OHIO BOARD OF BUILDING STANDARDS

EXISTING BUILDINGS
OBC CHAPTER 34

Better Codes, Better Buildings, Safer Ohio

OBC CHAPTER 34 – EXISTING BUILDINGS

SECTION 3401
GENERAL

3401.1 Scope. *The provisions of this chapter shall control the maintenance, alteration, repair, addition and change of occupancy of existing structures.*

3401.1.1 Compliance*. Compliance shall be demonstrated by meeting the requirements of one of the following options:*

1. *Chapters 2 through 33 of this code; or*
2. *Sections 3403 through 3411; or*
3. *Section 3412 Compliance Alternatives.*

3401.1.1.1 Energy Code Compliance. *Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall also comply with the provisions for alterations, repairs, additions and changes of occupancy or relocation in the International Energy Conservation Code, and the ASHRAE 90.1 as referenced in Chapter 35. Where provisions of the other codes conflict with provisions of this chapter, the provisions of this chapter shall take precedence.*

3401.1.2 Occupancy and use. *When determining the appropriate application of the referenced sections of this code, the occupancy and use of a building shall be determined in accordance with Chapter 3.*

3401.1.3 General Requirements. *Section 3406 Fire Escapes, 3407 Glass Replacement, and 3411 Accessibility for Existing Buildings shall apply to all buildings within the scope of Chapter 34.*

3401.2 Maintenance. *Buildings, structures, equipment and parts thereof, shall be maintained in a safe and sanitary condition and in accordance with the condition(s) established in current and any previous plan approvals and certificates of occupancy. Devices or safeguards which are required by this code shall be maintained in conformance with the code edition under which installed. The owner or the owner's designated agent shall be responsible for the maintenance of buildings and structures. To determine compliance with this subsection, the building official shall have the authority to require a building or structure to be inspected. The requirements of this chapter shall not provide the basis for removal or abrogation of fire protection and safety systems and devices in existing structures without approval of the building official.*

3401.3 Building materials and systems*. Building materials and systems shall comply with the requirements of this section.*

3401.3.1 Existing materials*. Materials already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the building code official to be dangerous to life, health or safety per Section 109. Where such conditions are determined to be dangerous to life, health or safety, they shall be mitigated or made safe.*

3401.3.2 New and replacement materials*. Except as otherwise required or permitted by this code, materials permitted by the applicable code for new construction shall be used. Like materials shall be permitted for repairs and alterations, provided no hazard to life, health or property is created. Hazardous materials shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.*

3401.3.3 Used materials and products*. The use of used materials and products which meet the requirements of this code for new materials and products is permitted. Used products and materials shall not be reused unless approved by the building official.*

3401.3.4 Renovation, repair, and paint certification requirements and asbestos abatement. *The contractor requirements for the "Renovation, Repair, and Paint" certification program and the contractor requirements for asbestos abatement are within the jurisdiction of the rules of the Ohio Department of Health and the Ohio Environmental Protection Agency respectively.*

3401.3.5 Fire resistance determination for existing assemblies and materials. *When this chapter requires a fire resistive assembly or component, and there is no available evidence matching the assembly or component to a tested, rated assembly or component, the fire resistance rating of the existing assembly or component shall be evaluated by using Section 721 or "Resource A, Guidelines on Fire Ratings of Archaic Materials and Assemblies" in the "International Existing Buildings Code".*

3401.4 Compliance with seismic forces. *Where compliance with the seismic design provisions of this code is required, the procedures shall be in accordance with the following:*

3401.4.1 Existing seismic force-resisting systems. *Values of R, Ω_0, and ~~Cd~~ C_d for the existing seismic force-resisting system shall be those specified by this code for an ordinary system unless it is demonstrated that the existing system will provide performance equivalent to that of a detailed, intermediate or special system. Seismic systems not having an ASCE 7 category of ordinary shall be analyzed using ASCE 7 values for the respective system.*

3401.4.2 Seismic Evaluation and Design Procedures. *The seismic evaluation and design shall be based on the procedures specified in Chapter 16 or ASCE 41 per this section.*

1. *Chapter 16 of this code using one hundred per cent of the prescribed forces, or,*
2. *Compliance with ASCE 41 based on the applicable performance level as shown in Table 3401.4.2. It shall be permitted to use the "BSE-1E" earthquake hazard level as defined in ASCE 41.*

3401.4.3 Compliance with reduced seismic forces. *Where seismic evaluation and design is permitted to meet reduced seismic force levels in accordance with Section 3405, the procedures used shall be in accordance with this code using seventy- five per cent of the prescribed forces. Values of R, Ωo, and C_d used for analysis shall be as specified in Section 3401.4.1 of this code.*

TABLE 3401.4.2
PERFORMANCE OBJECTIVE FOR USE IN ASCE 41 FOR COMPLIANCE WITH REDUCED BUILDING CODE-LEVEL SEISMIC FORCES

RISK CATEGORY (BASED ON OBC TABLE 1604.5)	*STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1E EARTHQUAKE HAZARD LEVEL*
I	*Life Safety (3-C)*
II	*Life Safety (3-C)*
III	*Damage Control (2-B)*
IV	*Immediate Occupancy (1-B)*

3401.5 Dangerous conditions. *The building official shall have the authority to require the elimination of conditions deemed dangerous in accordance with Section 109.*

3401.6 Concrete evaluation and design procedures. *Evaluation and design of structural concrete repairs and rehabilitation shall be in compliance with Chapter 34 and ACI 562.*

SECTION 3402
DEFINITIONS

3402.1 Definitions. *The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein.*

The following terms are defined in Chapter 2.

ADDITION.
ALTERATION.
CHANGE OF OCCUPANCY.

DANGEROUS.
EXISTING STRUCTURE.
HISTORIC BUILDING.
MAINTENANCE.
PRIMARY FUNCTION.
SUBSTANTIAL STRUCTURAL DAMAGE.
TECHNICALLY INFEASIBLE.

SECTION 3403
ADDITIONS

***3403.1 General**. Additions to any building or structure shall comply with the requirements of this code for new construction. Alterations to the existing building or structure shall be made to ensure that the existing building or structure together with the addition are no less conforming with the provisions of this code than the existing building or structure was prior to the addition. An existing building together with its additions shall comply with the requirements of 3403.1.1 or 3403.1.2 depending on the occupancy of the building.*

***3403.1.1 Additions to buildings of Groups R and I occupancies.** The combined height and area of the existing building and the addition shall not exceed the height and area allowed by chapter 5. Where a fire wall that complies with section 706 is provided between the addition and the existing building, the addition shall be considered a separate building.*

3403.1.2 Additions to buildings of Groups other than R and I occupancies.
When the combined height and area of the existing building and the addition exceeds the height or area allowed by Chapter 5 including any area increases permitted, the following shall be permitted:

1. *A fire wall that complies with Section 706 shall be constructed between the existing building and the addition. When a fire wall is constructed to separate the existing building from the addition, the addition shall be considered a separate building.*
2. *A fire barrier that complies with Section 707 as required for separating fire areas shall be provided between the addition and the existing building. When a fire barrier is constructed to separate the existing building from the addition, all the following shall apply.*
    a. *The combined height and area of the addition and existing building shall be used to determine the construction type and fire protection requirements for the addition.*
    b. *The construction type of the existing building and the addition may differ.*
    c. *Fire protection system is not required in the existing building when a fire protection system is required in the addition.*
    d. *When calculating the allowable combined height and area of the existing building and the addition in accordance with Chapter 5, the tabular values corresponding to a building equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 shall be used whether or not the existing building is provided throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.*
3. *When the combined height and area of the existing building and the addition does not exceed the height and area allowed by Chapter 5, but the area of the existing building plus the new addition creates a fire area greater than the threshold limits of Chapter 9, one of the following shall be provided:*
    1. *A fire barrier to limit the fire area; or*
    2. *An automatic sprinkler system in the addition extends into the existing building to a barrier or partition.*

***3403.2 Flood hazard areas**. For buildings and structures in flood hazard areas established in Section 1612.3, any addition that constitutes substantial improvement of the existing structure, as defined in Chapter 2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.*
For buildings and structures in flood hazard areas established in Section 1612.3, any additions that do not constitute substantial improvement or substantial damage of the existing structure, as defined in Chapter 2, are

not required to comply with the flood design requirements for new construction.

3403.3 Existing structural elements carrying gravity load. *Any existing gravity load-carrying structural element for which an addition and its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened, supplemented, replaced or otherwise altered as needed to carry the increased load required by this code for new structures. Any existing gravity load carrying structural element whose gravity load-carrying capacity is decreased shall be considered an altered element subject to the requirements of Section 3404.3. Any existing element that will form part of the lateral load path for any part of the addition shall be considered an existing lateral load-carrying structural element subject to the requirements of Section 3403.4.*

3403.3.1 Design live load*. Where the addition does not result in increased design live load, existing gravity load-carrying structural elements shall be permitted to be evaluated and designed for live loads approved prior to the addition. If the approved live load is less than that required by Section 1607, the area designed for the nonconforming live load shall be posted with placards of approved design indicating the approved live load. Where the addition does result in increased design live load, the live load required by Section 1607 shall be used.*

3403.3.2 Snow load. *Any structural element of an existing building subjected to additional loads from the effects of snow drift as a result of an addition shall comply with the building code.*

Exceptions:

1. *Structural elements whose stress is not increased by more than 5 percent.*
2. *Buildings of Group R occupancy with no more than five dwelling units or sleeping units used solely for residential purposes where the existing building and the addition comply with the conventional light-frame construction methods of the building code or the provisions of the residential code of Ohio.*

3403.4 Existing structural elements carrying lateral load. *Where the addition is structurally independent of the existing structure, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the addition is not structurally independent of the existing structure, the existing structure and its addition acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 3401.4.2.*

Exception*: Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is no more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 3401.4.2. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.*

3403.5 Smoke alarms. *When additions are made to sleeping rooms or in the immediate vicinity of the sleeping rooms in Group R or I-1 occupancies, smoke alarms shall be installed in accordance with the provisions of this code, the household fire warning equipment provisions of NFPA 72, and shall be listed in accordance with UL 217.*

Exceptions:

1. *Work involving the exterior surfaces, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck are exempt from the requirements of this section.*
2. *Installation or alteration of plumbing or mechanical systems are exempt from the requirements of this section.*

3403.5.1 Power source. *Required smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source for the following conditions:*

1. *In new dwelling units or sleeping areas.*
2. *In existing dwelling units or sleeping areas where there is an attic, crawl space, or basement available which could provide access for hard-wiring.*

3. *In existing dwelling units or sleeping areas where the existing interior finishes are removed, exposing the structure.*

Exceptions:

1. *Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power.*
2. *Hard-wiring of new smoke alarms installed in existing finished areas shall not be required where there is not access to an attic, crawl space, or basement, as described above, and where the removal of interior wall or ceiling finishes exposing the structure, is not otherwise proposed. Listed conventional battery operated smoke alarms or listed battery operated low-power radio (wireless) alarms are permitted to be installed in these existing finished areas.*

3403.5.2 Interconnection. *Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section 3403.5.1, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of smoke alarms shall not be required where listed low-power radio (wireless) alarms are installed and all alarms sound upon activation of one alarm.*

Exceptions:

1. *Interconnection is not required in buildings that are not undergoing alterations, repairs, or construction of any kind.*
2. *Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for interconnection without the removal of interior finishes.*

SECTION 3404
ALTERATIONS

3404.1 General. *Except as provided by Section 3401.4 or this section, alterations to any building, structure, or system (egress, fire protection, smoke control, mechanical, plumbing, etc.) shall comply with the requirements of the code for new construction to the extent of the alteration. Portions of the structure not altered and not affected by the alteration are not required to comply with the code requirements for a new structure. Alterations shall be such that the existing building, structure, or system is no less complying with the provisions of this code than the existing building or structure was prior to the alteration.*

Exceptions:

1. *An existing stairway shall not be required to comply with the requirements of Chapter 10 where the stairs conform to the criteria of a prior edition of the OBC.*
2. *A new stair shall not be required to comply with the required tread and risers if replacing an existing stair where the existing space and construction does not allow a reduction in pitch or slope.*
3. *Handrails shall not be required to comply with the requirements of Section 1012.6 regarding full extension of the handrails where such extensions would be hazardous due to plan configuration.*

3404.1.1 Alterations to systems, components and materials. *When alterations are proposed to existing systems, the existing systems, materials, or components shall not be required to comply with all of the requirements of this code for new construction except to the extent that they are affected by the alteration. Additions or alterations to existing systems, materials, or components shall not cause them to become unsafe, hazardous, overloaded, or become less effective than when originally installed, constructed and/or approved. Existing systems that are proposed to be modified shall not require resizing as long as the load on the system is not increased and the system length is not increased, even if the existing system does not meet current code minimums.*

3404.2 Flood hazard areas. *For buildings and structures in flood hazard areas established in Section 1612.3, any alteration that constitutes substantial improvement of the existing structure, as defined in Chapter 2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.*

For buildings and structures in flood hazard areas established in Section 1612.3, any alterations that do not

constitute substantial improvement or substantial damage of the existing structure, as defined in Chapter 2, are not required to comply with the flood design requirements for new construction.

3404.3 Existing structural elements carrying gravity load. *Any existing gravity load-carrying structural element for which an alteration causes an increase in design gravity load of more than 5 percent shall be strengthened, supplemented, replaced or otherwise altered as needed to carry the increased gravity load required by this code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the alteration shall be shown to have the capacity to resist the applicable design gravity loads required by this code for new structures.*

> ***3404.3.1 Design live load.*** *Where the alteration does not result in increased design live load, existing gravity load-carrying structural elements shall be permitted to be evaluated and designed for live loads approved prior to the alteration. If the approved live load is less than that required by Section 1607, the area designed for the nonconforming live load shall be posted with placards of approved design indicating the approved live load. Where the alteration does result in increased design live load, the live load required by Section 1607 shall be used.*

3404.4 Existing structural elements carrying lateral load. *Except as permitted by Section 3404.5, where the alteration increases design lateral loads in accordance with Sections 1609 or 3401.4.2, or where the alteration results in a structural irregularity as defined in ASCE 7, or where the alteration decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the requirements of Sections 1609 or 3401.4.2.*

> ***Exception****: Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is no more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces per Sections 1609 and 3401.4.2. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of additions and alterations since original construction.*

3404.5 Voluntary seismic improvements*. Alterations to existing structural elements or additions of new structural elements that are not otherwise required by this chapter and are initiated for the purpose of improving the performance of the seismic force-resisting system of an existing structure or the performance of seismic bracing or anchorage of existing nonstructural elements shall be permitted, provided that an engineering analysis is submitted demonstrating the following:*

1. *The altered structure and the altered nonstructural elements are no less in compliance with the provisions of this code with respect to earthquake design than they were prior to the alteration.*
2. *New structural elements are detailed and connected to the existing structural elements as required by Chapter 16.*
3. *New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by Chapter 16.*
4. *The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.*

3404.6 Smoke alarms. *When alterations are made to sleeping rooms or in the immediate vicinity of the sleeping rooms in Group R or I-1 occupancies, smoke alarms shall be installed in accordance with the provisions of this code, the household fire warning equipment provisions of NFPA 72, and shall be listed in accordance with UL 217.*

> ***Exceptions:***
>
> 1. *Work involving the exterior surfaces, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck are exempt from the requirements of this section.*
> 2. *Installation or alteration of plumbing or mechanical systems are exempt from the requirements of this section.*

3404.6.1 Power source. Required smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source for the following conditions:

1. *In new dwelling units or sleeping areas.*
2. *In existing dwelling units or sleeping areas where there is an attic, crawl space, or basement available which could provide access for hard-wiring.*
3. *In existing dwelling units or sleeping areas where the existing interior finishes are removed, exposing the structure.*

Exceptions:

1. *Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power.*
2. *Hard-wiring of new smoke alarms installed in existing finished areas shall not be required where there is not access to an attic, crawl space, or basement, as described above, and where the removal of interior wall or ceiling finishes exposing the structure, is not otherwise proposed. Listed conventional battery operated smoke alarms or listed battery operated low-power radio (wireless) alarms are permitted to be installed in these existing finished areas.*

3404.6.2 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section 3403.5.1, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of smoke alarms shall not be required where listed low-power radio (wireless) alarms are installed and all alarms sound upon activation of one alarm.

Exceptions:

1. *Interconnection is not required in buildings that are not undergoing alterations, repairs, or construction of any kind.*
2. *Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for interconnection without the removal of interior finishes.*

SECTION 3405
REPAIRS

3405.1 General. Building and structures, and parts thereof, shall be repaired in compliance with Section 3405 and 3401.2. Work on nondamaged components shall be considered part of the repair and shall not be subject to the requirements for alterations in this chapter. Routine maintenance required by Section 3401.2, minor repairs exempt from approval in accordance with Section 102.10.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for repairs in this section.

3405.2 Substantial structural damage to vertical elements of the lateral force resisting system. A building that has sustained substantial structural damage to the vertical elements of its lateral force-resisting system shall be evaluated and repaired in accordance with the applicable provisions of Sections 3405.2.1 through 3405.2.3.

Exception: Buildings assigned to Seismic Design Category A, B, or C whose substantial damage was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.

3405.2.1 Evaluation. The building shall be evaluated by a registered design professional, and the evaluation findings shall be submitted to the building official. The evaluation shall establish whether the damaged building, if repaired to its pre-damage state, would comply with the provisions of this code for wind and earthquake loads.

Wind loads for this evaluation shall be those prescribed in Section 1609. Earthquake loads for this evaluation, if required, shall be those prescribed in Section 3401.4.3.

3405.2.2 Extent of repair for compliant buildings. If the evaluation establishes compliance of the pre-damage building in accordance with Section 3405.2.1, then repairs shall be permitted that restore the building to its pre-damage state based on material properties and design strengths applicable at the time

of original construction.

***3405.2.3 Extent of repair for noncompliant buildings**. If the evaluation does not establish compliance of the pre-damage building in accordance with Section 3405.2.1, then the building shall be rehabilitated to comply with applicable provisions of this code for load combinations, including wind or seismic loads. The wind loads for the repair shall be as required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be as required by the code. Earthquake loads for this rehabilitation design shall be those required for the design of the pre-damage building, but not less than 75 percent of those prescribed in Section 1613. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.*

***3405.3 Substantial structural damage to gravity load-carrying components.** Gravity load-carrying components that have sustained substantial structural damage shall be rehabilitated to comply with the applicable provisions of this code for dead and live loads. Snow loads shall be considered if substantial structural damage was caused by or related to snow load effects. Existing gravity load-carrying structural elements shall be permitted to be designed for live loads approved prior to the damage. Existing gravity load-carrying structural elements that were damaged due to snow loading shall be rehabilitated to comply with snow load requirements of this code for new buildings. Non-damaged gravity load-carrying components that receive dead, live or snow loads from rehabilitated components shall also be rehabilitated or shown to have the capacity to carry the design loads of the rehabilitation design. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.*

***3405.3.1 Lateral force-resisting elements**. Regardless of the level of damage to vertical elements of the lateral force-resisting system, if substantial structural damage to gravity load-carrying components was caused primarily by wind or earthquake effects, then the building shall be evaluated in accordance with Section 3405.2.1 and, if noncompliant, rehabilitated in accordance with Section 3405.2.3.*

***Exception**: Buildings assigned to Seismic Design Category A, B, or C whose substantial structural damage was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.*

***3405.4 Less than substantial structural damage**. For damage less than substantial structural damage, repairs shall be allowed that restore the building to its pre-damage state based on material properties and design strengths applicable at the time of the original construction. New structural members and connections used for this repair shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.*

***3405.5 Flood hazard areas**. For buildings and structures in flood hazard are as established in Section 1612.3, any repair that constitutes substantial improvement of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.*
For buildings and structures in flood hazard areas established in Section 1612.3, any repairs that do not constitute substantial improvement or repair of substantial damage of the existing structure, as defined in Section 1612.2, are not required to comply with the flood design requirements for new construction.

SECTION 3406
FIRE ESCAPES

***3406.1 Where permitted**. Fire escapes shall be permitted only as provided for in Sections 3406.1.1 through 3406.1.3.*

***3406.1.1 Existing fire escapes**. Existing fire escapes shall be continued to be accepted as a component in the means of egress in existing buildings only.*

***3406.1.2 New fire escapes**. New fire escapes for existing buildings shall be permitted only where exterior*

stairs cannot be utilized due to lot lines limiting stair size or due to the sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

***Exception**: In existing adult group homes and when an existing building is proposed to be used for a change of occupancy to an adult group home, new fire escapes shall be permitted as a means of Emergency escape/fire department access.*

***3406.1.3 Limitations.** Fire escapes shall comply with this section and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent of the required exit capacity.*

***3406.2 Location.** Where located on the front of the building and where projecting beyond the building line, the lowest landing shall not be less than 7 feet (2134 mm) or more than 12 feet (3658 mm) above grade, and shall be equipped with a counterbalanced stairway to the street. In alleyways and thoroughfares less than 30 feet (9144 mm) wide, the clearance under the lowest landing shall not be less than 12 feet (3658 mm).*

***3406.3 Construction**. The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal 2 inches (51 mm) thick are permitted on buildings of Type 5 construction. Walkways and railings located over or supported by combustible roofs in buildings of Type 3 and 4 construction are permitted to be of wood not less than nominal 2 inches (51 mm) thick.*

***3406.4 Dimensions**. Stairs shall be at least 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm) and landings at the foot of stairs not less than 40 inches (1016 mm) wide by 36 inches (914 mm) long, located not more than 8 inches (203 mm) below the door.*

***3406.5 Opening protectives**. Doors and windows along the fire escape shall be protected with ¾ hour opening protectives.*

SECTION 3407
GLASS REPLACEMENT

***3407.1 Conformance**. The installation or replacement of glass shall be as required for new installations.*

SECTION 3408
CHANGE OF OCCUPANCY

***3408.1 Conformance.** A change of occupancy of an existing building or space shall be permitted without conforming to all the requirements of this code, provided the proposed use is not more hazardous than the existing use, based on an analysis of life and fire risk. Such analysis is permitted to be based upon the provisions of section 3412. If the proposed use is more hazardous than the existing use, such building shall be made to comply with the requirements of chapters 3 through 12 and 14 through 33 or with section 3412 of this chapter.*

***3408.2 Certificate of occupancy**. A certificate of occupancy shall be issued where it has been determined that the requirements of section 3408 have been met, there are no outstanding orders and it has been determined that no serious hazards exist.*

***3408.3 Stairways**. Existing stairways in an existing structure shall not be required to comply with the requirements of a new stairway as outlined in Sections 1011, 1014, and 1015.*

***3408.4 Snow, Wind, and Seismic Design.** When a change of occupancy results in a structure being reclassified to a higher risk category, the structure shall conform to the snow, wind, and seismic requirements for a new structure of the higher risk category.*

***Exceptions**:*

1. *Specific seismic detailing requirements of Section 1613 for a new structure shall not be required to be met where the seismic performance is shown to be equivalent to that of a new structure. A demonstration of equivalence shall consider the regularity, over strength, redundancy and ductility of the structure.*

2. *When a change of use results in a structure being reclassified from Risk Category I or II to Risk Category III and the structure is located where the seismic coefficient, SDS, is less than 0.33, compliance with the seismic requirements of Section 1613 are not required.*
3. *When a change of use results in a building being reclassified from Risk Category I or II to Risk Category III, work is not required to upgrade the roof snow load capacity or building capacity to resist wind loading, provided the building meets industry standards in place at the time of original construction for snow and wind loading.*

SECTION 3409
HISTORIC BUILDINGS

***3409.1 Historic buildings**. The provisions of this code relating to the construction, repair, alteration, addition, restoration and movement of structures, and change of occupancy shall not be mandatory for historic buildings where such buildings are judged by the building official to not constitute a distinct life safety hazard.*

SECTION 3410
MOVED STRUCTURES

***3410.1 Conformance**. Structures moved shall be safe and sanitary and any repair, alteration, or change in occupancy shall comply with the provisions of this code for new structures. Field work, building location, foundations and foundation connections, wind loads, seismic loads, snow loads, and flood loads, shall comply with the requirements of this code.*
The building official shall be authorized to inspect, or require inspection at the expense of the owner, the various components of a relocated building to verify that they have not sustained damage. Building service equipment, mechanical, plumbing, and fire protection systems shall be tested to assure that they are in operating condition. Any repairs or alterations required as a result of such inspections shall be approved and completed prior to issuance of the certificate of occupancy.
Buildings previously approved as industrialized units, when moved after first occupancy are to be evaluated for conformance in accordance with this section by the building official in the jurisdiction where the building is intended to be relocated.

SECTION 3411
ACCESSIBILITY FOR EXISTING BUILDINGS

***3411.1 Scope**. The provisions of Sections 3411.1 through 3411.9 apply to maintenance, change of occupancy, additions and alterations to existing buildings, including those identified as historic buildings.*

***3411.2 Maintenance of facilities**. A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.*

***3411.3 Extent of application**. An alteration of an existing element, space or area of a building or facility shall not impose a requirement for greater accessibility than that which would be required for new construction. Alterations shall not reduce or have the effect of reducing accessibility of a building, portion of a building or facility.*

***3411.4 Change of occupancy**. Existing buildings that undergo a change of group or occupancy shall comply with this section.*

***Exception**: Type B dwelling units or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with alterations where the area being altered is 50 percent or less of the aggregate area of the building.*

***3411.4.1 Partial change in occupancy**. Where a portion of the building is changed to a new occupancy classification, any alterations shall comply with Sections 3411.6, 3411.7 and 3411.8.*

***3411.4.2 Complete change of occupancy**. Where an entire building undergoes a change of occupancy, it shall comply with Section 3411.4.1 and shall have all of the following accessible features:*

1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1111.
4. Accessible parking, where parking is being provided.
5. At least one accessible passenger loading zone, when loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

Exception: *The accessible features listed in Items 1 through 6 are not required for an accessible route to Type B units.*

3411.5 Additions*. Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section 3411.7.*

3411.6 Alterations*. A building, facility or element that is altered shall comply with the applicable provisions in Chapter 11 of this code, unless technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent technically feasible.*

Exceptions*:*

1. *The altered element or space is not required to be on an accessible route, unless required by Section 3411.7.*
2. *Accessible means of egress required by Chapter 10 are not required to be provided in existing buildings and facilities.*
3. *The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall meet the provision for a Type B dwelling unit shall be permitted to meet the provision for a Type B dwelling unit.*
4. *Type B dwelling or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with alterations where the area of the alteration is 50 percent or less of the aggregate area of the building.*

3411.7 Alterations affecting an area containing a primary function*. Where an alteration affects the accessibility to, or contains an area of primary function, the route to the primary function area and the amenities serving the area shall be accessible. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.*

Exceptions:

1. *The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function. The determination of disproportionality and the conditions for applying this exception shall be in accordance with section 3411.7.1.*
2. *This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.*
3. *This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.*
4. *This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of an existing building, facility or element.*
5. *This provision does not apply to altered areas limited to Type B dwelling and sleeping units.*

3411.7.1 Disproportionate costs and alternative compliance. *Alterations required to be made to provide an accessible path of travel to the altered area will be deemed disproportionate to the overall alteration when the cost exceeds twenty per cent of the cost of the alteration to the primary function area. The determination of disproportionate costs shall be made and applied in accordance with the following:*

1. *Costs that may be counted as expenditures required to provide an accessible path of travel may include:*

1.1 Costs associated with providing an accessible entrance and an accessible route to the altered

area, for example, the cost of widening doorways or installing ramps;

1.2 Costs associated with making restrooms accessible, such as installing grab bars, enlarging toilet stalls, insulating pipes, or installing accessible faucet controls;

1.3 Costs associated with providing accessible telephones, such as relocating the telephone to an accessible height, installing amplification devices, or installing a telecommunications device for deaf persons (TDD);

1.4 Costs associated with relocating an inaccessible drinking fountain.

2. Required accessible features in the event of disproportionality.

2.1 When the cost of alterations necessary to make the path travel to the altered area fully accessible is disproportionate to the cost of the overall alteration, the path of travel shall be made accessible to the extent that it can be made accessible without incurring disproportionate costs.

2.2 In choosing which accessible elements to provide, priority should be given to those elements that will provide the greatest access, in the following order:

2.2.1. An accessible entrance;

2.2.2. An accessible route to the altered area;

2.2.3. At least one accessible restroom for each sex or a single unisex restroom;

2.2.4. Accessible telephones;

2.2.5. Accessible drinking fountains;

2.2.6. When possible, additional accessible elements such as parking, storage, and alarms.

3. Series of smaller alterations. The obligation to provide an accessible path of travel may not be evaded by performing a series of small alterations to the area served by a single path of travel if those alterations could have been performed as a single undertaking.

3.1 If an area containing a primary function has been altered without providing an accessible path of travel to that area, and subsequent alterations of that area, or a different area on the same path of travel, are undertaken within three years of the original alteration, the total cost of alterations to the primary function areas on that path of travel during the preceding three year period shall be considered in determining whether the cost of making that path of travel accessible is disproportionate.

***3411.8 Scoping for alterations**. The provisions of Sections 3411.8.1 through 3411.8.15 shall apply to alterations to existing buildings and facilities.*

***3411.8.1 Entrances**. Accessible entrances shall be provided in accordance with Section 1105.*

***Exception**: Where an alteration includes alterations to an entrance, and the building or facility has an accessible entrance, the altered entrance is not required to be accessible, unless required by Section 3411.7. Signs complying with Section 1111 shall be provided.*

***3411.8.2 Elevators**. Altered elements of existing elevators shall comply with ASME A17.1 and Chapter 11. Such elements shall also be altered in elevators programmed to respond to the same hall call control as the altered elevator.*

***3411.8.3 Platform lifts**. Platform (wheelchair) lifts complying with Chapter 11 and installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route.*

***3411.8.4 Stairs and escalators in existing buildings**. In alterations, change of occupancy or additions where an escalator or stair is added where none existed previously and major structural modifications are necessary for installation, anaccessible route shall be provided between the levels served by the escalator or stairs in accordance with Sections 1104.4 and 1104.5.*

***3411.8.5 Ramps**. Where slopes steeper than allowed by Section 1012.2 are necessitated by space limitations, the slope of ramps in or providing access to existing buildings or facilities shall comply with Table 3411.8.5.*

TABLE 3411.8.5
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*

For SI: 1 inch = 25.4 mm.

***3411.8.6 Performance areas**. Where it is technically infeasible to alter performance areas to be on an accessible route, at least one of each type of performance area shall be made accessible.*

***3411.8.7 Accessible dwelling or sleeping units**. Where Group I-1, I-2, I-3, R- 1, R-2 or R-4 dwelling or sleeping units are being altered or added, the requirements of Section 1107 for Accessible units apply only to the quantity of spaces being altered or added.*

***3411.8.8 Type A dwelling or sleeping units**. Where more than 20 Group R-2 dwelling or sleeping units are being added, the requirements of Section 1107 for Type A units apply only to the quantity of the spaces being altered or added. The requirements of Section 1107 for Accessible units apply only to the quantity of spaces being altered or added.*

***3411.8.9 Type B dwelling or sleeping units.** Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 for Type B units apply only to the quantity of the spaces being added. Where Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being altered and where the area of the alteration is greater than 50 percent of the aggregate area of the building, the requirements of Section 1107 for Type B units apply only to the quantity of the spaces being altered.*

***3411.8.10 Jury boxes and witness stands**. In alterations, accessible wheelchair spaces are not required to be located within the defined area of raised jury boxes or witness stands and shall be permitted to be located outside these spaces where the ramp or lift access restricts or projects into the means of egress.*

***3411.8.11 Toilet rooms**. Where it is technically infeasible to alter existing toilet and bathing facilities to be accessible, an accessible family or assisted use toilet or bathing facility constructed in accordance with Section 1109.2.1 is permitted. The family or assisted-use facility shall be located on the same floor and in the same area as the existing facilities.*

***3411.8.12 Dressing, fitting and locker rooms.** Where it is technically infeasible to provide accessible dressing, fitting or locker rooms at the same location as similar types of rooms, one accessible room on the same level shall be provided. Where separate-sex facilities are provided, accessible rooms for each sex shall be provided. Separate-sex facilities are not required where only unisex rooms are provided.*

***3411.8.13 Fuel dispensers**. Operable parts of replacement fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the vehicular way where fuel dispensers are installed on existing curbs.*

***3411.8.14 Thresholds**. The maximum height of thresholds at doorways shall be ¾ inch (19.1 mm). Such thresholds shall have beveled edges on each side.*

***3411.9 Historic buildings**. These provisions shall apply to buildings and facilities designated as historic structures that undergo alterations or a change of occupancy, unless technically infeasible. Where compliance with the requirements for accessible routes, entrances or toilet facilities would threaten or destroy the historic significance of the building or facility, as determined by the applicable governing authority, the alternative requirements of Sections 3411.9.1 through 3411.9.4 for that element shall be permitted.*

***Exception**: Type B dwelling or sleeping units required by Section 1107 are not required to be provided in historic buildings.*

***3411.9.1 Site arrival points**. At least one accessible route from a site arrival point to an accessible entrance*

shall be provided.

3411.9.2 Multilevel buildings and facilities. *An accessible route from an accessible entrance to public spaces on the level of the accessible entrance shall be provided.*

3411.9.3 Entrances*. At least one main entrance shall be accessible.*

Exceptions*:*

1. *If a main entrance cannot be made accessible, an accessible nonpublic entrance that is unlocked while the building is occupied shall be provided; or*
2. *If a main entrance cannot be made accessible, a locked accessible entrance with a notification system or remote monitoring shall be provided.*

Signs complying with Section 1111 shall be provided at the primary entrance and the accessible entrance.

3411.9.4 Toilet and bathing facilities. *Where toilet rooms are provided, at least one accessible family or assisted-use toilet room complying with Section 1109.2.1 shall be provided.*

SECTION 3412
COMPLIANCE ALTERNATIVES

3412.1 Compliance*. The provisions of this section are intended to maintain or increase the current degree of public safety, health and general welfare in existing buildings while permitting repair, alteration, addition and change of occupancy without requiring full compliance with Chapters 2 through 33, or Sections 3401.1.1, and 3403 through 3409, except where compliance with other provisions of this code is specifically required in this section.*

3412.2 Applicability*. Structures existing prior to July 1, 1979, in which there is work involving additions, alterations or changes of occupancy shall be made to comply with the requirements of this section or the provisions of Sections 3403 through 3409. The provisions in Sections 3412.2.1 through 3412.2.5 shall apply to existing occupancies that will continue to be, or are proposed to be, in Groups A, B, E, F, I-2, M, R, S. These provisions shall not apply to buildings with occupancies in Group H or I-1, I-3, or I-4.*

Exception: *As described in Section 3408.1, the methodology used in this section is permitted to be used as a comparative risk analysis tool when evaluating an existing structure for a proposed change of occupancy on existing structures that were approved for construction on or after July 1, 1979.*

3412.2.1 Change in occupancy*. Where an existing building is changed to a new occupancy classification and this section is applicable, the provisions of this section for the new occupancy shall be used to determine compliance with this code.*

3412.2.2 Partial change in occupancy*. Where a portion of the building is changed to a new occupancy classification, and that portion is separated from the remainder of the building with fire barriers or horizontal assemblies having a fire-resistance rating as required by Table 508.4 for the separate occupancies, or with approved compliance alternatives, the portion changed shall be made to comply with the provisions of this section.*

Where a portion of the building is changed to a new occupancy classification, and that portion is not separated from the remainder of the building with fire barriers or horizontal assemblies having a fire-resistance rating as required by Table 508.4 for the separate occupancies, or with approved compliance alternatives, the provisions of this section which apply to each occupancy shall apply to the entire building. Where there are conflicting provisions, those requirements which secure the greater public safety shall apply to the entire building or structure.

3412.2.3 Additions*. Additions to existing buildings shall comply with the requirements of this section.*

3412.2.3.1 Additions to buildings of Groups R and I occupancies. *The combined height and area of the existing building and the addition shall not exceed the height and area allowed by chapter 5. Where a fire wall that complies with section 706 is provided between the addition and the existing*

building, the addition shall be considered a separate building.

3412.2.3.2 Additions to buildings of Groups other than R and I occupancies. *When the combined height and area of the existing building and the addition exceeds the height or area allowed by Chapter 5 including any area increases permitted, the following shall be permitted:*

1. *A fire wall that complies with Section 706 shall be constructed between the existing building and the addition. When a fire wall is constructed to separate the existing building from the addition, the addition shall be considered a separate building.*
2. *A fire barrier that complies with Section 707 as required for separating fire areas shall be provided between the addition and the existing building. When a fire barrier is constructed to separate the existing building from the addition, all the following shall apply.*
    a. *The combined height and area of the addition and existing building shall be used to determine the construction type and fire protection requirements for the addition.*
    b. *The construction type of the existing building and the addition may differ.*
    c. *Fire protection system is not required in the existing building when a fire protection system is required in the addition.*
    d. *When calculating the allowable combined height and area of the existing building and the addition in accordance with Chapter 5, the tabular values corresponding to a building equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 shall be used whether or not the existing building is provided throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.*
3. *When the combined height and area of the existing building and the addition does not exceed the height and area allowed by Chapter 5, but the area of the existing building plus the new addition creates a fire area greater than the threshold limits of Chapter 9, one of the following shall be provided:*
    1. *A fire barrier to limit the fire area; or*
    2. *An automatic sprinkler system in the addition extends into the existing building to a barrier or partition.*

3412.2.4 Alterations and repairs*. An existing building or portion thereof, which does not comply with the requirements of this code for new construction, shall not be altered or repaired in such a manner that results in the building being less safe or sanitary than such building is currently. If, in the alteration or repair, the current level of safety or sanitation is to be reduced, the portion altered or repaired shall conform to the requirements of Chapters 2 through 12 and Chapters 14 through 33.*

3412.2.4.1 Flood hazard areas*. For existing buildings located in flood hazard areas established in Section 1612.3, if the alterations and repairs constitute substantial improvement of the existing building, the existing building shall be brought into compliance with the requirements for new construction for flood design.*
As used in this section, a substantial improvement shall mean any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the pre-improvement market value.

3412.2.5 Accessibility requirements*. All portions of the buildings proposed for change of occupancy shall conform to the accessibility provisions of Section 3411.*

3412.3 Acceptance*. For repairs, alterations, additions and changes of occupancy to existing buildings that are evaluated in accordance with this section, compliance with this section shall be accepted by the building official.*

3412.3.1 Hazards*. Where the building official determines that an unsafe condition exists, as provided for in Section 109, such unsafe condition shall be abated in accordance with Section 109.*

3412.4 Investigation and evaluation. *For proposed work covered by this section, the building owner shall cause the existing building to be investigated and evaluated in accordance with the provisions of this section.*

3412.4.1 Structural analysis*. The owner shall have a structural analysis of the existing building made to determine adequacy of structural systems for the proposed alteration, addition or change of occupancy. The analysis shall demonstrate that the building with the work completed is capable of resisting the loads specified in Chapter 16.*

3412.4.2 Submittal*. The results of the investigation and evaluation as required in Section 3412.4, along with proposed compliance alternatives, shall be submitted to the building official.*

3412.4.3 Determination of compliance*. The building official shall determine whether the existing building, with the proposed addition, alteration or change of occupancy, complies with the provisions of this section in accordance with the evaluation process in Sections 3412.5 through 3412.9.*

3412.5 Evaluation. *The evaluation shall be comprised of three categories: fire safety, means of egress and general safety, as defined in Sections 3412.5.1 through 3412.5.3.*

3412.5.1 Fire safety. *Included within the fire safety category are the structural fire resistance, automatic fire detection, fire alarm and fire suppression system features of the facility.*

3412.5.2 Means of egress*. Included within the means of egress category are the configuration, characteristics and support features for means of egress in the facility.*

3412.5.3 General safety*. Included within the general safety category are the fire safety parameters and the means of egress parameters.*

3412.6 Evaluation process*. The evaluation process specified herein shall be followed in its entirety to evaluate existing buildings in Groups A, B, E, F, M, R, S, and U. For existing buildings in Group I-2, the evaluation process specified herein shall be followed and applied to each and every individual smoke compartment. Table 3412.7 shall be utilized for tabulating the results of the evaluation. References to other sections of this code indicate that compliance with those sections is required in order to gain credit in the evaluation herein outlined. In applying this section to a building with mixed occupancies, where the separation between the mixed occupancies does not qualify for any category indicated in Section 3412.6.16, the score for each occupancy shall be determined, and the lower score determined for each section of the evaluation process shall apply to the entire building, or to each smoke compartment for Group I-2 occupancies.*
Where the separation between mixed occupancies qualifies for any category indicated in Section 3412.6.16, the score for each occupancy shall apply to each portion or smoke compartment of the building based on the occupancy of the space.

3412.6.1 Building height and number of stories. *The value for building height and number of stories shall be the lesser value determined by the formula in Section 3412.6.1.1. Chapter 5 shall be used to determine the allowable height and number of stories of the building, including allowable increases due to automatic sprinklers as provided for in Section 504.2. Subtract the actual building height in feet from the allowable and divide by 12 ½ feet. Enter the height value and its sign (positive or negative) in Table 3412.7 under Safety Parameter 3412.6.1, Building Height, for fire safety, means of egress and general safety. The maximum score for a building shall be 10.*

3412.6.1.1 Height formula*. The following formulas shall be used in computing the building height value.*

$$Height\ value, feet = \frac{(AH) - (EBH)}{12.5} \times CF \qquad \textit{(Equation 34-1)}$$

Height value, ~~feet~~ stories = (AS-EBS) x CF ***(Equation 34-2)***

where:
AH = Allowable height in feet from Section 504.
EBH = Existing building height in feet.

AS = Allowable height in stories from Section 504.
EBS = Existing building height in stories.
CF = 1 if (AH) – (EBH) is positive.
CF = Construction-type factor shown in Table 3412.6.6(2) if (AH) – (EBH) is negative.

Note: *Where mixed occupancies are separated and individually evaluated as indicated in Section 3412.6, the values AH, AS, EBH and EBS shall be based on the height of the occupancy being evaluated.*

3412.6.2 Building area*. The value for building area shall be determined by the formula in Section 3412.6.2.2. Section 506 and the formula in Section 3412.6.2.1 shall be used to determine the allowable area of the building. Subtract the actual building area in square feet from the allowable area and divide by 1,200 square feet. Enter the area value and its sign (positive or negative) in Table 3412.7 under Safety Parameter 3412.6.2, Building Area, for fire safety, means of egress and general safety. In determining the area value, the maximum permitted positive value for area is 50 percent of the fire safety score as listed in Table 3412.8, Mandatory Safety Scores. Group I-2 occupancies shall be scored zero.*

3412.6.2.1 Allowable area formula*. The following formula shall be used in computing allowable area:*

$A_a = [A_t + (NS \times I_f)]$ ***(Equation 34-3)***

where:
A_a *= Allowable building area per story (square feet).*
A_t *= Tabular allowable area factor (NS, S1, S13R, S13D or SM value), as applicable in accordance with Table 506.2.*
NS = Tabular allowable area factor in accordance with Table 506.2 or nonsprinklered building (regardless of whether the building is sprinklered).
I_f *= Area factor increase due to frontage as calculated in accordance with Section 506.3.*

3412.6.2.2 Area formula*. The following formula shall be used in computing the area value. Determine the area value for each occupancy floor area on a floor-by-floor basis. For each occupancy, choose the minimum area value of the set of values obtained for the particular occupancy.*

$$Area\ value\ i = \frac{Allowable\ area_i}{1{,}200\ square\ feet}\left[1 - \left(\frac{Actual\ area_i}{Allowable\ aea_i} + \cdots + \frac{Actual\ area_n}{Allowable\ area_n}\right)\right] \qquad \textit{(Equation 34-4)}$$

where:
i = Value for an individual separated occupancy on a floor.
n = Number of separated occupancies on a floor.

3412.6.3 Compartmentation. *Evaluate the compartments created by fire barriers or horizontal assemblies which comply with Sections 3412.6.3.1 and 3412.6.3.2 and which are exclusive of the wall elements considered under Sections 3412.6.4 and 3412.6.5. Conforming compartments shall be figured as the net area and do not include shafts, chases, stairways, walls or columns. Using Table 3412.6.3, determine the appropriate compartmentation value(CV) and enter that value into Table 3412.7 under Safety Parameter 3412.6.3, Compartmentation, for fire safety, means of egress and general safety.*

TABLE 3412.6.3
COMPARTMENTATION VALUES

OCCUPANCY	*CATEGORIES[a]*

	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
F, M, R, S-1	0	4	10	16	22

For SI: 1 square foot = 0.093 m.
a. For areas between categories, the compartmentation value shall be obtained by linear interpolation.

3412.6.3.1 Wall construction. A wall used to create separate compartments shall be a fire barrier conforming to Section 707 with a fire-resistance rating of not less than 2 hours. Where the building is not divided into more than one compartment, the compartment size shall be taken as the total floor area on all floors. Where there is more than one compartment within a story, each compartmented area on such story shall be provided with a horizontal exit conforming to Section 1026. The fire door serving as the horizontal exit between compartments shall be so installed, fitted and gasketed that such fire door will provide a substantial barrier to the passage of smoke.

3412.6.3.2 Floor/ceiling construction. A floor/ceiling assembly used to create compartments shall conform to Section 711 and shall have a fire-resistance rating of not less than 2 hours.

3412.6.4 Tenant and dwelling unit separations. Evaluate the fire-resistance rating of floors and walls separating tenants, including dwelling units, and not evaluated under Sections 3412.6.3 and 3412.6.5. Group I-2 occupancies shall evaluate the rating of the separation between patient sleeping rooms.
Under the categories and occupancies in Table 3412.6.4, determine the appropriate value and enter that value in Table 3412.7 under Safety Parameter 3412.6.4, Dwelling Unit Separations, for fire safety, means of egress and general safety.

TABLE 3412.6.4
SEPARATION VALUES

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

3412.6.4.1 Categories. The categories for tenant and dwelling unit separations are:

1. Category a—No fire partitions; incomplete fire partitions; no doors; doors not self-closing or automatic-closing.
2. Category b—Fire partitions or floor assemblies with less than a 1-hour fire-resistance rating or not constructed in accordance with Sections 708 or 711, respectively.
3. Category c—Fire partitions with a 1-hour or greater fire-resistance rating constructed in accordance with Section 708 and floor assemblies with a 1-hour but less than 2-hour fire-resistance rating constructed in accordance with Section 711, or with only one tenant within the floor area.
4. Category d—Fire barriers with a 1-hour but less than 2-hour fire-resistance rating constructed in accordance with Section 707 and floor assemblies with a 2-hour or greater fire-resistance

rating constructed in accordance with Section 711.

5. *Category e—Fire barriers and floor assemblies with a 2-hour or greater fire-resistance rating and constructed in accordance with Sections 707 and 711, respectively.*

3412.6.5 Corridor walls. *Evaluate the fire-resistance rating and degree of completeness of walls which create corridors serving the floor, and constructed in accordance with Section 1020. This evaluation shall not include the wall elements considered under Sections 3412.6.3 and 3412.6.4. Under the categories and groups in Table 3412.6.5, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.5, Corridor Walls, for fire safety, means of egress and general safety.*

TABLE 3412.6.5
CORRIDOR WALL VALUES

OCCUPANCY	CATEGORIES			
	a	b	c[a]	d[a]
A-1	-10	-4	0	2
A-2	-30	-12	0	2
A-3, F, M, R, S-1	-7	-3	0	2
A-4, B, E, S-2	-5	-2	0	5
I-2	-10	0	1	2

a. Corridors not providing at least one-half the exit access travel distance for all occupants on a floor shall use Category b.

3412.6.5.1 Categories. *The categories for Corridor walls are:*

1. *Category a—No fire partitions; incomplete fire partitions; no doors; or doors not self-closing.*
2. *Category b—Less than 1-hour fire-resistance rating or not constructed in accordance with Section 708.4.*
3. *Category c – 1 hour to less than 2 hour fire-resistance rating, with doors conforming to Section 716 or without corridors as permitted as permitted by Section 1020.*
4. *Category d—2-hour or greater fire-resistance rating, with doors conforming to Section 716.*

3412.6.6 Vertical openings. *Evaluate the fire-resistance rating of interior exit stairways or ramps, hoistways, escalator openings and other shaft enclosures within the building, and openings between two or more floors. Table 3412.6.6(1) contains the appropriate protection values. Multiply that value by the construction type factor found in Table 3412.6.6(2). Enter the vertical opening value and its sign (positive or negative) in Table 3412.7 under Safety Parameter 3412.6.6, Vertical Openings, for fire safety, means of egress, and general safety. If the structure is a one-story building or if all the unenclosed vertical openings within the building conform to the requirements of Section 712 and Section 713, enter a value of 2. The maximum positive value for this requirement ~~is~~ (VO) shall be 2.*

3412.6.6.1 Vertical opening formula. *The following formula shall be used in computing vertical opening value.*

$$VO = PV \times CF \qquad \text{(Equation 34-4)}$$

Where:
VO = Vertical opening value. The calculated value shall not be greater than positive 2.0.
PV = Protection value ~~[~~ from Table 3412.6.6(1)~~]~~.
CF = Construction type factor ~~[~~from Table 3412.6.6(2)~~]~~.

TABLE 3412.6.6(1)
VERTICAL OPENING PROTECTION VALUE

PROTECTION	VALUE
None (unprotected opening)	-2 times number floors connected
Less than 1 hour	-1 times number floors connected

1 to less than 2 hours	1
2 hours or more	2

TABLE 3412.6.6(2)
CONSTRUCTION-TYPE FACTOR

FACTOR	TYPE OF CONSTRUCTION								
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
	1.2	1.5	2.2	3.5	2.5	3.5	2.3	3.3	7

3412.6.7 HVAC systems. *Evaluate the ability of the HVAC system to resist the movement of smoke and fire beyond the point of origin. Under the categories in Section 3412.6.7.1, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.7, HVAC Systems, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Categories a, b, or c shall be considered to fail the evaluation.*

3412.6.7.1 Categories. *The categories for HVAC systems are:*

1. *Category a - Plenums not in accordance with Section 602 of the mechanical code. -10 points.*
2. *Category b - Air movement in egress elements not in accordance with Section 1020.5. -5 points.*
3. *Category c - Both categories a and b are applicable. -15 points.*
4. *Category d - Compliance of the HVAC system with Section 1020.5 and Section 602 of the mechanical code. 0 points.*
5. *Category e - Systems serving one story; or a central boiler/chiller system without ductwork connecting two or more stories. +5 points.*

3412.6.8 Automatic fire detection. *Evaluate the smoke detection capability based on the location and operation of automatic fire detectors in accordance with Section 907 and the mechanical code. Under the categories and occupancies in Table 3412.6.8, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.8, Automatic Fire Detection, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Category a, b, or c shall be considered to fail the evaluation.*

TABLE 3412.6.8
AUTOMATIC FIRE DETECTION VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-3, F, M, R, S-1	-10	-5	0	2	6	NA
A-2	-25	-5	0	5	9	NA
A-4, B, E, S-2	-4	-2	0	4	8	NA
I-2	NP	NP	NP	4	5	2

NA = Not applicable.
NP = Not Permitted.

3412.6.8.1 Categories. *The categories for automatic fire detection are:*

1. *Category a—None.*
2. *Category b—Existing smoke detectors in HVAC systems and maintained in accordance with the fire code.*
3. *Category c—Smoke detectors in HVAC systems. The detectors are installed in accordance with the requirements for new buildings in the 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.*

3412.6.9 Fire alarm systems. *Evaluate the capability of the fire alarm system in accordance with Section 907. Under the categories and occupancies in Table 3412.6.9, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.9, Fire Alarm Systems, for fire safety, means of egress and general safety.*

TABLE 3412.6.9
FIRE ALARM SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a	b[a]	c	d
A-1, A-2, A-3, A-4, B, E, R	-10	-5	0	5
F, M, S	0	5	10	15
I-2	-4	1	2	5

a. For buildings equipped throughout with an automatic sprinkler system, add 2 points for activation by a sprinkler waterflow device.

3412.6.9.1 Categories. *The categories for fire alarm systems are:*

1. *Category a—None.*
2. *Category b—Fire alarm system with manual fire alarm boxes in accordance with Section 907.4 and alarm notification appliances in accordance with Section 907.5.2.*
3. *Category c—Fire alarm system in accordance with Section 907.*
4. *Category d—Category c plus a required emergency voice/alarm communications system and a fire command center that conforms to Section 911 and contains the emergency voice/alarm communications system controls, fire department communication system controls and any other controls specified in Section 911 where those systems are provided.*

3412.6.10 Smoke control*. Evaluate the ability of a natural or mechanical venting, exhaust or pressurization system to control the movement of smoke from a fire. Under the categories and occupancies in Table 3412.6.10, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.10, Smoke Control, for means of egress and general safety.*

TABLE 3412.6.10
SMOKE CONTROL VALUES

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

a. This value shall be 0 if compliance with Category d or e in Section 3412.6.8.1 has not been obtained.

3412.6.10.1 Categories. *The categories for smoke control are:*

1. *Category a—None.*
2. *Category b—The building is equipped throughout with an automatic sprinkler system. Openings are provided in exterior walls at the rate of 20 square feet (1.86 m^2) per 50 linear feet (15 240 mm) of exterior wall in each story and distributed around the building perimeter at intervals not exceeding 50 feet (15 240 mm). Such openings shall be readily openable from the inside without a key or separate tool and shall be provided with ready access thereto. In lieu of operable openings, clearly and permanently marked tempered glass panels shall be used.*
3. *Category c—One enclosed exit stairway, with ready access thereto, from each occupied floor of the building. The stairway has operable exterior windows and the building has openings in*

accordance with Category b.

4. *Category d—One smokeproof enclosure and the building has openings in accordance with Category b.*
5. *Category e—The building is equipped throughout with an automatic sprinkler system. Each floor area is provided with a mechanical air-handling system designed to accomplish smoke containment. Return and exhaust air shall be moved directly to the outside without recirculation to other floor areas of the building under fire conditions. The system shall exhaust not less than six air changes per hour from the floor area. Supply air by mechanical means to the floor area is not required. Containment of smoke shall be considered as confining smoke to the fire area involved without migration to other floor areas. Any other tested and approved design which will adequately accomplish smoke containment is permitted.*
6. *Category f—Each stairway shall be one of the following: a smokeproof enclosure in accordance with Section 1023.11; pressurized in accordance with Section 909.20.5 or shall have operable exterior windows.*

3412.6.11 Means of egress capacity and number. *Evaluate the means of egress capacity and the number of exits available to the building occupants. In applying this section, the means of egress are required to conform to the following sections of this code: 1003.7, 1004, 1005, 1006, 1007, 1016.2, 1026.1, 1028.2, 1028.5, 1029.2, 1029.3, 1029.4, and 1030. The number of exits credited is the number that is available to each occupant of the area being evaluated. Existing fire escapes shall be accepted as a component in the means of egress when conforming to Section 3406. Under the categories and occupancies in Table 3412.6.11, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.11, Means of Egress Capacity, for means of egress and general safety.*

TABLE 3412.6.11
MEANS OF EGRESS VALUES[a]

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

3412.6.11.1 Categories. *The categories for Means of Egress Capacity and number of exits are:*

1. *Category a—Compliance with the minimum required means of egress capacity or number of exits is achieved through the use of a fire escape in accordance with Section 3406.*
2. *Category b—Capacity of the means of egress complies with Section 1005 and the number of exits complies with the minimum number required by Section 1006.*
3. *Category c—Capacity of the means of egress is equal to or exceeds 125 percent of the required means of egress capacity, the means of egress complies with the minimum required width dimensions specified in the code and the number of exits complies with the minimum number required by Section 1006.*
4. *Category d—The number of exits provided exceeds the number of exits required by Section 1006. Exits shall be located a distance apart from each other equal to not less than that specified in Section 1007.*
5. *Category e—The area being evaluated meets both Categories c and d.*

3412.6.12 Dead ends. *In spaces required to be served by more than one means of egress, evaluate the length of the exit access travel path in which the building occupants are confined to a single path of travel. Under the categories and occupancies in Table 3412.6.12, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.12, Dead Ends, for means of egress and general safety.*

TABLE 3412.6.12
DEAD-END VALUES

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

3412.6.12.1 Categories. *The categories for dead ends are:*

1. *Category a—Dead end of 35 feet (10 670 mm) in nonsprinklered buildings or 70 feet (21 340 mm) in sprinklered buildings.*
2. *Category b—Dead end of 20 feet (6096 mm); or 50 feet (15 240 mm) in Group B in accordance with Section 1020.4, exception 2.*
3. *Category c — No dead ends; or ratio of length to width (l/w) is less than 2.5:1.*
4. *Category d – Dead ends exceeding Category a.*

3412.6.13 Maximum exit access travel distance. *Evaluate the length of exit access travel to an approved exit. Determine the appropriate points in accordance with the following equation and enter that value into Table 3412.7 under Safety Parameter 3412.6.13, Maximum Exit Access Travel Distance, for means of egress and general safety. The maximum allowable exit access travel distance shall be determined in accordance with Section 1017.1.*

$$Points = 20 \times \frac{Maximum\ Alowable\ travel\ distance - Maximum\ actual\ travel\ distance}{Maximum\ allowable\ travel\ distance}$$

3412.6.14 Elevator control. *Evaluate the passenger elevator equipment and controls that are available to the fire department to reach all occupied floors. Elevator recall controls shall be provided in accordance with the fire code. Under the categories and occupancies in Table 3412.6.14, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.14, Elevator Control, for fire safety, means of egress and general safety. The values shall be zero for a single-story building.*

TABLE 3412.6.14
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	+2
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

For SI: 1 foot = 304.8 mm.
NP = Not Permitted.

3412.6.14.1 Categories. *The categories for elevator controls are:*

1. *Category a—No elevator.*
2. *Category b—Any elevator without Phase I emergency recall operation and Phase II ~~recall~~ emergency in-car operation.*
3. *Category c—All elevators with Phase I emergency recall operation and Phase II ~~recall~~ emergency in-car operation as required by the fire code.*
4. *Category d—All meet Category c; or Category b where permitted to be without Phase I emergency recall operation and Phase II emergency in-car operation; and at least one elevator that complies with new construction requirements serves all occupied floors.*

3412.6.15 Means of egress emergency lighting. *Evaluate the presence of and reliability of means of egress emergency lighting. Under the categories and occupancies in Table 3412.6.15, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.15, Means of Egress Emergency Lighting, for means of egress and general safety.*

TABLE 3412.6.15
MEANS OF EGRESS EMERGENCY LIGHTING VALUES

NUMBER OF EXITS REQUIRED BY SECTION 1006	CATEGORIES		
	a	b	~~c~~c
Two or more exits	NP	~~0~~ 40	~~4~~4
Minimum of one exit	0	1	~~1~~1

NP = Not Permitted.

3412.6.15.1 Categories. *The categories for means of egress emergency lighting are:*

1. *Category a—Means of egress lighting and exit signs not provided with emergency power in accordance with Chapter 27.*
2. *Category b—Means of egress lighting and exit signs provided with emergency power in accordance with Chapter 27.*
3. *Category c – Emergency power provided to means of egress lighting and exit signs, which provides protection in the event of power failure to the site or building.*

3412.6.16 Mixed occupancies. *Where a building has two or more occupancies that are not in the same occupancy classification, the separation between the mixed occupancies shall be evaluated in accordance with this section. Where there is no separation between the mixed occupancies or the separation between mixed occupancies does not qualify for any of the categories indicated in Section 3412.6.16.1, the building shall be evaluated as indicated in Section 3412.6 and the value for mixed occupancies shall be zero. Under the categories and occupancies in Table ~~3410.6.16~~ 3412.6.16, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.16, Mixed Occupancies, for fire safety and general safety. For buildings without mixed occupancies, the value shall be zero. Facilities in Group I-2 occupancies meeting Category a shall be consider to fail the evaluation.*

TABLE 3412.6.16
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

NP = Not permitted.

a. For fire-resistance ratings between categories, the value shall be obtained by linear interpolation.

3412.6.16.1 Categories. *The categories for mixed occupancies are:*

1. *Category a—Occupancies separated by minimum 1-hour fire barriers or minimum 1-hour horizontal assemblies, or both.*
2. *Category b—Separations between occupancies in accordance with Section 508.4.*
3. *Category c—Separations between occupancies having a fire-resistance rating of not less than twice that required by Section 508.4.*

3412.6.17 Automatic sprinklers. *Evaluate the ability to suppress a fire based on the installation of an automatic sprinkler system in accordance with Section 903.3.1.1 "Required sprinklers" shall be based on the requirements of this code. Under the categories and occupancies in Table 3412.6.17, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.17, Automatic*

Sprinklers, for fire safety, means of egress divided by 2 and general safety. High-rise buildings defined in Chapter 2 that undergo a change of occupancy to Group R shall be equipped throughout with an automatic sprinkler system in accordance with Section 403 and Chapter 9. Facilities in Group I-2 occupancies meeting Category a, b, c or f shall be considered to fail the evaluation.

TABLE 3412.6.17
SPRINKLER SYSTEM VALUES

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

NP = Not Permitted.
a. These options cannot be taken if Category a in Section 3412.6.18 is used.

3412.6.17.1 Categories. *The categories for automatic sprinkler system protection are:*

1. *Category a—Sprinklers are required throughout; sprinkler protection is not provided or the sprinkler system design is not adequate for the hazard protected in accordance with Section 903.*
2. *Category b—Sprinklers are required in a portion of the building; sprinkler protection is not provided or the sprinkler system design is not adequate for the hazard protected in accordance with Section 903.*
3. *Category c—Sprinklers are not required; none are provided.*
4. *Category d—Sprinklers are required in a portion of the building; sprinklers are provided in such portion; the system is one which complied with the code at the time of installation and is maintained and supervised in accordance with Section 903.*
5. *Category e—Sprinklers are required throughout; sprinklers are provided throughout in accordance with Chapter 9.*
6. *Category f—Sprinklers are not required throughout; sprinklers are provided throughout in accordance with Chapter 9.*

3412.6.18 Standpipes. *Evaluate the ability to initiate attack on a fire by making a supply of water available readily through the installation of standpipes in accordance with Section 905. "Required standpipes" shall be based on the requirements of this code. Under the categories and occupancies in Table 3412.6.18, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.18, Standpipes, for fire safety, means of egress and general safety.*

3412.6.18
STANDPIPE SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a[a]	b	c	d
A-1, A-3, F, M, R, S-1	-6	0	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 3412.6.17 is used.

3412.6.18.1 Standpipe. *The categories for standpipe systems are:*

1. *Category a —Standpipes are required; standpipe is not provided or the standpipe system design is not in compliance with Section 905.3.*
2. *Category b—Standpipes are not required; none are provided.*
3. *Category c—Standpipes are required; standpipes are provided in accordance with Section 905.*

4. Category d—Standpipes are not required; standpipes are provided in accordance with Section 905.

TABLE 3412.6.19
INCIDENTAL ~~ACCESSORY OCCUPANCY~~ USE AREA VALUES[a]

PROTECTION REQUIRED BY TABLE 509	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
1 Hour and AS	-3	-2	-1	-1	0	-1	0
1 Hour	-1	0	-1	0	0	0	0
1 Hour, or AS with CRS	-1	0	-1	0	0	0	0
AS with CRS	-1	-1	-1	0	0	-1	0
1 Hour or AS	-1	0	0	0	0	0	0

AS = Automatic sprinkler system;
CRS = Construction capable of resisting the passage of smoke (see Section 509.4.2)

3412.6.19 Incidental uses. Evaluate the protection of incidental uses in accordance with Section 509.4.2. Do not include those where this code requires suppression throughout the buildings, including covered and open mall buildings, high-rise buildings, public garages and unlimited area buildings. Assign the lowest score from Table 3412.6.19 for the building or floor area being evaluated and enter that value into Table 3412.7 under Safety Parameter 3412.6.19, Incidental Uses, for fire safety, means of egress and general safety. If there are no specific occupancy areas in the building or floor area being evaluated, the value shall be zero.

3412.6.20 Smoke compartmentation. Evaluate the smoke compartments for compliance with Section 407.5. Under the categories and occupancies in Table 3412.6.20, determine the appropriate smoke compartmentation value (SCV) and enter that value into Table 3412.7 under Safety Parameter 3412.6.20, Smoke Compartmentation, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Category b or c shall be considered to fail the evaluation.

TABLE 3412.6.20
SMOKE COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES[a]		
	a	b	c
A, B, E, F, M, R, and S	0	0	0
I-2	0	NP	NP

For SI: 1 square foot = 0.093 m^2.
NP = Not permitted.
a. For areas between categories, the smoke compartmentation value shall be obtained by linear interpolation.

3412.6.20.1 Categories. Categories for smoke compartment size are:
1. Category a – Smoke compartment size is equal to or less than 22,500 square feet (2092 m^2).
2. Category b – Smoke compartment size is greater than 22,500 square feet (2092 m2).
3. Category c – Smoke compartments are not provided.

3412.6.21 Patient ability, concentration, smoke compartment location and ratio to attendant. In I-2 occupancies, the ability of patients, their concentration and ratio to attendants shall be evaluated and applied in accordance with this section. Evaluate each smoke compartment using the categories in Section 3412.6.21.1, 3412.6.21.2, and 3412.6.21.3 and enter the value in Table 3412.8. To determine the safety factor, multiply the three values together, if the sum is 9 or greater, compliance has failed.

3412.6.21.1 Patient ability for self-preservation. *Evaluate the ability of the patients for self-preservation in each smoke compartment in an emergency. Under the categories and occupancies in Table 3412.6.21.1 determine the appropriated value and enter that value in Table 3412.7 under Safety Parameter 3412.6.21.1, Patient Ability for Self-preservation, for means of egress and fire safety.*

TABLE 3412.6.21.1
PATIENT ABILITY VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	1	2	3

3412.6.21.1.1 Categories. *The categories for patient ability for self-preservation are:*

1. *Category a – (mobile) Patients are capable of self-preservation without assistance.*
2. *Category b – (not mobile) Patients rely on assistance for evacuation or relocation.*
3. *Category c – (not movable) Patients cannot be evacuated or relocated.*

3412.6.21.2 Patient concentration. *Evaluate the concentration of patients in each smoke compartment under Section 3412.6.21.2. Under the categories and occupancies in Table 3412.6.21.2 determine the appropriate value and enter that value in Table 3412.7 under Safety Parameter 3412.6.21.2, Patient Concentration, for means of egress and general safety.*

TABLE 3412.6.21.2
PATIENT CONCENTRATION VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	1	2	3

3412.6.21.2.1 Categories: *The categories for patient concentration are:*

1. *Category a – smoke compartment has 1 to 10 patients.*
2. *Category b – smoke compartment has more than 10 to 40 patients.*
3. *Category c – smoke compartment has more than 40 patients.*

3412.6.21.3 Attendant-to-patient ratio. *Evaluate the attendant-to-patient ratio for each compartment under Section 3412.6.21.3. Under the categories and occupancies in Table 3412.6.21.3 determine the appropriate value and enter that value in Table 3412.7 under Safety Parameter 3412.6.21.3, Attendant-to-patient Ratio, for means of egress and general safety.*

TABLE 3412.6.21.3
ATTENDANT-TO-PATIENT RATIO VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	1	2	3

3412.6.21.3.1 Categories. *The categories for attendant-to-patient concentrations are:*

1. *Category a – attendant-to-patient concentration is 1:5.*
2. *Category b – attendant-to-patient concentration is 1:6 to 1:10.*
3. *Category c – attendant-to-patient concentration is greater than 1:10 or no patients.*

3412.7 Building score. *After determining the appropriate data from Section 3412.6, enter those data in Table 3412.7 and total the building score.*

3412.8 Safety scores*. The values in Table 3412.8 are the required mandatory safety scores for the evaluation process listed in Section 3412.6.*

3412.9 Evaluation of building safety. *The mandatory safety score in Table 3412.8 shall be subtracted from the building score in Table 3412.7 for each category. Where the final score for any category equals zero or more, the building is in compliance with the requirements of this section for that category. Where the final score for any category is less than zero, the building is not in compliance with the requirements of this section.*

TABLE 3412.7
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 less than 22,500 sq. ft. (2092 m^2): Yes No	*Attendant-to-patient ratio*

SAFETY PARAMETERS	*FIRE SAFETY (FS)*	*MEANS OF EGRESS (ME)*	*GENERAL SAFETY (GS)*
3412.6.1 Building Height *3412.6.2 Building Area* *3412.6.3 Compartmentation*			
3412.6.4 Tenant and Dwelling Unit Separations *3412.6.5 Corridor Walls* *3412.6.6 Vertical Openings*			
3412.6.7 HVAC Systems *3412.6.8 Automatic Fire Detection* *3412.6.9 Fire Alarm Systems*			
3412.6.10 Smoke Control *3412.6.11 Means of Egress Capacity* *3412.6.12 Dead Ends*	**** **** ****		
3412.6.13 Maximum Exit Access Travel Distance *3412.6.14 Elevator Control* *3412.6.15 Means of Egress Emergency Lighting*	**** ***		
3412.6.16 Mixed Occupancies *3412.6.17 Automatic Sprinklers* *3412.6.18 Standpipes* *3412.6.19 Incidental Use* *3412.6.20 Smoke compartmentation* *3412.6.21.1 Patient ability for self-preservation* *3412.6.21.2 Patient concentration* *3412.6.21.3 Attendant-to-patient Ratio*	 **** **** ****	* * * * ÷ 2 =	
Building score — total value			

TABLE 3412.8
MANDATORY SAFETY SCORES[a]

OCCUPANCY	FIRE SAFETY (MFS)	MEANS OF EGRESS (MME)	GENERAL SAFETY (MGS)
A-1	16	27	27
A-2	19	30	30
A-3	18	29	29
A-4, E	23	34	34
B	24	34	34
F	20	30	30
I-2	19	34	34
M	19	36	36
R	17	34	34
S-1	15	25	25
S-2	23	33	33

a. MFS = Mandatory Fire Safety;
MME = Mandatory Means of Egress;
MGS = Mandatory General Safety.

TABLE 3412.9
EVALUATION FORMULAS[a]

FORMULA	T.3410.7			T.3410.8	SCORE	PASS	FAIL
FS-MFS ≥ 0	_____	(FS)	—	_____ (MFS) =	_____	_____	_____
ME-MME ≥ 0	_____	(ME)	—	_____ (MME) =	_____	_____	_____
GS-MGS ≥ 0	_____	(GS)	—	_____ (MGS) =	_____	_____	_____

a. FS = Fire Safety
ME = Means of Egress
GS = General Safety
MFS = Mandatory Fire Safety
MME = Mandatory Means of Egress
MGS = Mandatory General Safety

3412.9.1 Mixed occupancies. For mixed occupancies, the following provisions shall apply:

1. Where the separation between mixed occupancies does not qualify for any category indicated in Section 3412.6.16, the mandatory safety scores for the occupancy with the lowest general safety score in Table 3412.8 shall be utilized (see Section 3412.6.)
2. Where the separation between mixed occupancies qualifies for any category indicated in Section 3412.6.16, the mandatory safety scores for each occupancy shall be placed against the evaluation scores for the appropriate occupancy.