2, A-3	0	1		3	6	6
A-4, E	0	0		1	3	5
F, S	0	2[a]	2[a]	3[a]	3[a]	3[a]
I-2	-1	0	0	0	3	0

a. This value shall be 0 if compliance with Category d or e in Section 1401.6.8.1 has not been obtained.

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends	* * * *	3	3
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

We'll take 3 points, but only in 2 categories. 'Fire Safety' is not really an issue - once a fire has started.

Existing Building Code

- 1401.6.11 MOE - Step 11 of 21
  - 1401.6.11.1 Categories
    - a – compliant with use of a fire escape
    - b – proper capacity & number of exits
    - c – good exit width and over abundance (125%) of egress capacity
    - d – plenty of exits and properly located, no excessive travel
    - e – meeting both items 'c' & 'd', above

MOE is a very important Life Safety issue. We can't 'win' points, only lose if a fire escape is part of the egress scheme

TABLE 1401.6.11
MEANS OF EGRESS VALUES[a]

OCCUPANCY	CATEGORIES				
	a	b	c	d	e
A-1, A-2, A-3, A-4, E, I-2	-10	0	2	8	10
M	-3	0	1	2	4
B, F, S	-1	0	0	0	0

a. The values indicated are for buildings six stories or less in height. For buildings over six stories above grade plane, add an additional -10 points.

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends	* * * * * * * *	3 0	3 0
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

At least we didn't lose points.

Based on the extensive alterations to this building ; MOE must at least meet at least the capacity and quantity as required of a new building. The potential to lose points exists when a fire escape is used to meet that required capacity or required quantity.

Existing Building Code

- 1401.6.12 Dead Ends – Step 12 of 21
  - 1401.6.12.1 Categories
    - a – 35'+ / 70'+ with AS
    - c – no dead ends or very wide dead ends
    - D - corridors of death

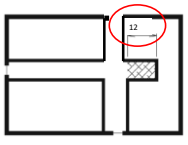


TABLE 1401.6.12
DEAD-END VALUES

OCCUPANCY	CATEGORIES[a]			
	a	b	c	d
	-2		2	-4
A-2, E	-2	0	2	-4
I-2	-2	0	2	-6

a. For dead-end distances between categories, the dead-end value shall be obtained by linear interpolation.

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends	* * * * * * * * * * * *	3 0 0	3 0 0
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting			
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

We could have gained points if the designer had been able to eliminate all dead ends or make the dead ends very wide.

Existing Building Code

- 1401.6.13 Travel Distance– Step 13 of 21
  - Maximum allowable exit access travel distance
    - IBC Table 1017.2
      - 250' permitted with AS

Easy place to gain or lose big points, depending on length of Exit Access Travel Distance

$$\text{Points} = 20 \times \frac{\text{Maximum allowable travel distance} - \text{170' actual}}{\text{Max. allowable travel distance}}$$

(Equation 14-6)

$$\text{Points} = 20 \times \frac{(250 \text{ feet} - 170 \text{ feet})}{250 \text{ feet}}$$

(Equation 14-6)

Points = 20 (80/250) = 6.4

TABLE 1017.2
EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200	250[b]
H-1	Not Permitted	250[b]
B	200	300[c]
F-2, S-2, U	300	400[c]

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends	* * * * * * * * * * * *	3 0 0	3 0 0
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting	* * * *	6.4	6.4
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Nice boost for a fairly short travel distance in an AS protected structure.
Note that a travel distance greater than allowed for a new building would result in lost points.

Keep in mind that the egress capacity, and number of egress, must be compliant per 1401.6.11.1

Existing Building Code

- 1401.6.14 Elevator Control – Step 14 of 21
  - Based on 1401.6.14.1
    - a – no elevator
    - b – elevators without FD control
    - c – phase I & phase II elevators
    - d – phase I / II, stretcher sized elevator, all floors

Note: New stretcher sized elevator voluntarily installed for accessibility and as a marketing scheme to permit bicycle storage inside apartments

TABLE 1401.6.14
ELEVATOR CONTROL VALUES

ELEVATOR TRAVEL	CATEGORIES			
	a	b	c	d
Less than 25 feet of travel above or below the primary level of elevator access for emergency fire-fighting or rescue personnel	-2	0	0	
Travel of 25 feet or more above or below the primary level of elevator access for emergency fire-fighting or rescue personnel	-4	NP	0	+4

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends	* * * * * * * * * * * *	3 0 0	3 0 0
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting	* * * * 2	6.4 2	6.4 2
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Installation of a stretcher capable elevator (intended to accommodate bicycles) boosted the count. Money well spend by a smart designer.

Existing Building Code

- 1401.6.15 MOE Emergency Lighting –15 of 21
  - Based on 1401.6.15.1
    - a – No power = really, really dark
    - b – 90 minute emergency MOE illumination
    - c – Generator emergency power 2+ hour fuel supply

TABLE 1401.6.15
MEANS-OF-EGRESS EMERGENCY LIGHTING VALUES

NUMBER OF EXITS REQUIRED BY SECTION 1015 OF THE *INTERNATIONAL BUILDING CODE*	CATEGORIES		
	a	b	c
Two or more exits	NP		4
Minimum of one exit	0	1	1

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends	* * * * * * * * * * * *	3 0 0	3 0 0
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting	* * * * 2 * * * *	6.4 2 0	6.4 2 0
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Taking the goose eggs for our battery back-emergency lights. Fairly easy to pick-up four additional points with a generator. However, voluntary installation of a new generator would prompt IBC requirements that the unit be sized to handle the new elevator per IBC 3003.1.

Existing Building Code

- 1401.6.16 Mixed Occupancy Value – 16 of 21
  - Based on 1401.6.16.1
    - a – 1 hour fire barriers
    - b – IBC Section 508.4 compliant
    - c – 2 times IBC Table 508.4

No mixed occupancies in our building means no chance to gain or lose points

TABLE 1401.6.16
MIXED OCCUPANCY VALUES[a]

OCCUPANCY	CATEGORIES		
	a	b	c
A-1, A-2, R	-10	0	10
A-3, A-4, B, E, F, M, S	-5	0	5
I-2	NP	0	5

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends	* * * * * * * * * * * *	3 0 0	3 0 0
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting	* * * * 2 * * * *	6.4 2 0	6.4 2 0
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio	0	* * * *	0
Building score—total value			

No mixed occupancies in our building means no chance to gain or lose points

Existing Building Code

- 1401.6.17 Sprinkler System – Step 17 of 21
  - Based on 1401.6.17.1
    - a – required but not properly provided
    - b – partial system required but not properly provided
    - c – not required, not provided
    - d – partial system as required
    - e– complete system as required by IBC 903.2.8
    - f – complete system installed as an option

Our building will be outfitted with a NFPA 13 system. The 13 system exceeds the minimum 13R requirement for a sprinkler system.

TABLE 1401.6.17
SPRINKLER SYSTEM VALUES

OCCUPANCY	CATEGORIES					
	a[e]	b[e]	c	d	e	f
A-1, A-3, F, M, R, S-1	-6	-3	0	2		6
A-2	-4	-2	0	1	2	4
A-4, B, E, S-2	-12	-6	0	3	6	12
I-2	NP	NP	NP	8	10	NP

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height	1	1	1
1401.6.2 Building Area	10.5	10.5	10.5
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	0	0	0
1401.6.6 Vertical Openings	6.6	6.6	6.6
1401.6.7 HVAC Systems	5	5	5
1401.6.8 Automatic Fire Detection	2	2	2
1401.6.9 Fire Alarm System	0	0	0
1401.6.10 Smoke control	* * * *	3	3
1401.6.11 Means of Egress	* * * *	0	0
1401.6.12 Dead ends	* * * *	0	0
1401.6.13 Maximum Exit Access Travel Distance	* * * *	6.4	6.4
1401.6.14 Elevator Control	2	2	2
1401.6.15 Means of Egress Emergency Lighting	* * * *	0	0
1401.6.16 Mixed Occupancies	0	* * * *	0
1401.6.17 Automatic Sprinklers	4	4 ÷2 = 2	4
1401.6.18 Standpipes			
1401.6.19 Incidental Use			
1401.6.20 Smoke compartmentation			
1401.6.21.1 Patient ability for self-preservation			
1401.6.21.2 Patient concentration			
1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Our building will have a NFPA 13 Sprinkler. Protection in all portions of the building will give us some points. Recall that the sprinkler 'upgrade' had a positive impact when earlier consideration was made to building height & area calculations.

Existing Building Code

- 1401.6.18 Standpipes – Step 18 of 21
  - Based on 1401.6.18.1
    - a – required but not properly provided
    - b – not required, not provided
    - c –system as required
    - d – complete system installed as an option

TABLE 1401.6.18
STANDPIPE SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a[a]	b	c	d
A-1, A-3, F, M, R, S-1	-6		4	6
A-2	-4	0	2	4
A-4, B, E, S-2	-12	0	6	12
I-2	-2	0	1	2

a. This option cannot be taken if Category a or Category b in Section 1401.6.17 is used.

No pipe in our building.

No pipe required as the top story floor level is less than 30' above FD access elevation (IBC 905.3.1)

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height	1	1	1
1401.6.2 Building Area	10.5	10.5	10.5
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	0	0	0
1401.6.6 Vertical Openings	6.6	6.6	6.6
1401.6.7 HVAC Systems	5	5	5
1401.6.8 Automatic Fire Detection	2	2	2
1401.6.9 Fire Alarm System	0	0	0
1401.6.10 Smoke control	* * * *	3	3
1401.6.11 Means of Egress	* * * *	0	0
1401.6.12 Dead ends	* * * *	0	0
1401.6.13 Maximum Exit Access Travel Distance	* * * *	6.4	6.4
1401.6.14 Elevator Control	2	2	2
1401.6.15 Means of Egress Emergency Lighting	* * * *	0	0
1401.6.16 Mixed Occupancies	0	* * * *	0
1401.6.17 Automatic Sprinklers	4	4 ÷2 = 2	4
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use			
1401.6.20 Smoke compartmentation			
1401.6.21.1 Patient ability for self-preservation			
1401.6.21.2 Patient concentration			
1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

Another place for a designer to gain some points.

Existing Building Code

- 1401.6.19 Incidental Use Areas – Step 19 of 21
  - Based on IBC Section 509 protection requirements
    - Laundry rooms
    - Waste collection areas
    - Recycling closet
    - Common area maintenance closet

Laundry room & refuse rooms are 1 hour separated & AS protected

TABLE 1401.6.19
INCIDENTAL USE AREA VALUES

PROTECTION REQUIRED BY TABLE 509 OF THE *INTERNATIONAL BUILDING CODE*	PROTECTION PROVIDED						
	None	1 hour	AS	AS with CRS	1 hour and AS	2 hours	2 hours and AS
2 hours and AS	-4	-3	-2	-2	-1	-2	0
2 hours, or 1 hour and AS	-3	-2	-1	-1	0	0	0
	-3	-2	-1	-1		-1	0
1 hour	-1	0	-1	-1	0	0	0
1 hour, or AS with CRS	-1	0	-1	-1	0	0	0
AS with CRS	-1	-1	-1	-1	0	-1	0
1 hour or AS	-1	0	0	0	0	0	0

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height 1401.6.2 Building Area 1401.6.3 Compartmentation	1 10.5 0	1 10.5 0	1 10.5 0
1401.6.4 Tenant and Dwelling Unit Separations 1401.6.5 Corridor Walls 1401.6.6 Vertical Openings	0 0 6.6	0 0 6.6	0 0 6.6
1401.6.7 HVAC Systems 1401.6.8 Automatic Fire Detection 1401.6.9 Fire Alarm System	5 2 0	5 2 0	5 2 0
1401.6.10 Smoke control 1401.6.11 Means of Egress 1401.6.12 Dead ends	* * * * * * * * * * * *	3 0 0	3 0 0
1401.6.13 Maximum Exit Access Travel Distance 1401.6.14 Elevator Control 1401.6.15 Means of Egress Emergency Lighting	* * * * 2 * * * *	6.4 2 0	6.4 2 0
1401.6.16 Mixed Occupancies 1401.6.17 Automatic Sprinklers 1401.6.18 Standpipes 1401.6.19 Incidental Use 1401.6.20 Smoke compartmentation 1401.6.21.1 Patient ability for self-preservation 1401.6.21.2 Patient concentration 1401.6.21.3 Attendant-to-patient Ratio	0 4 0 0	* * * * 4 ÷ 2 = 2 0 0	0 4 0 0
Building score—total value			

Laundry room & trash room are 1 hour separated & AS protected as expected of a NFPA 13 system. We gain nothing for compliance as new.

Existing Building Code

- 1401.6.20 Smoke Compartments– Step 20 of 21
  - Applies only to Group I-2
    - No way to add or lose points

TABLE 1401.6.20
SMOKE COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES[a]		
	a	b	c
I-2	0	NP	NP

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height	1	1	1
1401.6.2 Building Area	10.5	10.5	10.5
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	0	0	0
1401.6.6 Vertical Openings	6.6	6.6	6.6
1401.6.7 HVAC Systems	5	5	5
1401.6.8 Automatic Fire Detection	2	2	2
1401.6.9 Fire Alarm System	0	0	0
1401.6.10 Smoke control	* * * *	3	3
1401.6.11 Means of Egress	* * * *	0	0
1401.6.12 Dead ends	* * * *	0	0
1401.6.13 Maximum Exit Access Travel Distance	* * * *	6.4	6.4
1401.6.14 Elevator Control	2	2	2
1401.6.15 Means of Egress Emergency Lighting	* * * *	0	0
1401.6.16 Mixed Occupancies	0	* * * *	0
1401.6.17 Automatic Sprinklers	4	4 ÷ 2 = 2	4
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use	0	0	0
1401.6.20 Smoke compartmentation	N/A	N/A	N/A
1401.6.21.1 Patient ability for self-preservation			
1401.6.21.2 Patient concentration			
1401.6.21.3 Attendant-to-patient Ratio			
Building score—total value			

N/A to groups other than I-2

Existing Building Code

- 1401.6.21 Patient Capabilities – Step 21 of 21
  - Applies only to I-2
    - 1401.6.21.1 Capability of patients to self-rescue
    - 1401.6.21.2 Number of patients / smoke compartment
    - 1401.6.21.3 Staff to patient ratio

Note that the operational issue of staffing will become a 'special stipulation' to be noted on the C of O per IBC 111.2.
FD also needs to be aware of this 'maintenance' issue.

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height	1	1	1
1401.6.2 Building Area	10.5	10.5	10.5
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	0	0	0
1401.6.6 Vertical Openings	6.6	6.6	6.6
1401.6.7 HVAC Systems	5	5	5
1401.6.8 Automatic Fire Detection	2	2	2
1401.6.9 Fire Alarm System	0	0	0
1401.6.10 Smoke control	* * * *	3	3
1401.6.11 Means of Egress	* * * *	0	0
1401.6.12 Dead ends	* * * *	0	0
1401.6.13 Maximum Exit Access Travel Distance	* * * *	6.4	6.4
1401.6.14 Elevator Control	2	2	2
1401.6.15 Means of Egress Emergency Lighting	* * * *	0	0
1401.6.16 Mixed Occupancies	0	* * * *	0
1401.6.17 Automatic Sprinklers	4	4 ÷ 2 = 2	4
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use	0	0	0
1401.6.20 Smoke compartmentation	N/A	N/A	N/A
1401.6.21.1 Patient ability for self-preservation	* * * *	N/A	N/A
1401.6.21.2 Patient concentration	* * * *	N/A	N/A
1401.6.21.3 Attendant-to-patient Ratio	* * * *	N/A	N/A
Building score—total value			

Again, per the text - N/A to groups other than I-2

Existing Building Code

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height	1	1	1
1401.6.2 Building Area	10.5	10.5	10.5
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	0	0	0
1401.6.5 Corridor Walls	0	0	0
1401.6.6 Vertical Openings	6.6	6.6	6.6
1401.6.7 HVAC Systems	5	5	5
1401.6.8 Automatic Fire Detection	2	2	2
1401.6.9 Fire Alarm System	0	0	0
1401.6.10 Smoke control	* * * *	3	3
1401.6.11 Means of Egress	* * * *	0	0
1401.6.12 Dead ends	* * * *	0	0
1401.6.13 Maximum Exit Access Travel Distance	* * * *	6.4	6.4
1401.6.14 Elevator Control	2	2	2
1401.6.15 Means of Egress Emergency Lighting	* * * *	0	0
1401.6.16 Mixed Occupancies	0	* * * *	0
1401.6.17 Automatic Sprinklers	4	4 ÷2 = 2	4
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use	0	0	0
1401.6.20 Smoke compartmentation	N/A	N/A	N/A
1401.6.21.1 Patient ability for self-preservation	* * * *	N/A	N/A
1401.6.21.2 Patient concentration	* * * *	N/A	N/A
1401.6.21.3 Attendant-to-patient Ratio	* * * *	N/A	N/A
Building score—total value	31.1	38.5	40.5

Tally it up!

Existing Building Code

- 1401.8 Mandatory Minimum Safety Scores
  - Our result:
    - FS= 31.1
    - ME= 38.5
    - GS= 40.5
  - Compliant !

TABLE 1401.8
MANDATORY SAFETY SCORES[a]

OCCUPANCY	FIRE SAFETY (MFS)	MEANS OF EGRESS (MME)	GENERAL SAFETY (MGS)
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
S-1	19	29	29
S-2	29	39	39

Existing Building Code

- Evaluation Notes:
  - 1401.9 Evaluation of Fire Separated Occupancies
    - 1401.9.1 Mixed Occupancy Buildings
      - Separated Occupancies meeting 1401.6.6 - Cat. A, B, or C
        - » Each occupancy individually evaluated

M group Minimum score 23-40-40	B group Minimum score 30-40-40	A-2 group Minimum score 21-32-32

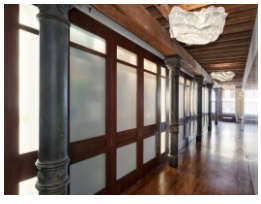
Existing Building Code

- Evaluation Notes:
  - 1401.9 Evaluation of Non-Separated Occupancies
    - 1401.9.1 Mixed Occupancy Buildings
      - Non-separated Occupancies
        - » Evaluation based on all relevant occupancy groups
        - » Occupancy with lowest GS score prevails for all occupancies

M group Minimum score per A-2 occupancy	B group Minimum score per A-2 occupancy	A-2 group Minimum score 21-32-32 Applies to all non-separated occupancies

Existing Building Code

- Before we go away…..Resource A
  - Guidelines for Fire Rating of Archaic Assemblies
    - Part I - Walls
    - Part II – Columns
    - Part III - Floor / ceiling assemblies
    - Part IV – Beams
    - Part V – Doors
- A resource option for use by design engineers
- BO must understand the option



Existing Building Code

- Wrap-up - IEBC Performance Compliance
  - 1 of 3.1 compliance options
  - If applicant selects, BO must accept choice
  - Limited to specified use groups
  - BO administers Code
  - Engineering report required
  - Formal building use analysis required
  - Accessibility issues remain prescriptive
  - Flood provisions apply upon substantial improvement
  - IEBC compliance = Fire Code compliance for the evaluated part
  - Special rules for evaluation of mixed occupancies

What did I fail to address?

Use of OEDM Training Materials

Use of Office of Education and Data Management (OEDM) training materials must be approved in writing by the State of Connecticut, Department of Administrative Services' Office of Communications. In approving of such use, the State of Connecticut assumes no liability associated with such use, including, but not limited to, the user's dissemination of any inaccurate information or interpretation in connection with its use of these training materials. Use of the training materials is at the sole risk of the user, and the State's approval of the use does not constitute an endorsement of the user or its intended use.

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