2. Revise as follows:

[F] 909.2 (IFC 909.2) General design requirements. Buildings, structures or parts thereof required by this code to have a smoke control system or systems, or a stair pressurization system shall have such systems designed in accordance with the applicable requirements of Section 909 and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to adequately describe the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied by sufficient information and analysis to demonstrate compliance with these provisions.

1020.1.7 Smokeproof enclosures. In buildings required to comply with Section ~~403 or~~ 405, each of the exits of a building that serves stories where the floor surface is ~~located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access or~~ more than 30 feet (9144 mm) below the level of exit discharge serving such floor levels shall be constructed as a smokeproof enclosure or pressurized stairway in accordance with Section 909.20. In buildings required to comply with Section 403, each of the exits of a building that serves stories where the floor surface is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall be a smokeproof enclosure and pressurized stairway in accordance with Section 909.20.

Reason: This proposal would require Stair pressurization for all high rise buildings with required interior stairwells serving floors over 75 ft. Smoke control systems have been required in nearly two thirds of the United States for over a decade.

High-rise buildings constructed to the requirements of International Building Code, but without any specific measures to control smoke migration, are all the more vulnerable to property damage and occupants' loss of life. In reality, all the available research indicates that the need for smoke control is more pressing in tall buildings that in any other type of construction. As a minimum, the IBC needs to provide more effective means to prevent smoke from entering critical exit stairwells in high-rise buildings. Pressurization results in airflows of high velocity in the gaps around closed doors and construction cracks, thereby preventing smoke from flowing back into the pressurized space through these openings. Pressurized stairwells are provided with the goal of maintaining a tenable environment within the escape routes in the event of a building fire.

During the Hearings in Orlando last September, the Committee indicated the option to use stairwell pressurization exists. However, the IBC does not require stairwell pressurization in high-rise buildings, and only requires smoke control in underground buildings, atriums, and covered mall buildings. Section 403.13 of the 2006 IBC requires Smokeproof exit enclosures for high-rise buildings in every required stairway serving floors more than 75 feet (22.86 m) above the ground. Section 909.20.5 merely permits sprinklered Buildings to use stairwell pressurization as an alternate to the smokeproof enclosures. Stair pressurization to provide uncontaminated air within required interior exit stairwells in high-rise buildings should be required in all cases, regardless of whether the building is sprinklered or not. In order to ensure the continuity of fresh air supply, air ducts to the interior stairwells need to be protected from the effect of fire, or constructed as fire resistant systems.

Smoke can behave very differently in tall buildings than in low buildings. The predominant factors that cause smoke movement in tall buildings are stack effects, the affect of external wind forces, and forced air movement within the building. Smoke removal and venting practices are complicated by stack effects, which will tend to favour natural air movement vertically through the building as a results of differences in temperature and densities between the inside and outside air. [1]

Options such as the use natural ventilation are only available where openings in exterior stairwells can be accommodated. Even then, a number of problems have been identified with this approach. Firstly, the required volume of fresh air is high. Secondly, natural supply and exhaust through vents may be subject to adverse exterior wind conditions, and even when functioning satisfactorily, would generally require vents located on different exterior walls. Thirdly, the performance of natural vents is influenced by building stack effects, which may be particularly significant on the upper or lowermost stories for tall buildings. This effect can range from either strong inflow or strong outflow from all natural vents on a given storey. [2]

Several incidents in North America during the past 40 years have demonstrated that serious fires can occur in modern high-rise buildings, that these fires can generate tremendous quantities of smoke, and that smoke can spread rapidly throughout these buildings. Most notable were the 1970 One New York Plaza fire, the1973 Hyatt Regency O'Hare Hotel fire, the 1980 MGM Grand Hotel in Las Vegas, a 1981 fire in North York Ontario at the Inn on the Park Hotel, the 1983 First Canadian Place in Toronto, Ontario, One Meridian Plaza, Philadelphia, Pennsylvania and the First Interstate Bank in Los Angeles, California in the 1990's.

More recently, the NIST Reports on the World Trade Center disaster discuss various aspects of the post impact condition of the exit stairwell. The NYC Building Code did not require stairwell pressurization in sprinklered buildings. However, the *NIST NCSTAR 1-7, WTC Investigation Report* contains the following quotations and comments:

"A survivor from a floor in the 20s in WTC 1: "The stairwell was lit the entire way down. There was a grayish color smoke which smelled like fuel. The more we reached the lower floors the stronger the smell became. On the 6th floor, the sprinklers were on, which slowed us down because we wanted to be cautious and not slip or fall." Interview 1000044 (NIST 2004)" [3]

"The explosion significantly damaged floors, walls, and doorways in subgrade levels and forced large amounts of smoke well away from the immediate area. In one report, visibility was reduced to 0.3 m (1 ft) within about 1 min at the 44th floor of WTC 1, largely through the spread of smoke in elevator and stairwell shafts (Isner and Klem 1993b). Before beginning evacuation, many occupants experienced smoke on occupied floors and encountered even heavier smoke as they descended the buildings in the stairwells." [3]

The IBC needs to provide more effective means to prevent smoke from entering critical exit stairwells in high-rise buildings. Pressurization prevents smoke from flowing back into the pressurized exit stairwells and smokeproof enclosures. The goal of this proposal is maintaining a tenable environment within the escape routes in the event of a building fire.

Bibliography:

1. Klote, J.H. and Milke, J.A. Fire Protection Handbook, NFPA 19th Edition, Volume II, Smoke Movement in Buildings, Chapter 6, Section 12-113 – 12-126
2. Building Research Establishment, UK, Smoke Ventilation of Common Access Areas of Flats & Maisonettes (BD2410), Final Factual Report, Appendix A (Review), BRE Ltd, 2005
3. NIST NCSTAR 1-7 (Draft), Federal Building and Fire Safety Investigation of the World Trade Center Disaster Occupant Behavior, Egress, and Emergency Communications (Draft)

Cost Impact: The code change proposal will increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The provisions would mandate a pressurized stair and at the same time leave the smokeproof stair requirements in Section 403. Having both sets of requirements causes confusion. In addition instead of referencing 909 the criteria is listed within the proposed section. This may cause a coordination problem with Section 909.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc,, representing the International Firestop Council, requests Approval as Modified by this public comment.

Replace proposal as follows:

403.14 Stair pressurization. Every required interior exit stairway serving floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall be provided with a stair pressurization system complying with the requirements of Sections 909.20. The system shall be pressurized to a minimum of 0.15 inch of water (37 Pa) and a maximum of 0.35 inch of water (87 Pa) relative to the building measured with all stairway doors closed under maximum anticipated stack pressures.

[F] 909.2 (IFC 909.2) General design requirements. Buildings, structures or parts thereof required by this code to have a smoke control system or systems, or a stair pressurization system shall have such systems designed in accordance with the applicable requirements of Section 909 and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to adequately describe the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied by sufficient information and analysis to demonstrate compliance with these provisions.

Commenter's Reason: This proposal would require Stair pressurization for all high rise buildings with required interior stairwells serving floors over 75 ft. Smoke control systems have been required in nearly two thirds of the United States for over a decade. High-rise buildings constructed to the requirements of International Building Code, but without any specific measures to control smoke migration, are all the more vulnerable to property damage and occupants' loss of life. As a minimum, the IBC needs to provide more effective means to prevent smoke from entering critical exit stairwells in high-rise buildings.

Justification: Several incidents in North America during the past 40 years have demonstrated that serious fires can occur in modern high-rise buildings, that these fires can generate tremendous quantities of smoke, and that smoke can spread rapidly throughout these buildings. Most notable were the 1970 One New York Plaza fire, the1973 Hyatt Regency O'Hare Hotel fire, the 1980 MGM Grand Hotel in Las Vegas, a 1981 fire in North York Ontario at the Inn on the Park Hotel, the 1983 First Canadian Place in Toronto, Ontario, One Meridian Plaza, Philadelphia, Pennsylvania and the First Interstate Bank in Los Angeles, California in the 1990's.

There is a large body of available research that indicates that the need for smoke control is more pressing in tall buildings than in any other type of construction. Pressurization results in airflows of high velocity in the gaps around closed doors and construction cracks, thereby preventing smoke from flowing back into the pressurized space through these openings. Pressurized stairwells are provided with the goal of maintaining a tenable environment within the escape routes in the event of a building fire. While the option to use stairwell pressurization exists, the IBC does not require stairwell pressurization in high-rise buildings, and only requires smoke control in underground buildings, atriums, and covered mall buildings. Section 403.13 of the 2006 IBC requires Smokeproof exit enclosures for high-rise buildings in every required stairway serving floors more than 75 feet (22.86 m) above the ground. Section 909.20.5 merely permits sprinklered Buildings to use stairwell pressurization as an alternate to the smokeproof enclosures. Stair pressurization to provide uncontaminated air within required interior exit stairwells in high-rise buildings should be required in all cases, regardless of whether the building is sprinklered or not. In order to ensure the continuity of fresh air supply, air ducts to the interior stairwells need to be protected from the effect of fire, or constructed as fire resistant systems.

Smoke can behave very differently in tall buildings than in low buildings. The predominant factors that cause smoke movement in tall buildings are stack effects, the affect of external wind forces, and forced air movement within the building. Smoke removal and venting practices are complicated by stack effects, which will tend to favour natural air movement vertically through the building as a results of differences in temperature and densities between the inside and outside air. [1]

Options such as the use natural ventilation are only available where openings in exterior stairwells can be accommodated. Even then, a number of problems have been identified with this approach. Firstly, the required volume of fresh air is high. Secondly, natural supply and exhaust through vents may be subject to adverse exterior wind conditions, and even when functioning satisfactorily, would generally require vents located on different exterior walls. Thirdly, the performance of natural vents is influenced by building stack effects, which may be particularly significant on the upper or lowermost stories for tall buildings. This effect can range from either strong inflow or strong outflow from all natural vents on a given storey.[2]

The IBC needs to provide more effective means to prevent smoke from entering critical exit stairwells in high-rise buildings. Pressurization prevents smoke from flowing back into the pressurized exit stairwells and smokeproof enclosures. The goal of this proposal is maintaining a tenable environment within the escape routes in the event of a building fire.

Bibliography:

1. Klote, J.H. and Milke, J.A. Fire Protection Handbook, NFPA 19th Edition, Volume II, Smoke Movement in Buildings, Chapter 6, Section 12-113 –12-126

2. Building Research Establishment, UK, Smoke Ventilation of Common Access Areas of Flats & Maisonettes (BD2410), Final Factual Report,
Appendix A (Review), BRE Ltd, 2005

Final Action: AS AM AMPC____ D

G61-07/08
403.12 (New)

THIS CODE CHANGE WILL BE HEARD ON THE IBC MEANS OF EGRESS PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: Gary Lewis, Chair, representing the ICC Ad Hoc Committee on Terrorism Resistant Buildings

Add new text as follows:

403.12 Remoteness of exit stairway enclosures. The nearest wall of separate required exit stairway enclosures shall be placed a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between the nearest portion of the stairway enclosure. In buildings with three or more exit stairway enclosures, at least two of the exit stairway enclosures shall be placed a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between the nearest portion of the exit stairway enclosure. Interlocking or scissor stairs shall be counted as one exit stairway.

Reason: The purpose of this change is to add a new Section 403.19 that will require stair shafts to meet remoteness criteria, in addition to the separation distance requirements for exit access doorways of Section 1015.2.1.

The Code has long contained requirements designed to ensure that all the exit access doors on a floor are not grouped closely together. Grouping exit access doors too closely defeats the whole point of multiple exits.

The National Institute of Standards and Technology's (NIST) report on the World Trade Center (WTC) tragedy recommends a new remoteness criterion for stair shafts (Recommendation 18). The report pointed out that, at some locations, stairs that met the exit access distance requirements were, nonetheless, very closely grouped. Their shafts were very close together and all three were destroyed by the airplane impact, thereby dooming all above. It is not the proponents' intent to make stair shafts immune to airplane attacks but the re-examination of our basic criteria that was prompted by the attack and the WTC Report suggests that far less dramatic events could render more than one stair shaft unusable. The cause need not be an act of terror either. There are other explosive hazards in high rise buildings. It is only prudent to separate the stair shafts themselves as well as the exit access doors.

It is possible that, in some high rise office buildings, this provision will result in one or more stairs being across the hall from the core rather than in the core. No additional floor area will be required for the sum total of core and stairs. If a stair is outside the traditional core, then the core itself will be smaller. Some might suggest that such a stair location might inhibit design flexibility in tenant spaces. This is simply not true. The architect might have to work a little harder to develop layouts but, with a little skill, any constraint can be incorporated into an acceptable design.

Bibliography:

National Institute of Standards and Technology. Final Report of the National Construction Safety Team on the Collapses of the World Trade Center Towers. United States Government Printing Office: Washington, D.C. September 2005.

Cost Impact: The proposal will not increase construction costs. It merely deals with the location of building elements that are already required by the Code.

Analysis: The last sentence of this proposal addresses interlocking/scissor stairways. There are other code changes dealing specifically with scissors stairways that will be heard by the IBC Means of Egress Committee.

Committee Action: **Disapproved**

Committee Reason: Forcing the stairway enclosures to be 1/3 of the diagonal of the building apart will have a profound effect on the design and costs of the building. This should not be done without technical justification and studies on if this proposed requirement will have the desired results.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Herman Brice and Gerald Jones, National Institute of Building Sciences/Multihazard Mitigation Council representing the NIBS/MMC Committee for Translating the NIST World Trade Center Recommendations into Building Codes requests Approval as Modified by this public comment.

Replace proposal as follows:

403.12 Remoteness of exit stairway enclosures. The required exit stairway enclosures shall be separated by a distance not less than 30 feet or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the stairway enclosures. In buildings with three or more exit stairway enclosures, at least two of the exit stairway enclosures shall comply with this section. Interlocking or scissor stairs shall be counted as one exit stairway.

Commenter's Reason: The change, as originally proposed, would add a new Section 403.19 requiring stair shafts to meet remoteness criteria in addition to the separation distance requirements for exit access doorways of Section 1015.2.1. The reason noted that the code has long contained requirements designed to ensure that all the exit access doors on a floor are not grouped closely together, that grouping exit access doors too closely defeats the whole point of multiple exits, and that the National Institute of Standards and Technology's (NIST) report on the World Trade Center (WTC) tragedy recommends a new remoteness criterion for stair shafts (Recommendation 18). The report pointed out that, at some locations, stairs that met the exit access distance requirements were, nonetheless, very closely grouped. Although the ICC committee disapproved this change indicating that additional technical justification is needed, the vote was very close. The NIBS/MMC committee believes that the modification as proposed by this public comment will lessen the cost and design impacts considerably while also providing the needed separations.

Public Comment 2:

Gary Lewis City of Summit, NJ, representing the ICC Ad Hoc Committee on Terrorism Resistant Buildings requests Approval as Modified by this public comment.

Replace proposal as follows:

403.12 Remoteness of exit stairway enclosures. The required exit stairway enclosures shall be separated by a distance not less than 30 feet or not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the stairway enclosures. In buildings with three or more exit stairway enclosures, at least two of the exit stairway enclosures shall comply with this section. Interlocking or scissor stairs shall be counted as one exit stairway.

Commenter's Reason: The purpose of this change is to add a new provision to high-rise building regulation (Section 403.12) that will require a minimum, safe degree of remoteness between exit stair enclosures in addition to the currently required exit and exit access *door* remoteness.

Recommendation #18 of the NIST World Trade Center Study recommends a new remoteness criterion for stair shafts, so that an intentional or accidental event involving one means of egress does not subsequently render the remote stair unusable as well.

The Means of Egress Committee split their judgment in Palm Springs on this change 7-7, with the Chairman having to break the tie and recommending this proposal for disapproval. In meeting with opponents and interested parties, the TRB Committee has modified our proposal to mitigate the negative impact of this provision and have but a minimal impact, if any, on design.

When first proposed in 2006/07, the Committee's approach was to require that 2 required stair shafts be located in separate structural bays. That approach was rejected in Orlando by the Committee as too vague and undefined an approach. As a result of that advice, the Committee opted for the D/.33 approach (minimum 1/3 of the diagonal) that is currently in place for exit and exit access doors. The objections last February in Palm Springs centered around the 1/3 of the diagonal potentially locating the shafts outside the standard building core, thereby negatively impacting building design.

The Committee has responded to this concern in this comment by providing a minimum separation distance of 30 feet, representing a typical structural bay, or 1/3 of the diagonal of the floor plate, whichever is less. This will address both the concerns of the large floor plate structures having shafts so far apart as to be outside the core, as well as very small plate building floors where the 30' minimum separation may not be readily achievable.

The Committee continues to believe that a minimum safe separation of the exit stair shafts (as formerly required in at least one of the legacy model codes) is as equally important as the exit access remoteness provision itself to ensure the viability of at least one exit route from high rise buildings in the event one or more is rendered unavailable.

Final Action: AS AM AMPC____ D

G64-07/08
403.15 (New)

THIS CODE CHANGE WILL BE HEARD ON THE IFC PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: Ken Kraus, Los Angeles Fire Department, CA and Daniel E. Nichols, PE, New York Division of Code Enforcement and Administration, Albany, NY

Add new text as follows:

403.15 Smoke exhaust. Buildings and structures shall be equipped with natural or mechanical ventilation for removal of products of combustion in accordance with one of the following:

1. Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50 foot intervals. The area of operable windows or panels shall not be less than 40 square feet per 50 linear feet of perimeter.

   Exceptions:

   1. In Group R-1 occupancies, each guest room or suite having an exterior wall shall be permitted to be provided with 2 square feet of venting area in lieu of the area specified in item 1.
   2. Windows shall be permitted to be fixed tempered glass panes provided that no coating or film is applied that will modify the natural breaking characteristics of the glass

2. Mechanical air-handling equipment providing one exhaust air change every 10 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.
3. Any other approved design that will produce equivalent results.

(Renumber subsequent sections)

Reason: Every code development cycle since the 2000 IBC was created, a code change has been submitted regarding requirements to vacate smoke from hi-rise buildings. Unfortunately, many of these proposals were attempting to utilize existing technical sections of the IBC regarding a smoke control system when all they were intending was a way for the fire service to remove smoke from a hi-rise. Smoke control systems would do a great job of removing smoke for the fire department but the full applicability of IBC Section 909 exceeds the intended purpose.

This proposal is to provide a new section to the hi-rise section with technical requirements for smoke exhaust. The proposal permits three ways to comply; natural, mechanical, or alternative method. The result of this system is one of three methods:

1. The fire department opens windows on the floor and provides pressurization by fans.
2. The buildings HVAC system is equipped with dampers per floor, an arrangement to stop recirculation by providing 100% fresh air intake and outside exhaust, and a control panel at the fire command center.
3. An alternative design approved by the code official.

The issue that this code change proposal addresses is that of fire department operations. One of the fire department's duties during a fire event is to expel the smoke after the fire has occurred. With a current lack of requirements for this type of system, the only way that ventilation of smoke or odors occurs without significant building damage is utilizing the exit stairs with fans provided by the fire department. This is marginally effective and is further inhibited by buildings with floor plans that do not have a clear path between two exit stairs or when the building is of significant height.

Addressing automatic sprinkler systems; a fire suppressed by an automatic sprinkler system does significantly reduce the total amount of smoke produced. However, the atmosphere created by a sprinkler suppressed fire or smoke from other incidents, such as burnt food, smoldering fires, or the like, still produces a volume of smoke that needs to be removed after the incident.

To reiterate, this system is for fire department use and not intended to be part of the initial life safety systems placed in hi-rise buildings, like sprinklers, fire alarms, and pressurized exit stairways. During a coordinated fire event, the fire command center already requires air-handling equipment and controls to be located therein. When using the mechanical ventilation option, the net result of this proposal is appropriate dampers to zone, per floor, and an additional requirement to provide for 100% fresh air return and exhaust.

Cost Impact: This code change proposal will increase the cost of construction.

Committee Action: Approved as Modified

Modify the proposal as follows:

403.15 Smoke exhaust. Buildings and structures shall be equipped with natural or mechanical ventilation for removal of products of combustion in accordance with one of the following:

1. Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50 foot intervals. The area of operable windows or panels shall not be less than 40 square feet per 50 linear feet of perimeter.

   Exceptions:

   1. In Group R-1 occupancies, each guest room or suite having an exterior wall shall be permitted to be provided with 2 square feet of venting area in lieu of the area specified in item 1.
   2. Windows shall be permitted to be fixed ~~tempered glass panes provided that no coating or film is applied that will modify the natural breaking characteristics of the glass~~ , provided that glazing can be cleared by firefighters.

2. Mechanical air-handling equipment providing one exhaust air change every ~~10~~ 15 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.
3. Any other approved design that will produce equivalent results.

Committee Reason: The committee agreed that the proponent's reason statement accurately and adequately substantiates the need for the change which will provide the fire department with an effective tool for the removal of smoke from high-rise buildings during post-fire salvage and overhaul operations. The modification is a clearer statement of the desired performance characteristic of fixed windows.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, C.B.O, Schirmer Engineering Corporation requests Approval as Modified by this public comment.

Further modify proposal as follows:

403.15 Smoke removal exhaust. To facilitate smoke removal in post-fire salvage and overhaul operations, buildings and structures shall be equipped with natural or mechanical ventilation for removal of products of combustion in accordance with one of the following:

1. Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50 foot intervals. The area of operable windows or panels shall not be less than 40 square feet per 50 linear feet of perimeter.

   Exceptions:

   1. In Group R-1 occupancies, each guest room or suite having an exterior wall shall be permitted to be provided with 2 square feet of venting area in lieu of the area specified in item 1.
   2. Windows shall be permitted to be fixed provided that glazing can be cleared by firefighters.

2. Mechanical air-handling equipment providing one exhaust air change every 15 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.
3. Any other approved design that will produce equivalent results.

Commenter's Reason: As stated in Committee Reason of the 2008 Report of the Public Hearings on the 2008 Editions of the International Code, the ventilation system being required is intended to ONLY "…provide the fire department with an effective tool for the removal of smoke from high-rise buildings during post-fire salvage and overhaul operations." (Entire Committee Reason is found below)

The proposed modification will make the provision clear and concise, therefore limiting the potential for misapplication.

The proposed change to the title is also intended to add clarity to the provision. The term "smoke exhaust" is used in 12 other places in the IBC, each with a little different meaning. The term "smoke removal" is only used in one other location in the IBC, and thus the potential for misapplication is reduced.

Committee Reason: *The committee agreed that the proponent's reason statement accurately and adequately substantiates the need for the change which will provide the fire department with an effective tool for the removal of smoke from high-rise buildings during post-fire salvage and overhaul operations. The modification is a clearer statement of the desired performance characteristic of fixed windows.*

Final Action: AS AM AMPC____ D

G65-07/08
403.15 (New), Chapter 35 (New)

THIS CODE CHANGE WILL BE HEARD ON THE IBC STRUCTURAL PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: Michael Gardner, Gypsum Association

1. Add new text as follows:

403.15 Structural integrity of exit stairway enclosures and elevator shaft enclosures. For all buildings that are more than 420 feet (128 m) in height, exit stairway enclosures and elevator shafts enclosures shall comply with Sections 403.15.1 through 403.15.3.

403.15.1. Wall assembly. The wall assemblies making up the exit stairway enclosures and elevators shaft enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.

403.15.2. Wall assembly materials. The face of the wall assemblies making up the exit stairway enclosures and elevator shaft enclosures that are not exposed to the interior of the exit stairway enclosure or elevator shaft enclosure shall be constructed in accordance with one of the following methods:

1. The wall assembly shall incorporate not less than two layers of impact-resistant construction board each of which meets or exceeds Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.

2. The wall assembly shall incorporate not less than one layer of impact-resistant construction material that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.
3. The wall assembly shall incorporate multiple layers of any material, tested in tandem, that meet or exceed Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.

403.15.3. Other Wall Assemblies: An entire wall assembly that provides impact resistance equivalent to that required by Section 403.15.1.and the Hard Body Impact Classification Level 3 in ASTM C1629/C1629M shall be permitted.

2. Add standard to Chapter 35 as follows:

ASTM C1629/C1629M-06 Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels

Reason: The intent of this proposal is to incorporate a reference to ASTM Standard C 1629 into the code. The standard was developed through the ASTM process to directly address impact-resistance requirements for materials that could be incorporated into stair and elevator enclosures in high rise construction.

By incorporating the reference to ASTM C 1629 a definitive method of establishing criteria to assess the impact-resistance of stair and elevator enclosures will be incorporated into the code. This is in contrast to recent proposals that have attempted to inappropriately impose specific requirements of the ASTM E 119 standard onto enclosure systems or that have proposed other arbitrary performance requirements for enclosure systems.

While the standard was developed to specifically test gypsum and fiber-reinforced cement panels, it can readily be used to test the impact resistance of other board and panel materials. In addition, it establishes specific values for the impact resistance of materials that can be used as a benchmark for the evaluation of other materials and systems.

This proposal directly reflects recent action by the City of New York. In July 2006, Section 32-05 of Chapter 32 of Title 1 of the Rules of the City of New York was adopted by the City of New York. Section 32-05 established criteria for the evaluation of stair enclosures in office building construction in New York City by incorporating a reference to the ASTM C 1629 standard. Rule 32 also established performance criteria for systems constructed using other materials.

This proposal takes the language adopted by the City of New York and modifies it for use in the IBC. In so doing, it eliminates much of the prescriptive language contained in Section 32-05 of the New York City text. That is intentional since much of the prescriptive language contained in Section 32-05 appears in other sections of or is incorporated by reference into the IBC.

The proposed Section 403.15 establishes that the language will apply only to buildings that are more than 420 feet in height and only to the exit stairway and elevator enclosures within those buildings. This is more restrictive than the New York City language which imposes the impact resistant requirements onto all office buildings regardless of size or height.

Section 403.15.1. directly mimics the New York City language that requires the entire assembly to withstand an impact resistance of 195 lbf as measured by the ASTM C 1629 Soft Body Impact Test. The test method used in C 1629 is conducted in accordance with the ASTM E 695 test method which covers the measurement of the relative resistance of wall, floor, and roof construction to impact loading.

Section 403.15.2 requires the face of the system that is not exposed to the shaft – the outside face - to be protected by a material or materials that comply with a level of impact resistance as established by the ASTM C 1629 Hard Body Impact Test. To comply with the proposed language at least two layers of Level 2 material or one layer of Level 3 material must be incorporated into the system. Level 2 material must withstand a Hard Body impact of 100 lbf to comply with the standard. Level 3 material must withstand a Hard Body impact of 150 lbf to comply with the standard.

The same section also permits the use of a system composed of multiple layers of different materials provided the composite system can comply with a Level 3 Hard Body test. The same concept is contained in the New York City language.

Section 403.15.3. is intended to permit monolithic systems, such as those constructed of masonry or concrete, to be evaluated using an available test method that will permit a quantifiable comparison with the performance requirements established by the proposed language. This is a change from the New York City language which specifically allows the use of masonry or concrete walls, but makes no provisions for other monolithic systems such as those constructed of plaster or other similar materials.

Cost Impact: The code change proposal will increase the cost of construction

Committee Action: **Disapproved**

Committee Reason: The committee generally agrees with this proposed enhancement of exit enclosure integrity, but as written it is specific for only one material. It would require other enclosure materials such as concrete and masonry to comply with a reference standard that is specific to panels of gypsum and fiber-reinforced cement.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Michael Gardner, Gypsum Association, requests Approval as Modified by this public comment.

Modify proposal as follows:

403.15.3.1. Concrete or masonry walls. Concrete or masonry walls shall be considered to have complied with the requirements of this section.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Committee reason statement for disapproval of the original proposal indicates that the structural committee agreed with the concept of enhanced exit enclosure integrity, but believed that the original proposal restricted material system options when it required concrete and masonry systems to comply with a gypsum board standard. Proposed modification rectifies committee concern by specifically stating that a concrete or masonry system complies with the intent of the overall proposed language and can be installed to satisfy the requirements of the section without the need for further testing.

Public Comment 2:

Steve Skalko. Portland Cement Association, requests Approval as Modified by this public comment.

Modify proposal as follows:

403.15 Structural integrity of exit ~~stairway~~ enclosures and elevator ~~shaft~~ hoistway enclosures. For buildings of occupancy category III or IV in accordance with Table 1604.5 with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, and for all buildings that are more than 420 feet (128 m) in height, exit ~~stairway~~ enclosures and elevator ~~shafts~~ hoistway enclosures shall comply with Sections 403.15.1 through 403.15.~~3~~4.

403.15.1. Wall assembly. The wall assemblies making up the exit ~~stairway~~ enclosures and elevator~~s~~ ~~shaft~~ hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.

403.15.2. Wall assembly materials. The face of the wall assemblies making up the exit ~~stairway~~ enclosures and elevator ~~shaft~~ hoistway enclosures that are not exposed to the interior of the exit ~~stairway~~ enclosure or elevator ~~shaft~~ hoistway enclosure shall be constructed in accordance with one of the following methods:

1. The wall assembly shall incorporate not less than two layers of impact-resistant construction board each of which meets or exceeds Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.
2. The wall assembly shall incorporate not less than one layer of impact-resistant construction material that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.
3. The wall assembly shall incorporate multiple layers of any material, tested in tandem, that meet or exceed Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.

403.15.3 Concrete and masonry walls: Concrete or masonry walls shall be deemed to satisfy the requirements of Sections 403.15.1 and 403.15.2.

~~403.15.3~~ 403.15.4 Other Wall Assemblies: ~~An entire~~ Any other wall assembly that provides impact resistance equivalent to that required by Section 403.15.1 and ~~the~~ Section 403.15.2 for Hard Body Impact Classification Level 3 in ASTM 1629/C1629M shall be permitted.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Hardening of exit enclosures and elevator hoistways is an important fire safety feature that is presently lacking in the code. G65 presents an approach to add this feature to the IBC however it needs additional modifications to fully address high rise buildings where this feature would be important to the occupants.

For example, occupancy category III and IV structures less than 420 feet in height may be at higher risk than some category II structures greater than 420 feet in height; therefore, occupants of these structures deserve the additional protection proposed for taller buildings. The height threshold being proposed for category III and IV buildings is the same as the existing threshold for high rise buildings (see Section 403.1).

By deleting the word "stairway" in the proposal, exit passageways (see Section 1021) which are commonly used to connect offset exit stairs will also be required to be "hardened" the same as the stairs they connect. This insures continuity of the hardened exit enclosure for the full length until an occupant reaches the exit discharge. In addition the change from "shaft" to "hoistway" is for consistency with other code provisions (e.g., see Chapter 30).

Finally, as noted in the last paragraph of the proponent's reason, the NYC rule permits concrete or masonry enclosures without further testing. However, Section 403.15.3 of G65 will require concrete or masonry walls to be tested to some unknown standard that is equivalent to C1629. Presumably NYC determined that concrete or masonry walls normally used to enclose exits and elevator hoistways meet the intent of their rule. This modification will exempt concrete and masonry walls from being subjected to unnecessary tests.

Below is the pertinent section from the NYC rule upon which G65 was based.

Concrete and masonry walls. Concrete or masonry walls shall satisfy the impact resistance requirements of this section provided that the enclosure walls are anchored to structural members that provide lateral support as required by the seismic provisions of RS 10. The assembly shall be rated for two-hour fire resistance, as measured by the method described in ASTM E119.

Final Action: AS AM AMPC____ D

G66-07/08
403.17

THIS CODE CHANGE WILL BE HEARD ON THE IBC MEANS OF EGRESS PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: Jeff Harper, Rolf Jensen and Associates

Revise as follows:

403.17 (Supp) Additional ~~Exit Stairway~~ means of egress. For buildings other than Group R-2 that are more than 420 feet (128 m) in height, one additional ~~exit stairway~~ means of egress meeting the requirements of ~~Section 1009 and 1020~~ Chapter 10 shall be provided in addition to the minimum number of exits required by Section 1019.1. ~~The total width of any combination of remaining stairways with one stairway removed shall not be less than the total width required by Section 1005.1. Scissor stairs shall not be considered the additional exit stair required by this section.~~

Reason: The purpose of the proposed change is to put the requirement for additional egress beyond what is normally required by Chapter 10 into terms that are already defined and used within the context of the Code. The proposed change is justified in that it gives an AHJ a little more flexibility in what can be considered while at the same time reducing the overall construction cost and increasing design flexibility for super tall buildings.

The rationale cited by the submitters of G71-06/07 was mostly focused on providing a means to permit firefighting operations to continue while allowing a rapid, full building evacuation. However, the resulting code changes materially restrict the designer and the code official into a very specific design for buildings exceeding the 420 foot height. In reality, as the G71 submitter acknowledges, there are other alternatives to achieve the goals of firefighter operations occurring concurrently with building evacuation. The proposed language changes give the AHJ and designer a little more flexibility in the design, construction and operation rather than in dictating the design of buildings exceeding 420 feet.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: This proposal will undue the work approved at the Final Action hearings in Rochester. This is a key element for occupants and emergency responders in the event of a full building evacuation. Justification was not provided for the deletion of this requirement.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Richard Schulte, Schulte and Associates requests Approval as Submitted.

Commenter's Reason: The Committee rationale for denying this code change proposal indicates that this proposal will undo the previous membership action regarding the number of stairs which are required. In fact, this code change merely provides an alternative of providing a horizontal exit on each floor, rather than a third stair. The rationale for the third stair was fire-related. Providing a horizontal exit on every floor, rather than a third stair, provides far more protection for both the occupants of the building and the fire service than would a third stair. It should be noted that NFPA 14 requires that standpipe outlets be provided at each door opening in a horizontal exit. Hence, from a fire fighting standpoint, providing a horizontal exit on each floor is far superior to providing standpipe outlets only in the stair enclosures and at the fire service elevator.

It should also be noted that the original high rise provisions as adopted in the late 1970's allowed an option of either providing sprinkler protection throughout the building or providing a horizontal exit on each floor. If providing a horizontal exit on each floor was considered to be acceptable protection for a high rise building without sprinkler protection just 30 years ago, it seems reasonable that providing both sprinkler protection throughout the building and a horizontal exit on each floor should be a design which complies with the “spirit” of code section being amended.

Public Comment 2:

David Frable, U.S. General Services Administration, Public Building Service, requests Approval as Modified by this public comment.

Replace proposal as follows:

403.17 (Supp) Additional means of egress. For buildings other than Group R-2 that are more than 420 feet in height, one additional means of egress meeting the requirements of Chapter 10 shall be provided in addition to the minimum number of exits required by Section 1019.1. ~~The total width of any combination of remaining stairways with one stairway removed shall not be less than the total width required by Section 1005.1~~. The exit stair capacity of the additional exit stair shall not be less than the exit stair capacity of any exit stair provided. Scissor stairs shall not be considered the additional exit stair required by this Section.

Commenter's Reason: The intent of this proposed code change is to clarify the intent of this paragraph. It also provides needed guidance for determining the total exit capacity of the all the exit stairs in the building when an additional exit stair is required to be provided. The second sentence of this section as is now found in the Supplement is unclear and can be variously interpreted. One incorrect interpretation would be that a single stairway would need to provide 100% of the exit capacity. The proposed replacement sentence will, instead, provide a direct statement of the capacity that the additional stairway needs to meet. To be clear, the U.S. General Services Administration prefers that Section 403.17 be removed from the code (Supplement) per the proposal G67-07/08, but if the paragraph is to remain in the code, this revision would provide clearer direction to the code user.

Public Comment 3:

Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC) requests Approval as Modified by this public comment.

Modify proposal as follows:

403.17 (Supp) Additional means of egress. For buildings other than Group R-2 that are more than 420 feet in height, one additional means of egress meeting the requirements of Chapter 10 shall be provided in addition to the minimum number of exits required by Section 1019.1. The total width of any combination of remaining stairways with one stairway removed shall not be less than the total width required by Section 1005.1. Scissor stairs shall not be considered the additional exit stair required by this section.

> **Exception.** An additional exit stairway shall not be required on any floor where the minimum number of exits required by Section 1019.1 is provided and the total width of any combination of exit stairs with any one stairway removed satisfies the requirement of Section 1005.1 for total required width required.

Commenter's Reason: This public comment reinstates the current text for determining the total width of the remaining stairs as well as clarifying that scissor stairs are not considered the addition stair. The significant change in this public comment is the added exception which is intended to provide a practical solution to buildings where the floor plate is reduced as the building gets higher. Providing an additional stair for smaller floor plates where the resulting exit width is provided with a stair removed is overly restrictive. This comment provides a reasonable compromise.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in Aprril/2005, the CTC has held fifteen meetings - all open to the public. This public comment is a result of the CTC's investigation of the area of study entitled "NIST World Trade Center Recommendations". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html

Final Action: AS AM AMPC____ D

G67-07/08
403.17

THIS CODE CHANGE WILL BE HEARD ON THE IBC MEANS OF EGRESS PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: Kim Clawson, Chicago Committee on High Rise Buildings, (CCHRB); David Frable, U.S. General Services Administration, Public Building Service and David S. Collins, AIA, The Preview Group, Inc., representing the American Institute of Architects Codes and Standards Committee; Raymond A. Grill, PE, Arup, representing himself; Lawrence G. Perry, AIA, Building Owners and Managers Association (BOMA) International

Delete without substitution:

~~**403.17 (Supp) Additional exit stairway.** For buildings other than Group R-2 that are more than 420 feet (128 m) in height, one additional exit stairway meeting the requirements of Sections 1009 and 1020 shall be provided in addition to the minimum number of exits required by Section 1019.1. The total width of any combination of remaining stairways with one stairway removed shall not be less than the total width required by Section 1005.1. Scissor stairs shall not be considered the additional exit stair required by this section.~~

Reasons: Clawson:

1. The provisions in 403.17 requiring additional stairs causes significant additional cost to building construction with little or no demonstrated comparable increase in life safety. The additional costs consist both of the actual construction cost differences between construction of stair (versus a typical floor system); and the costs due to lost rentable and/or usable floor area that has been given over to stair area. It is essential to remember that zoning ordinances limit the total amount of square footage that can be constructed; and that there is no exemption from that total for area used for non-rentable purposes such as stairways.
2. The provision appears to be internally inconsistent with fire protection strategies: R-2 buildings are specifically exempt (presumably because of the use of protect-in-place strategy for those uses) but the provision does not address or accommodate the use of horizontal exits, which are essentially the same concept as protect-in-place.
3. The extreme event has not yet been well enough defined, to confirm that the addition of a third stair will add an significant additional level of protection, or a reasonably necessary level of protection.
4. The provision has been incorporated into the Code somewhat prematurely. There is a need to consider it in regard with other exiting issues that have been recently adopted or are under consideration within the life safety community.~~;~~ Some of these include a fire department elevator (adopted into the 2007 Supplement), the use of elevators for egress of occupants and for ingress of first responders; and increased exit capacity due to increases in the minimum widths of exit stairs. There is an essential need for all the issues related to exiting to be evaluated as a whole.
5. Implementation of the provision is based on the height of the building, not on the need as reflected in the occupant load of a building and its stairs. For instance, an office building with mall floor plates (10,000 gsf) would have the same requirement of three stairs as one with larger floor plates (such as 25,000 gsf).

Reason: Frable/Collins: The purpose of this code change proposal is to delete the subject text that currently requires all buildings other than Group R-2 that are more than 420 feet (128 m) in height to install one additional exit stairway.

During the 2006/2007 ICC Code Development Hearings in Orlando, the General Code Committee disapproved this code change proposal for the following reasons:

1. The NIST report was not yet complete, therefore the proposal was premature;
2. Modeling had not been done to show the extent that an additional exit stair would improve exiting;
3. The logistics for closing off an exit stair for fire department staging during an emergency evacuation must be investigated;
4. The calculation method for determining total exit width was confusing, and did not clearly indicate the width required for the additional exit stair; and
5. The location of the additional exit stair in relationship to the other exit stairs and the elevators was not indicated.

At the Final Action Hearings of the ICC in May 2007, the ICC membership voted to overturn the General Code Committee's recommendation and approve the subject code change. At the Hearings, no new information was provided to address any of the General Committee's aforementioned concerns other than indicating that a NIST Report, NISTIR 7425 dated April 2007, *Accounting for Emergency Response in Building Evacuation: Modeling Differential Egress Capacity Solutions* was available at the back of the hearing room. According to proponents of the code change, the egress modeling conducted by NIST clearly demonstrated that the additional stair would improve occupant egress and firefighter access in buildings in all cases.

Based on our review of the subject NIST Report, it contains questionable technical information and numerous assumptions. In addition, it appears the egress modeling conducted by the NIST researchers to support the report cannot be reproduced for verification purposes and therefore in our opinion is inappropriate to be use as the only basis for this code change. For example:

1. The simplified egress simulation with a counter-flow sub-model was calibrated against only one evacuation drill observed in a 6 story office building having exit stairs 68 inches in width with 8 inch riser's heights and 11.1 inch tread depth's and having a very low building population. We would consider this to be atypical. All computer models need to be validated and be able to demonstrate numerous times repeatable results to ensure accuracy. Using data from only one low-rise building evacuation drill having a small population and extrapolating the data to taller buildings having much larger populations without validation is questionable and should not be used as technical substantiation for a code change of this magnitude.
2. The input data and assumptions used for the modeling scenario were not provided in the subject report for review. For example, total building population, occupant travel speed on level routes, occupant travel speed on stairs, floor rate through doors, floor rate on stairs, speed of slowest evacuee, number of exit door leaves available to evacuees, total length of route that is level, vertical distance moved via the stair, stair width (not effective flow width - report states clear width), stair riser height, stair tread depth, etc. were not provided in the report. Therefore, one cannot verify the results stated in the NIST report.
3. The modeling scenario assumes occupants within the exit stairs who are descending from floors located above the fire floor will immediately leave their exit stair, when that stair has been closed by the fire department, and transfer into nearest available stair. The General Code Committee believed that the logistics and time associated with the firefighters closing off an exit stair for fire department staging during an emergency evacuation must be investigated further. This concern was not addressed in the NIST report.
4. The modeling scenario assumes that the firefighters will not use the elevator. The General Code Committee believed that firefighters will typically use an elevator to get near the fire floor in lieu of using the exit stairs, so long as it is safe to use that elevator. This was particularly true since the code change to require a fire service access elevator was under consideration and was approved at the same hearings.

Another concern is with the statement that "scissor stairs shall not be considered an additional exit stair required by this section". As currently written, this statement implies that the exit capacity of a "scissor stair" cannot be utilized in determining the total required exit capacity of the building. This is at best unclear and sends an unreasonable message since the exit capacity of the "scissor stairs" would meet the intent and purpose of improving the building evacuation time.

We seriously question the need for an additional exit stair based on the fact that the IBC now requires a fire service access elevator in all buildings with an occupied floor more than 120 feet above the lowest level of fire department access. This new requirement not only provides a means for firefighters to quickly reach a location within the building one or two floors below the fire floor but also alleviates the impact of counter-flow raised by proponent's to substantiate the need for an additional exit stair.

Recommendation 17 from the NIST WTC report did not specifically require an additional exit stair, but recommended "tall buildings be designed to accommodate timely full building evacuation of occupants …..:" This recommendation does not discount the use of elevators or wider exit stairs, yet the proponents have stated that both are ineffective.

Last but not least, we feel the costs to construct the additional extra stair will significantly increase building construction and maintenance costs. For example, the difference between the cost of constructing 2 exit stairs having a nominal width of 44 inches versus constructing 3 exit stairs having a nominal width of 44 inches in a 42 story office building (504 feet in height) having 40,000 square foot per floor is over $1.3 million. In taller buildings the construction costs are even higher; for example the difference between the cost of constructing 2 exit stairs having a nominal width of 44 inches versus constructing 3 exit stairs having a nominal width of 44 inches in a 75 story office building (900 feet in height) having a 45,000 square foot per floor is over $2.3 million.

The bottom line is that it does not take a NIST report nor a rocket scientist to figure out that requiring additional exit stairs in buildings will improve the overall occupant evacuation times from a building. The bigger question that needs to be answered is - "at what economic cost to society is the ICC membership willing to incorporate these "so called" minimum requirements into the IBC." Other options may be available and all the ramifications of this new requirement have yet to be completely considered. It is our belief that with the new requirement for the installation of a fire service access elevator in tall buildings has increased the overall level of safety of the building occupants and fire fighters in a cost effective manner and therefore the need for an additional exit stair is not warranted.

Reason: Grill: The committee originally rejected this proposal for various reasons. The Committee statement made in support of disapproval follows. "Committee Reason: The committee felt that review of the NIST report was not yet complete, therefore this proposal was premature. Modeling should be done to show the extent that an additional stair would improve exiting. The logistics of closing off a stairway for fire department staging during an emergency evacuation must be investigated. The calculation method for exit stairway width was confusing, and did not clearly indicate the width required for the extra stairway. The location of the extra stairway in relation to the other exit stairways was not indicated. In a high rise, fire fighters will typically be using the elevator to get near the fire floor and then move to the stairway. A question would be if this stairway should be located near the elevators."

None of these concerns expressed in the committee rejection were addressed during the comment period. The requirement of a third stair to be provided and to not allow it to be considered as part of the egress capacity is overly restrictive. The justification for the proposal indicated that it implemented one of NIST's recommendations as a result of the WTC incident. Recommendation 17 from NIST's web site reads:

"Recommendation 17. NIST recommends that tall buildings be designed to accommodate timely full building evacuation of occupants when required in building-specific or large-scale emergencies such as widespread power outages, major earthquakes, tornadoes, hurricanes without sufficient advanced warning, fires, explosions, and terrorist attack. Building size, population, function, and iconic status should be taken into account in designing the egress system. Stairwell capacity and stair discharge door width38 should be adequate to accommodate counterflow due to emergency access by responders."

Note that NIST indicates that, "Building size, population, function, and iconic status should be taken into account in designing the egress system." The idea that adding a third totally redundant stair will make it easy for occupants to walk down 40 stories or more or make it easy for first responders to walk up 40 stories or more doesn't make sense. As noted in NIST's Recommendation 17, tall buildings should be looked at on a case by case basis.

Reason: Perry: This proposal seeks to remove the requirement for an 'extra' exit stair in buildings over 420' in height that was added via a successful public comment at the Rochester Final Action Hearings.

The cost impacts, from initial construction cost to the lifetime costs due to less efficient building cores, were not considered by the proponent. The result of this change, should any local jurisdiction attempt to figure out how to apply it, would likely be to create a maximum building height of 420' in that jurisdiction. There has been no technical substantiation as to the need for this 'extra' stair, no rationale explaining the types of incidents this is supposed to protect from, and no cost/benefit analysis to show that the gain from this change, either for occupant egress or for fire department access times, will be worth the enormous costs.

The new provision is technically flawed in that it establishes a new means of egress requirement solely on a building height basis, and does not correlate the new requirement with application of the rest of Chapter 10. The result is a new requirement that would be interpreted in a wide variety of ways. The proposal adds an 'extra' stair, and requires it to comply with Section 1009 and 1020. Section 1009 provides the 'nuts and bolts' provisions for the stair, and Section 1020 provides the 'nuts and bolts' for the required enclosure. There is nothing in the new language that explains how to apply the remaining provisions of Chapter 10, most of which are based on a floor-by-floor approach to exiting. Examples of the unaddressed issues this new requirement raises:

- Travel distance. The new section requires a calculation assuming 'one stair removed'. Does this need to be satisfied for travel distance purposes as well, with the result being that two exits would always need to be within travel distance?
- Horizontal exits. It is unclear how this new provision would apply in buildings using a horizontal exit approach. Is there no additional requirement for a stair, or would buildings using a horizontal exit have to add a stair on either side of the horizontal exit?
- Scissor Stairs. The new text prohibits using a scissor stair as the 'extra stair'. This can be read to either prohibit scissors stairs from counting as any multiple exits, or allowing the 1019.1-calculated number of exit stairs to be scissor stairs, with the prohibition only applicable to the 'extra' stair.
- Access to Exits. There is nothing in the new text that creates a clear link to mandate that access to the 'extra' stair be provided on any individual floor. The text requires one to provide an extra stair, and then to calculate total required stair width with any one stair removed. Nothing requires providing access to anything other than the number of exits currently required by Section 1019.1.

Cost Impact: This code change will not increase the cost of construction.

Committee Action: Disapproved

Committee Reason: The additional stairway provides flexibility for fire service access in the event of simultaneous full building evacuation. Without occupant evacuation elevators or some other method the third stairway is justified. There are massive consequences for these super tall buildings and these consequences must be considered.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

David S. Collins, FAIA, The Preview Group, Inc. representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: The basis for the requirement for an additional stair within super high rise buildings was largely taken from assumptions regarding the NIST recommendations based on the WTC investigation. Although the report provides significant information regarding the performance of the buildings, their occupants and the extraordinary efforts of the responding emergency personnel, the AIA

believes that a number of the recommendations in the report are not supported by the findings of the investigation. Recommendation 17 fails to explain how the issue of counterflow impeded egress, when the report indicates that everyone, except emergency responders, that was capable of exiting the building had done so prior to their collapse.

Recommendation 17. *NIST recommends that tall buildings should be designed to accommodate timely full building evacuation of occupants due to building-specific or large-scale emergencies such as widespread power outages, major earthquakes, tornadoes, hurricanes without sufficient advanced warning, fires, accidental explosions, and terrorist attack. Building size, population, function, and iconic status should be taken into account in designing the egress system. Stairwell and exit capacity should be adequate to accommodate counterflow due to emergency access by responders.*

Although Recommendation 17 suggests wider stairwells and greater exit capacity to accommodate total building evacuation and avoiding counter-flow issues from first responders, it isn't consistent with the information provided in the WTC report. They indicate that every person, other than emergency personnel, capable of exiting the WTC buildings had done so 20 minutes before the collapse. If that is true, what benefit would an additional stair provide.

Such a design raises a concern about orderly and controlled egress. No research is cited regarding the effect wider stairs may have, or the possibility that evacuating occupants will simply fill the larger stairwell causing counter-flow. Faster-moving individuals will tend to pass slower people descending the stairs, potentially leading to conflict and disruption of an orderly egress process.

The NIST report assumed that we are not ever designing buildings for eminent collapse because of an extraordinary event such as an airplane crash. Taking this leap of faith that a third stairway will provide added safety is not an appropriate conclusion and isn't based on any facts or analysis.

Public Comment 2:

Dave Frable, U.S. General Services Administration, Public Buildings Service, requests Approval as Submitted.

Commenter's Reason: The purpose of this code change proposal is to delete the subject text that currently requires all buildings other than Group R-2 that are more than 420 feet (128 m) in height to install one additional exit stairway. During the 2006/2007 ICC Code Development Hearings in Orlando, the General Code Committee disapproved this code change proposal for the following reasons:

1. The NIST report was not yet complete, therefore the proposal was premature;
2. Modeling had not been done to show the extent that an additional exit stair would improve exiting;
3. The logistics for closing off an exit stair for fire department staging during an emergency evacuation must be investigated;
4. The calculation method for determining total exit width was confusing, and did not clearly indicate the width required for the additional exit stair; and
5. The location of the additional exit stair in relationship to the other exit stairs and the elevators was not indicated.

At the Final Action Hearings of the ICC in May 2007, the ICC membership voted to overturn the General Code Committee's recommendation and approve the subject code change. At the Hearings, no new information was provided to address any of the General Committee's aforementioned concerns. However, at the Final Action Hearings in Rochester, the membership overturned the General Committee's recommendation without addressing any of the General Committee's concerns.

We strongly believe that there is a need that all issues that are related to occupant evacuation should be evaluated as a whole based on technical rationale and not be based on emotion in an arbitrary piece-meal fashion. For example, this proposed new requirement is based strictly on building height, without taking into consideration any other key factors such as building size, the building's fire protection features, occupant load, occupancy, fuel load, and associated risks that are necessary to ensure an environment is provided for occupants and first responders that is reasonably safe from fire and similar emergencies.

Lastly, at what economic cost to society is the ICC membership willing to incorporate this so called "minimum" requirement into their jurisdiction. We strongly believe that this type of requirement should be looked at on a case-by-case basis as stated in Recommendation 17 of the NIST WTC Report and not a shotgun approach as it now is portrayed.

Based on all of our concerns with the existing requirements, we urge the membership to approve this code change as submitted.

Public Comment 3:

Ray Grill, PE, Arup, representing himself requests Approval as Submitted.

Commenter's Reason: This requirement for a third redundant stair was introduced into the code based on the following recommendation from the NIST WTC investigation.

"Recommendation 17. NIST recommends that tall buildings be designed to accommodate timely full building evacuation of occupants when required in building-specific or large-scale emergencies such as widespread power outages, major earthquakes, tornadoes, hurricanes without sufficient advanced warning, fires, explosions, and terrorist attack. Building size, population, function, and iconic status should be taken into account in designing the egress system. Stairwell capacity and stair discharge door width 38 should be adequate to accommodate counterflow due to emergency access by responders."

Note that NIST indicates that, "Building size, population, function, and iconic status should be taken into account in designing the egress system."

The requirement for a 3rd totally redundant stair implies that tall buildings will be able to be evacuated quicker. This may not be the case. The concept that total evacuation would be a viable immediate option for tall buildings for all emergencies is not appropriate. This code change also implies that adding a third totally redundant stair will make it easy for occupants to walk down 40 stories or more or make it easy for first responders to walk up 40 stories or more. This is not the case. As noted in NIST's Recommendation 17, tall buildings should be looked at on a case by case basis.

The introduction of this requirement for tall buildings does not increase safety. It does have a significant impact on design and cost.

Public Comment 4:

Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC), representing requests Approval as Submitted.

Commenter's Reason: The current provisions for the additional stair were the results of G71-06/07 last cycle. As noted in the reason statement for the code change, it notes "It implements, in part, Recommendation 17 of the National Institute of Standards and Technology (NIST) World Trade Center (WTC) report." Based on the information to code committee during the 2006/2007 cycle, the code committee disapproved the change. However, the membership at the Rochester Final Action Hearings in Rochester overturned the code committee's recommendation and approved the provisions. During testimony in the current cycle on G67-07/08 at the Palm Springs hearings, it was noted that the membership has taken its position based on the previous cycle. While this is true, as with all code development issues, code provisions whether current or proposed, require the requisite substantiation to be provided.

The high rise provisions have been in the legacy codes since the 1970's. These provisions applied to all buildings greater than 75' in height, including taller buildings in the 420' range for which the current provisions apply. To date, the extent of the documentation provided in support of an additional stair seems to revolve around the NIST report and the view that the additional stairway provides flexibility for fire service access. In regard to the NIST report, the following is NIST's published recommendation number 17:

> NIST recommends that tall buildings be designed to accommodate timely full building evacuation of occupants when required in building-specific or large-scale emergencies such as widespread power outages, major earthquakes, tornadoes, hurricanes without sufficient advanced warning, fires, explosions, and terrorist attack. Building size, population, function, and iconic status should be taken into account in designing the egress system. Stairwell capacity and stair discharge door width[38] should be adequate to accommodate counterflow due to emergency access by responders.

As can be seen, the concern is one of counter-flow. As such, while it is agreed that a separate stair accomplishes this concern, it is clearly not the only way. One other option would be provide wider stairs for such taller buildings. The cost/benefit of the additional stair has not been provided.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in Aprril/2005, the CTC has held fifteen meetings - all open to the public. This public comment is a result of the CTC's investigation of the area of study entitled "NIST World Trade Center Recommendations". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html

Public Comment 5:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International, requests Approval as Submitted.

Commenter's Reason: The proposal to add an 'extra stair' is unfounded, and should be reversed. Extensive explanation of the lack of substantiation for this requirement, and the problems with its impact on very tall buildings, is well documented in the multiple reason statements provided from the multiple submitters of this proposal.

Even if there is a decision that some major change needs to be made, the 'extra stair' concept, as currently approved, is fatally flawed. The entire means of egress system included in the IBC is developed on a floor-by-floor basis. As noted in our reason statement to this proposal, this 'extra stair' has not been incorporated into the 'system' approach to the means of egress system in Chapter 10, leaving major gaps. The 'extra stair', as currently crafted, will not provide the additional level of safety it is being touted as providing. Additionally, the code would be 'broken' in that it would not provide criteria for how to apply the 'extra stair' approach in buildings utilizing horizontal exits.

Public Comment 6:

Richard Schulte, Schulte and Associates, requests Approval as Submitted.

Commenter's Reason: The Committee which reviewed this proposal seems to have neglected the fire safety record of high rise buildings, both sprinklered and unsprinklered, as did the membership when the requirement for the third stair was approved. From a historical point of view, a major fire has never occurred in a U.S. high rise building protected throughout by a sprinkler system, with but one exception, September 11th. (The fires which occurred in World Trade Center (WTC) towers on 9/11 resulted from terrorist attacks. According to NIST, the recommendations contained in the NIST WTC towers collapse are not intended to address a 9/11 type attack utilizing aircraft as missiles. Hence, the membership should disregard 9/11 when considering the need for a third stair.)

With respect to office buildings, the National Fire Protection Association (NFPA) indicates that the average number of fire fatalities which occurred in these types of buildings in the United States between 2000 and 2004 is one. Yes, that is correct. On average, only 1 American dies each year in fires in office building in recent years. That includes both high rise and low-rise office buildings and both sprinklered and unsprinklered buildings. What an amazing fire safety record, particularly when it is considered that the fire in the Cook County Administration Building (6 fatalities) occurred during this period. (The Cook County Administration Building was a partially sprinklered building. The sprinkler protection for this County Building was installed only on the First Floor and levels below.)

The fire in Cook County Administration Building is an example of where the fire department took control of a stair when an uncontrolled fire occurred on the 12th floor of the building. (The building is 37 stories/460 feet in height.) It should be noted that this did not impede the evacuation of the building (although, admittedly the fire took place around 5 PM on the Friday afternoon). In fact, the upper floors of the building remained relatively smoke-free for an extended period of time. (Fire fighters involved in building search on the upper floors did not wear self-contained breathing apparatus.) The fire experience at the Cook County Administration Building clearly demonstrates that there is little need for a third stair in an unsprinklered office building. If the County Administration Building had been protected throughout by a sprinkler system (as it is now), the fire would have been controlled by the operation of 1 or 2 sprinklers and there would have been no life loss or any need for a total evacuation of the building.

Based upon the experience at the Cook County Office Building, there seems to be little need for a third stair in high rise office buildings, regardless of the height. Given that the occupant load density of a hotel is one-half that of an office building (100 SF/person vs. 200 SF/person) and hotel guest room floors are highly compartmented, if a third stair is not necessary in an office building, then there is certainly no need for a third stair in an R-1 occupancy.

Finally, it should be noted that recent changes adopted in the code have increased the level of safety in high rise buildings. Among these changes is a requirement for a fire service elevator. In addition, it is expected that a code change which will increase the reliability of sprinkler systems in high rise buildings will be approved in this cycle. (The reliability of sprinkler systems in high rise buildings is already 100 percent when measured over a 30+ year period.) Given these two changes in the high rise provisions, as well as the magnificent fire safety record of sprinklered high rise buildings, the provision for a third stair in high rise buildings really only satisfies an emotional need to do something, rather than a logical analysis of the fire safety needs of both the occupants and fire fighters.

Given a choice between a mandatory requirement for a third stair in a high rise building and sprinkler protection in 1- and 2-family dwellings, it is obvious which protection feature will provide better fire protection for the public. We need to get the "biggest bang for our buck" when it comes to the dollars that we invest in fire protection. Providing a third stair in high rise buildings provides little in the way of an increase in safety for high rise buildings, while providing sprinklers in one- and two-family dwellings will address the most hazardous of occupancies from a life safety standpoint-our own homes. Yes, that's correct, the smallest buildings which we building are the most hazardous from a fire safety standpoint.

Final Action: AS AM AMPC____ D

G69-07/08
403.18, Table 403.18

THIS CODE CHANGE WILL BE HEARD ON THE IBC FIRE SAFETY PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: David Frable, U.S. General Services Administration

Delete without substitution:

~~**403.18 (Supp) Sprayed fire-resistive materials (SFRM).** The bond strength of the SFRM shall be in accordance with Table 403.18.~~

~~**TABLE 403.18 (Supp)**~~
~~**MINIMUM BOND STRENGTH**~~

~~**HEIGHT OF BUILDING**[a]~~	~~**SFRM MINIMUM BOND STRENGTH**~~
~~More than 75 feet and up to 420 feet~~	~~430 psf~~
~~More than 420 feet~~	~~1,000 psf~~

~~For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kW/m2~~
~~a. Above the lowest level of fire department vehicle access~~

Reason: The purpose of this code change proposal is to delete the subject text and Table that was "approved as modified" (G68-06/07) by the General Code Committee even though the Committee stated in their reason statement that no technical data has been provided to justify increasing the current IBC requirements for the minimum bond strength for SFRM in high-rise buildings. In addition, we feel that the proponents did not provided a logical explanation which clearly shows why the current Code provisions regarding the minimum bond strength for SFRM in high-rise buildings is inadequate and how this subject proposal will improve the level of overall safety to the building occupants. Inspectors for jurisdictions have acknowledged that the single most common reason for SFRM dislodgement during construction is the intentional removal of SFRM by trades for the purpose of attaching certain installations to the steel frame. Therefore, we do not see how Increasing the density or bond strength will resolve this issue. In addition, to our knowledge, there also has been no evidence submitted by any of the proponents to document the claim that building sway dislodges SFRM. Last but not least, it has come to our attention that there may have been misleading testimony regarding the cost impact for installing SFRM at these higher bond strengths. For example, based on independent government cost estimates; SFRM bond strength of 150 psi costs approximately $4.31 per gross square foot floor area; SFRM bond strength of 430 psi costs approximately $6.52 per gross square foot floor area; and SFRM bond strength of 1000 psi costs approximately $11.58 per gross square foot floor area. Based on these cost estimates, the increased cost for using a bond strength of 1000 psi versus 150 psi for a building 504 feet in height (42 stories) @ 40,000 square feet per floor would be over $12.2 million.

We strongly believe that mandating the increased "minimum" SFRM bond strengths for all high-rise buildings is unjustified and that this current code provision will significantly increase building construction costs in ALL high-rise buildings; without knowing if in fact, that increasing the SFRM minimum bond strengths will improve the level of overall safety to the building occupants.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The committee agreed that the bond strength requirements for sprayed fire-resistive materials (SFRM) should remain in the code based on a lack of technical justification to take them out and the fact that dislodging of SFRM does occur in buildings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

David Frable, U.S. General Services Administration, Public Building Service, requests Approval as Submitted.

Commenter's Reason: To say the least, The U.S. General Services Administration is disappointed with the reason statement provided by the 07/08 Fire Safety Code Committee for disapproval of this specific code change at the Code Development Hearings in Palm Springs, CA. The ICC Committees are the foundation upon which the process of development of the *ICC International Codes* is built and their importance cannot be overemphasized. In addition, it is essential that all ICC Code Committees prepare in advance, prior to their participation during the Code Development Hearings. Unfortunately, based on the reason statement provided by the Fire Safety Code Committee for this specific code change, it appears the Fire Safety Code Committee did not meet their responsibilities as Committee members to prepare in advance prior to participating in the Code Development Hearings.

At the Code Development Hearings in Rochester, NY the Committee's reason statement for "Approving as Modified" code change G68-06/07 stated the following:

> **"Committee Reason:** Although the data which provides technical support was not provided within the proposal, this does go along with the NIST recommendations and should provide better safety in high-rise buildings. Using the greater bond strengths will increase the probability that the protection will stay in place and will reduce the likelihood of being dislodged. These factors should provide for a longer time of safety. Placing the requirements in the high-rise provisions of Chapter 4 instead of within Chapter 7 makes sense because they are only applicable to high-rises and will be more likely to be found within that section. The committee did agree with the different bond strength requirements based upon the thought the taller buildings are at a higher risk and that items such as the vibration of tall buildings will affect the long term performance. Based on testimony which was provided, the cost impact of this requirement was considered as being relatively small. The higher density products which are currently available will generally meet these requirements. The modifications included a revision of the terminology "spray applied" to "sprayed" to be consistent with the action of FS156-06/07 and to create a more global point of reference for building height by moving footnote a to the main title of the first column."

Please note in the Fire Safety Code Committee's reason statement in G68-06/07, it states that no technical data had been provided by the proponent to justify increasing the current IBC requirements for the minimum bond strength for SFRM in high-rise buildings. However, in the Code Development Hearings in Palm Springs, CA, the Committee's reason statement for G69-07/08 states that the main reason for disapproval was that there was a "lack of technical justification" to remove this requirement from the Code even though the Committee reason statement in 06/07 stated that no technical data has been provided by the proponent to justify increasing the current IBC requirements for the minimum bond strength for SFRM in high-rise buildings.

In addition, the proponent has not provided a logical explanation which clearly shows why the current Code provisions regarding the minimum bond strength for SFRM in high-rise buildings is inadequate and how the subject proposal will improve the overall safety to the building occupants since the single most common reason for SFRM dislodgement during construction is the intentional removal of SFRM by trades for the purpose of attaching installations onto the steel frame.

However, our biggest concern is that the cost impact of this requirement is not as small as originally claimed by the proponents during the hearings in Buena Vista. In fact, the cost associated with increasing the bond strength to 430 psf and 1,000 psf is substantial based on independent Government estimates.

Lastly, new information from researcher's and manufacturer's indicate that there may not be enough data currently to justify this code change and therefore they are investigating revising the current tests methods for measuring the cohesion/adhesion of SFRM applied to structural members.

Therefore, based on these concerns, we strongly believe that increasing the minimum SFRM bond strengths for all high-rises does not justify the significant increase in construction costs in All high-rise buildings without knowing in fact if increasing SFRM bond strength to these arbitrary values meeting the current test methods will improve the overall level of safety to the building occupants; we urge the membership to approve this code change as submitted.

Public Comment 2:

Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC) requests Approval as Submitted.

Commenter's Reason: The current provisions for minimum bond strength were the results of G68-06/07 last cycle. As noted in the reason statement for the code change, it notes "The purpose of this proposal is to increase the required adhesions of Spray Applied Fire Resistant Materials (SFRM)." The proposal further sites Recommendation 6 of the NIST WTC report which calls for improvement of the in-place performance of SFRM. NIST Recommendation 6 reads as follows:

> NIST recommends the development of criteria, test methods, and standards: (1) for the in-service performance of sprayed fire-resistive materials (SFRM, also commonly referred to as fireproofing or insulation) used to protect structural components; and (2) to ensure that these materials, as-installed, conform to conditions in tests used to establish the fire resistance rating of components, assemblies, and systems.

The CTC notes that the prior to the approval of the increased bond strength in Table 403.15 that the code mandated cohesive/adhesive bond strength, regardless of height, was 150 psf in Section 1704.10.5. In fact, this section has remained unchanged and was not coordinated with the new provisions in Table 403.15.

Based on input received by the CTC, the CTC position remains that the bond strength should not be increased as a function of height. As noted in the NIST recommendation, the concern is one of in-service performance of the SFRM which means the material must remain in place to perform its intended function, regardless of height. This is an inspection related issue, one for which the CTC submitted code change S39-06/07 to improve the inspection provisions, including:

- Increased number of sampling locations
- Specific sampling for columns, beams, joists and trusses
- Physical and visual tests for: substrates; thickness; density, bond strength

S39-06/07 was approved and the provisions will be incorporated in the 2009 edition of the IBC.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in Aprril/2005, the CTC has held fifteen meetings - all open to the public. This public comment is a result of the CTC's investigation of the area of study entitled "NIST World Trade Center Recommendations". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html

Public Comment 3:

Lawrence G. Perry, AIA, Building Owners and Managers Association (BOMA) International, requests Approval as Submitted.

Commenter's Reason: In their approval of the new SFRM requirements during the 2006/2007 cycle, the Fire Safety Committee specifically noted that neither technical substantiation nor cost data had been provided to the committee. This cycle, cost information has been provided to the committee, clearly indicating that costs are far beyond the moderate 'incremental' increases alluded to by proponents last cycle. After approving the change without technical substantiation last cycle, the Committee has NO basis to deny this code change citing a lack of technical substantiation.

This committee is on record that they had no technical substantiation when they added this requirement to the code, yet they now will not remove the provisions unless they receive technical substantiation?

There is no evidence that arbitrarily tripling (from 150 psf to 430 psf) the bond strength of SFRM will provide any additional degree of safety in 75' tall buildings, and no evidence that increasing the bond strength by a factor of 7 (from 150 psf to 1000 psf) will provide any additional degree of safety in buildings >420' in height.

The extent of the cost impacts calculated by both GSA and the steel industry make it clear that the first response to this provision, if it remains, will be to look for alternatives. There has been no explanation from those touting the need for increasing SFRM bond strength for how a gypsum-board encased column (which can achieve the required hourly ratings) would compare to columns with any of the various types of SFRM.

Public Comment 4:

Richard Schulte, Schulte & Associates, requests Approval as Submitted.

Commenter's Reason: The Committe's rationale for disapproving this code change proposal is flawed. When this proposal was approved by the General Code Change Committee in Lake Buena Vista, a member of the committee specifically stated that there was no technical basis for the proposal to increase the bond strength of the fireproofing materials for steel structural members (and then proceeded to vote in favor of the proposal).

Neither the reason statement for the proposal to increase the bond strength for fireproofing materials for steel structural members, nor the NIST World Trade Center (WTC) towers collapse investigation contain any technical basis to increase the bond strength requirement. The fire safety record of sprinklered high rise buildings is magnificent-a major fire has never occurred in a US high rise building protected throughout by a sprinkler system. Given the better than excellent fire safety record of US high rise buildings and the fact that a code change to increase the reliability of sprinkler systems protecting high rise buildings greater than 420 feet in height will be approved in this code change cycle, there seems to be no need to continue to mandate a higher bond strength for fireproofing materials.

Simply because this recommendation comes from the NIST WTC investigation report is not a reason to have approved an increase in the required bond strength (given that NIST has yet to provide any justification for this recommendation). In testimony at the Rochester meeting, it was claimed that the justification is provided in the NIST report, but clearly there is no concise justification in the report which accompanies the recommendation. Approval of the proposal to increase the bond strength of fireproofing materials for steel structural members may have been emotionally satisfying, but the requirements inserted in the code should not be based upon emotion.

Simply stating that this provision is already in the Code is not sufficient rationale to justify that this provision remain in the Code. It is difficult to come up with a technical basis that this provision be removed from the Code when there was no technical basis for approving the code change in the first place. The proponent of this code change is being held to a higher standard than the original proponent was held. This is not only unfair to the proponent of this change, but is an illogical way to develop a building code**.**

Certainly, the membership should consider the precedent which is being set by holding one proponent to a higher standard than another proponent. If we can't develop a building code which has a technical basis in the 21st century, then the public's perception of the Code and the professionals who enforce the Code will suffer, as it should. Many design professionals already express doubts about the technical basis for much of the Code and the lack of a technical basis for the requirements for higher bond strength will simply reinforce the attitude that the Code is simply a marketing tool for manufacturers of fire protection products, particularly passive fire protection products. I'm sad to say that I agree with this sentiment. One way to begin to change this sentiment is to overturn the Committee's recommendation for disapproval and approve this code change as submitted.

Final Action: AS AM AMPC____ D

G70-07/08

404, 712.4, 712.4.5 (New)

Proposed Change as Submitted:

Proponent: Sarah A. Rice, CBO, Schirmer Engineering Corp.

Revise as follows:

712.4 Horizontal assemblies. Penetrations of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a shaft by Section 707.2 shall be protected in accordance with Sections 712.4.1 through ~~712.4.4~~ 712.4.5.

~~**SECTION 404**~~
~~**ATRIUMS**~~

~~**404.1 General**~~ **712.4.5 Atrium.** In other than Group H occupancies~~, and where permitted by Exception 5 in Section 707.2,~~ the provisions of this section shall apply to buildings or structures containing vertical openings defined herein as "Atriums."

~~**404.1.1**~~ **712.4.5.1 Definition.** The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

ATRIUM. An opening connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505.

~~**404.2**~~ **712.4.5.2 Use.** The floor of the atrium shall not be used for other than low fire hazard uses and only approved materials and decorations in accordance with the *International Fire Code* shall be used in the atrium space.

Exception: The atrium floor area is permitted to be used for any approved use where the individual space is provided with an automatic sprinkler system in accordance with Section 903.3.1.1.

[F] ~~**404.3**~~ **(Supp) 712.4.5.3 Automatic sprinkler protection**. An approved automatic sprinkler system shall be installed throughout the entire building.

Exceptions:

1. That area of a building adjacent to or above the atrium need not be sprinklered provided that portion of the building is separated from the atrium portion by not less than 2-hour fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711, or both.
2. Where the ceiling of the atrium is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the atrium is not required.

~~**404.4**~~ **712.4.5.4 Smoke control.** A smoke control system shall be installed in accordance with Section 909.

Exception: Smoke control is not required for atriums that connect only two stories.

~~**404.5**~~ **(Supp) 712.4.5.5 Enclosure of atriums.** Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.

Exceptions:

1. A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. The glass shall be installed in a gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.
2. A glass-block wall assembly in accordance with Section 2101.2.5 and having a 3/4-hour fire protection rating.
3. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are included in the design of the smoke control system.

[F] ~~**404.6**~~ **712.4.5.6 Standby power.** Equipment required to provide smoke control shall be connected to a standby power system in accordance with Section 909.11.

~~**404.7**~~ **712.4.5.7 Interior finish.** The interior finish of walls and ceilings of the atrium shall not be less than Class B with no reduction in class for sprinkler protection.

~~404.8~~ 712.4.5.8 **Travel distance.** In other than the lowest level of the atrium, where the required means of egress is through the atrium space, the portion of exit access travel distance within the atrium space shall not exceed 200 feet (60 960 mm).

Reason: Designing a penetration in a horizontal assembly to meet the provisions for "atriums" in 404 is just another penetration protection method allowed by the code, the same as all the other methods found in Section 712.4

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: The references to Atrium requirements in Sections 202, 402.9, 706.3.5, 707.2 Exp. 5, Table 903.2.13, Table 1016.1, 1026.1 and 2110.1.1 will be revised editorially if the proposal to move this text is approved.

Committee Action: **Disapproved**

Committee Reason: Generally the location proposed was felt to be inappropriate. Some committee members felt that Chapter 7 was an appropriate place to move the provisions but not within Section 712. Others felt that 404 is the appropriate location as it is used as a design option and is not simply a passive fire resistant building component.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, CBO, Schirmer Engineering Corporation, requests Approval as Submitted.

Commenter's Reason: Please note that Proposed Code Change G70-07/08 is a piece of a two-part code change proposal (G70-07/08 & FS161-07/08). If FS161-07/08 is successful, G70-07/08 should be approved.

As stated in the Analysis statement that appeared with the original code change, ICC staff has stated that any and all correlating of Section numbers will be done editorially if the proposal to move this text is approved.

G70-07/08 proposes to relocate the entire content of Section 404 to Chapter 7, specifically new Section 712 (See Code Change FS161-07/08) as classifying and designing a floor opening as an "atrium" is only one of the thirteen (13) ways that the code allows a floor opening to be protected in lieu of a shaft enclosure. Unlike the other special uses and occupancies addressed in Chapter 4, an "atrium" is NOT a stand-alone design option, it is truly only one of the 13 ways to protect a floor opening found in Section 707.2. To use the design option given in Section 404, the code user actually has to start in Chapter 7, specifically Section 707.2 which requires "Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section." Only by applying Exception No. 5 does the code user get to the atrium provisions, when it states "5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with the provisions for atriums in Section 404."

Yet, the majority of the other 12 methods of protection found in the Exceptions to Section 707.2 are actually located within Chapter 7. Therefore, it is appropriate and logical that the atrium provisions currently found in Section 404 be relocated to Chapter 7, as they truly are ONLY one of the many methods that a designer may use to address a floor opening in lieu of a shaft enclosure.

Final Action: AS AM AMPC____ D

G71-07/08
404, 707.2

Proposed Change as Submitted:

Proponent: Richard Schulte, Schulte & Associates

1. Delete without substitution

~~**SECTION 404**~~
~~**ATRIUMS**~~

~~**404.1 General.** In other than Group H occupancies, and where permitted by Exception 5 in Section 707.2, the provisions of this section shall apply to buildings or structures containing vertical openings defined herein as "Atriums."~~

~~**404.1.1 Definition.** The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.~~

~~**ATRIUM.** An opening connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505.~~

~~**404.2 Use.** The floor of the atrium shall not be used for other than low fire hazard uses and only approved materials and decorations in accordance with the International Fire Code shall be used in the atrium space.~~

~~**Exception:** The atrium floor area is permitted to be used for any approved use where the individual space is provided with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

~~**[F] 404.3 (Supp)Automatic sprinkler protection**. An approved automatic sprinkler system shall be installed throughout the entire building.~~

~~**Exceptions:**~~

1. ~~That area of a building adjacent to or above the atrium need not be sprinklered provided that portion of the building is separated from the atrium portion by not less than 2-hour fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711, or both.~~
2. ~~Where the ceiling of the atrium is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the atrium is not required.~~

~~**404.4 Smoke control.** A smoke control system shall be installed in accordance with Section 909.~~

~~**Exception:** Smoke control is not required for atriums that connect only two stories.~~

~~**404.5 (Supp) Enclosure of atriums.** Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.~~

~~**Exceptions:**~~

1. ~~A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. The glass shall be installed in a gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.~~
2. ~~A glass block wall assembly in accordance with Section 2110 and having a 3/4 hour fire protection rating.~~
3. ~~The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are included in the design of the smoke control system.~~

~~**[F] 404.6 Standby power.** Equipment required to provide smoke control shall be connected to a standby power system in accordance with Section 909.11.~~

~~**404.7 Interior finish.** The interior finish of walls and ceilings of the atrium shall not be less than Class B with no reduction in class for sprinkler protection.~~

~~**404.8 Travel distance.** In other than the lowest level of the atrium, where the required means of egress is through the atrium space, the portion of exit access travel distance within the atrium space shall not exceed 200 feet (60 960 mm).~~

2. Revise as follows:

707.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening or stairway that is not a portion of the means of egress protected according to Item 2.1 or 2.2:
   2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. The shutters shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.11 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release therefrom.
3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 712.4.
4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 712.4. Grease ducts shall be protected in accordance with the *International Mechanical Code*.
5. ~~In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with the provisions for atriums in Section 404.~~
6. 5. A shaft enclosure is not required for approved masonry chimneys where annular space protection is provided at each floor level in accordance with Section 717.2.5.
7. 6. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   7.1. 6.1. Does not connect more than two stories.
   7.2. 6.2. Is not part of the required means of egress system, except as permitted in Section 1020.1.
   7.3. 6.3. Is not concealed within the building construction.
   7.4. 6.4. Is not open to a corridor in Group I and R occupancies.
   7.5. 6.5. Is not open to a corridor on nonsprinklered floors in any occupancy.
   7.6. 6.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   7.7. 6.7. Is limited to the same smoke compartment.
8. 7. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.
9. 8. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. 9. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 713.
11. 10. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 8 or 9 in Section 1020.1.
12. 11. Floor openings protected by floor fire door assemblies in accordance with Section 711.8.
13. 12. Where permitted by other sections of this code.

Reason: The purpose of this code change proposal is to delete the atrium provisions in order to prevent buildings with atriums from being constructed.

The atrium provisions presently contained in the code allow the most basic compartmentation required by the code, floor-to-floor separations, to be violated if a building is protected by an electrically supervised sprinkler system and the floor opening forming the atrium is provided with some form of smoke control. The atrium provisions are based upon the assumption that the sprinkler system will be able to prevent the spread of fire between floors, as well as limit the spread of fire to the area of origin so as to limit the quantity of smoke generated by the fire. The atrium provisions further require some form of smoke control in order to protect portions of the egress system which are exposed to the floor openings forming the atrium. The code permits the smoke control system to be designed based upon the assumption that the sprinkler system will successfully control and limit the size of the fire. In effect, the atrium provisions establish a direct equivalency between the combination of sprinkler protection and smoke control and the separation of floors (floor-to-floor compartmentation).

In recent code change cycles, lobbyists for the manufacturers and installers of passive fire protection have questioned the reliability of sprinkler systems. In the "reason" statement for Code Change G57-01, the Association of the Wall and Ceiling Industries, International states that sprinkler protection fails in 23 percent of the fires which occur in buildings protected by a sprinkler system. In an article titled "Is the AFSCC [Alliance for Fire and Smoke Containment and Control] Anti-Sprinkler?", the AFSCC asserts that the failure rate of sprinkler systems is 1 in every 6 fires which are large enough to activate sprinklers. This same AFSCC article references a report on sprinkler system reliability written by William Koffel of Koffel Associates, Inc. The "Koffel Report" concludes that the average failure rate of sprinkler systems is 1 in 10 fires large enough to activate sprinklers. Another report on sprinkler reliability published by the National Fire Protection Association titled "U.S. Experience With Sprinklers and Other Fire Extinguishing Equipment," dated August 2005 (actually released on September 9, 2005) concludes that the average sprinkler system failure rate is 1 in 9 fires large enough to activate sprinklers.

Regardless of which of the above sprinkler failure rates is cited by the passive fire protection manufacturers and installers, it can only be concluded that any of the failure rates for sprinkler systems cited above is too high to allow an equivalency for an atrium based solely on the ability of a sprinkler system to control a fire. Hence, the only conclusion which can be drawn (assuming that the sprinkler protection reliability statistics cited by the passive fire protection industry are correct) is that the equivalency permitted by the atrium provisions is not justified.

When considering this proposal, it should be noted that a major fire has never occurred in a building which complies with the atrium provisions contained in the International Building Code or the atrium provisions contained in any one of the three regional model codes. (The atrium provisions contained in the regional model building codes were developed in the late 1970's. Hence, the magnificent fire record of buildings containing an atrium spans almost 3 decades.) It should also be noted that a major fire has never occurred in a high rise building protected throughout by a sprinkler system in the United States since the early 1970's (roughly 35 years). The magnificent fire safety record of buildings containing atriums and high rise buildings in the United States, along with studies of sprinkler systems protecting residential buildings in Scottsdale, Arizona and Prince George's County, Maryland, certainly calls into question the failure rate statistics for sprinkler systems being used by the passive fire protection industry lobbyists. (The Scottsdale Report and the Prince George's County, Maryland study indicate that the sprinkler system failure rate in residential occupancies is less than 1 in 100. Expressed in another way, the reliability of sprinkler protection exceeds 99 percent in residential occupancies.)

Given the above, either the passive fire protection industry is correct about the reliability of sprinkler systems, in which case the atrium provisions should be removed from the code, or the passive fire protection industry's sprinkler system failure rate statistics are grossly exaggerated and the substitution of sprinkler protection for floor-to-floor compartmentation is acceptable. This code change proposal will allow the code change committee and the ICC membership to weigh in on the reliability of sprinkler systems and should finally put to rest the issue of whether or not sprinkler systems are sufficiently reliable to justify reductions in passive fire protection when sprinkler protection is provided.

Of course, if sprinkler protection is considered to be reliable enough to justify the atrium provisions, then sprinkler protection should be considered to be reliable enough to justify all of the reductions in passive fire protection (commonly referred to as "trade-offs") presently permitted by the *International Building Code* when sprinkler protection is provided.

Bibliography:

1. IBC Code Change G57-01.
2. "Is the AFSCC Anti-Sprinkler?", Alliance for Fire and Smoke Containment and Control (AFSCC) website: http://www.afscc.org/AFSCCPositionOnSprinklers.htm
3. "Reliability of Automatic Sprinkler Systems" (Revised January 2006)", William E. Koffel, Alliance for Fire and Smoke Containment and Control (AFSCC) website: http://www.afscc.org/ReliabilityofSprinklerSystemsRJan2006.html
4. "U.S. Experience With Sprinklers and Other Fire Extinguishing Equipment", National Fire Protection Association, August 2005.
5. "Automatic Sprinklers-A 10 Year Study", Asst. Chief Jim Ford, Rural/Metro Fire Department-Scottsdale, Arizona, 1997: http://www.homefiresprinkler.org/images/sprinklers.PDF
6. "Residential Sprinklers: One Community's Experience Twelve Years After Mandatory Implementation.", Fire Chief Ronald Jon Siarnicki, Prince George's County Fire/EMS Department, January 2001: http://www.homefiresprinkler.org/images/PrinceGeorgeStudy.pdf

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The concept of presented in Section 404 for Atria is an important design tool and should not be deleted. The proponent noted particular concerns with very large atriums. It was suggested that the focus of future revisions be on those larger atriums of concern.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Richard Schulte, Schulte & Associates, requests Approval as Submitted.

Commenter's Reason: The protection of buildings which contain atriums is solely dependent upon the sprinkler protection being capable of controlling the fire. (The smoke control provisions contained in the Code permit the required smoke control system to be designed based upon the assumption that the sprinkler system is operative and will control any fire which occurs.) Since the publication of the 2000 edition of the IBC, we have heard from various trade groups, particularly the Alliance for Fire and Smoke Containment and Control (AFSCC), how unreliable sprinkler systems are. This argument has now been adopted by the California Fire Chiefs Association and the National Association of State Fire Marshals. If sprinkler systems are as unreliable as these three groups contend, then how can the Code allow unenclosed floor openings which connect as many stories as the designer wishes to be constructed? Of all the "trade-offs" for the installation of sprinkler systems, the atrium provisions are the provisions which most depend upon the reliability of the sprinkler system.

My purpose in submitting this proposal is not to delete the atrium provisions, but rather to foster a discussion of the sprinkler system reliability issue and to finally put an end to this discussion. It is my opinion, based upon discussions with numerous fire officials around the country, that the sprinkler reliability statistic being cited by the AFSCC, the Cal Chiefs and NASFM is based upon "bad" data and is highly inaccurate.

The atrium provisions have been in all three of the regional model codes since the late 1970's. In over 30 years, a serious fire has never occurred in a building containing an atrium which was protected throughout by a sprinkler system. If the failure rate of sprinkler system was as high as the AFSCC, the Cal Chiefs and NASFM contend, then certainly in the last 30 years there would have been at least one major fire in a building with an atrium.

It should be noted that representatives from the AFSCC, the Cal Chiefs and NASFM chose not to testify in support of this proposal at the hearing in Palm Springs. It would appear that the reason why the Cal Chiefs and NASFM chose not to testify is that both of these organizations know that the sprinkler system failure rate which the AFSCC cites is inaccurate. Certainly, the Cal Chiefs have access to data on the sprinkler system failure rate in California, but they don't want to cite the California experience with sprinklers because it demonstrates

the high degree of reliability of sprinkler systems. It time for the Cal Chiefs and NASFM to stop playing games with the sprinkler system reliability statistics and admit that sprinkler systems are reliable enough to justify the many "trade-offs" presently allowed in the IBC, including the atrium provisions.

The integrity of the code development process depends upon accurate and reliable statistics being used to justify provisions of the code. If you believe that sprinkler systems are as unreliable as the AFSCC contends, then vote to overturn the Committee's recommendation and delete the atrium provisions from the Code. A vote to support the Committee means that you agree with me that sprinkler systems are reliable. It's time to end the debate on sprinkler system reliability-either sprinkler systems are reliable enough to justify the atrium provisions or they are not. If sprinkler systems are reliable enough to justify the "trade-off" which permits atriums, then all of the other sprinkler system "trade-offs" contained in the Code are justified.

Final Action: AS AM AMPC____ D

G73-07/08
404.1.1

Proposed Change as Submitted:

Proponent: Sarah A. Rice, CBO, Schirmer Engineering Corporation

Revise definition as follows:

404.1.1 Definition. The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

ATRIUM. ~~An opening~~ A through penetration of a horizontal assembly connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment.~~,~~ Such penetrations are not open to the exterior ~~which is closed~~ at the top ~~and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505~~.

Reason: Using the provisions in Section 404 is only 1 of the 14 methods that the IBC in Section 707.2 provides a designer when they need to address through penetrations of horizontal assemblies (i.e, floor openings/penetrations) in lieu of putting a shaft.

Since the initial writers of the covered mall section developed what is now found in Section 402 of the IBC, the science of handling floor openings has become quite sophisticated. In fact, if floor openings in covered mall buildings were not considered as atrium, there would not be many other viable options to a designer that would allow the openness associated with a covered mall building. While the code previously said that a smoke control system should be installed in a covered mall building when it sort of looks and acts like an atrium, the exclusion of a mall in the definition of "atrium" actually created a language vs. application conflict in the IBC. With the words "and not defined as a mall" in the definition of atrium it would literally not be allowed to be applied to a covered mall building. This is inconsistent with where the IBC has been going with regard to floor penetrations.

With the advent of a technologically based design method for smoke control for both small and large spaces there is no longer a reason to not allow the floor opening in a covered mall building to be considered fully as an atrium if the design wishes to utilize that option in Section 707.2.

There is no technological reason why the opening in floor assemblies between stories in a covered mall building should not be addressed the same as in any other type of building – which would be to use Section 707.2 and potentially any of the 14 exceptions it contains.

The last sentence is unnecessary language – the code has very specific language about what is and isn't a mezzanine Nothing is lost by he last sentence.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: Atriums are considered a floor opening, not a penetration, and revising the definition to classify atriums as a penetration was felt to be inappropriate.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sarah A. Rice, CBO, Schirmer Engineering Corporation, requests Approval as Modified by this public comment.

Modify proposal as follows:

404.1.1 Definition. The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

ATRIUM. ~~A through penetration of~~ An opening through a horizontal assembly connecting two or more stories, other than openings for exit ~~enclosed~~ stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment. Such ~~penetrations~~ openings are not open to the exterior at the top.

Commenter's Reason: The proposed language is intended to add clarity to the application of the atrium provisions. The current definition of Atrium in the IBC is:

ATRIUM. An opening connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505.

Final Action: AS AM AMPC____ D

G74-07/08
404.5

Proposed Change as Submitted:

Proponent: Raymond A. Grill, PE, Arup, representing himself

Revise as follows:

404.5 (Supp) Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.

Exceptions:

1. A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. The glass shall be installed in a gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.
2. A glass-block wall assembly in accordance with Section 2101.2.5 and having a 3/4-hour fire protection rating.
3. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are ~~included~~ considered in the design of the smoke control system.

Reason: The current language implies that the volume of floors open to the atrium need to be included in the atrium exhaust system regardless of the geometry or other factors. This language has been interpreted to require things like even distribution of makeup air and exhaust throughout floors open to an atrium. This could lead to not having appropriate exhaust volume in the atrium space itself. Methods for determining appropriate exhaust rates for atriums are driven by maintaining the calculated smoke layer 6 feet above the egress path. If the fire is considered to be on a floor open to the atrium, this criteria could never be met. In some jurisdictions, it has been utilized to eliminate atrium designs for buildings. This was not the intent of the provision.

Spaces open to the atrium should be considered from a fire safety perspective in the design of the overall space and should be addressed in the rational analysis which is required to be prepared as a basis for design for smoke control systems.

Cost Impact: This code change will not increase the cost of construction.

Committee Action: **Approved as Submitted**

Committee Reason: The proposed language is clearer as to what is intended by the code for spaces open to the atrium with respect to smoke control design.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Maureen Traxler, City of Seattle Department of Planning and Development, requests Approval as Modified by this public comment.

Modify proposal as follows:

404.5 (Supp) Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.

Exceptions:

1. A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. The glass shall be installed in a gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.
2. A glass-block wall assembly in accordance with Section 2101.2.5 and having a 3/4-hour fire protection rating.
3. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are ~~considered~~ accounted for in the design of the smoke control system.

Commenter's Reason: This proposed modification is meant to further the intent of the original proposal. We agree that it might not be appropriate to include the adjacent spaces in the smoke control system's design. However, it may not be adequate merely to "consider" them. When a building department reviews a smoke control design, we want to know how those adjacent spaces are treated in the design. If they aren't "included" as part of the atrium, the design should show how the calculations take them into account.

Public Comment 2:

Mike Ashley, CBO, Alliance for Fire and Smoke Containment and Control (AFSCC), requests Disapproval.

Commenter's Reason: The proponent of this code change may have identified a potential problem in how Exception 3 is interpreted and applied. However, the proposed fix we believe results in unintended consequences which could allow an inadequate control system design for atriums containing floors open to the atrium without any physical separation as allowed by Exception 3. This Exception has been in the IBC since its inception and has been in every one of the Legacy Model Codes basically since atriums where first incorporated into those codes. Yet we certainly have seen our share of atrium building designs with up to 3 floors open to the atrium without physical separation without any apparent problems resulting in the design of the atrium smoke control system.

Nevertheless, our main concern is that the way the amended text would be applied to these spaces open to the atrium is that they must be "considered" in the design of the smoke control system rather than "included". The word "considered" is basically unenforceable since all an engineer has to do is indicate that he considered the 3 floors but did nothing about them. This would meet the literal application of this Exception but would certainly not meet the intent of the current Exception that something must be done with the smoke control system in the building to address 3 floors directly open to the atrium to assure that the atrium area is maintained relatively safe for occupants who may be exposed to the atrium.

By retaining the word "included," if this code change proposal is disapproved as requested by our Public Comment, it is our interpretation that the 3 open floors must be dealt with in terms of the potential smoke that they may generate that could enter the atrium. They do not necessarily have to be a part of the atrium smoke control system but they have to be part of a smoke control system that addresses the appropriate protection of the atrium. This could mean that the 3 adjacent floors open to the atrium are provided with an exhaust system created by negative pressure differentials to reduce or minimize the potential spread of smoke from these open spaces into the atrium. Certainly there are many different approaches that could be developed by professional engineers skilled in designing smoke control systems without having the adverse code compliance affects indicated in the proponent's Reason statement.

In conclusion, since the proposed wording change in this code change in our opinion will lessen the level of fire and life safety provided for atriums with smoke control systems, we believe this code change proposal should be disapproved. The proponent should come back with a more appropriate revision that specifically addresses his concerns without adversely impacting the intent of Exception 3 for Enclosure of Atriums with Smoke Control Systems.

Final Action: AS AM AMPC____ D

G75-07/08
406.3.6

Proposed Change as Submitted:

Proponent: Raymond A. Grill, PE, Arup, representing himself

Revise as follows:

404.8 Travel distance. In other than the lowest level of the atrium, where the required means of egress is through the atrium space, the portion of exit access travel distance within the atrium space shall not exceed 200 feet (60 960 mm). The travel distance requirements for areas of buildings open to the atrium and where access to the exits is not through the atrium, shall comply with the requirements of Chapter 10.

Reason: The change clarifies the intent of the code. This is consistent with the language in the *Uniform Building Code* Handbook which is a legacy code to the IBC. The discussion is located on Page 51 of the 1997 UBC Handbook.

Cost Impact: This code change will not increase the cost of construction.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal clarifies the code with regard to the egress requirements for atriums. More specifically, if the space does not exit through the atrium compliance with travel distance requirements is intended to be in accordance with Chapter 10.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lori Lee Graham, City of Portland, OR, representing herself, requests Approval as Modified by this public comment.

Modify proposal as follows:

404.8 Travel distance. In other than the lowest level of the atrium, where the required means of egress is through the atrium space, the portion of exit access travel distance within the atrium space shall not exceed 200 feet (60 960 mm). The travel distance requirements for areas of buildings open to the atrium and where access to the exits is not through the atrium, shall comply with the requirements of ~~Chapter 10~~ Section 1016.

Commenter's Reason: The issue is travel distance. The referral needs to only be back to travel distance section 1016, not to the whole of Chapter 10. The broader reference is confusing.

Final Action: AS AM AMPC____ D

G79-07/08
406.3.6

Proposed Change as Submitted:

Proponent: Jason J. Krohn, PE, Precast/Prestressed Concrete Institute

Revise as follows:

406.3.6 (Supp) Area and height increases. The allowable area and height of open parking garages shall be increased in accordance with the provisions of this section. Garages with sides open on three-fourths of the building's perimeter are permitted to be increased by 25 percent in area and one tier in height. Garages with sides open around the entire building's perimeter are permitted to be increased by 50 percent in area and one

tier in height. For a side to be considered open under the above provisions, the total area of openings along the side shall not be less than 50 percent of the interior area of the side at each tier and such openings shall be equally distributed along the length of the tier. For purposes of calculating the interior area of the side, the height need not exceed 6 feet (1829 mm).

Allowable tier areas in Table 406.3.5 shall be increased for open parking garages constructed to heights less than the table maximum. The gross tier area of the garage shall not exceed that permitted for the higher structure. At least three sides of each such larger tier shall have continuous horizontal openings not less than 30 inches (762 mm) in clear height extending for at least 80 percent of the length of the sides and no part of such larger tier shall be more than 200 feet (60 960 mm) horizontally from such an opening. In addition, each such opening shall face a street or yard accessible to a street with a width of at least 30 feet (9144 mm) for the full length of the opening, and standpipes shall be provided in each such tier.

Open parking garages of Type II construction, with all sides open, shall be unlimited in allowable area where the building height does not exceed 75 feet (22 860 mm). For a side to be considered open, the total area of openings along the side shall not be less than 50 percent of the interior area of the side at each tier and such openings shall be equally distributed along the length of the tier. For purposes of calculating the interior area of the side, the height need not exceed 6 feet (1829 mm). All portions of tiers shall be within 200 feet (60 960 mm) horizontally from such openings or other natural ventilation openings as defined in Section 406.3.3.1. These openings shall be permitted to be provided in courts with a minimum width of 30 feet (9144 mm) for the full width of the openings.

Reason: In order for a side to be considered open, the area of the openings along the side must be at least 50% of the interior area. While the "interior area" is not defined, many building officials interpret this to mean the product of the length of the side and the ceiling height. In most cases the "ceiling" is the underside of the floor system above, with stems of concrete double-tees or beams projecting below it. Since the minimum clear height permitted in a parking garage is 7 feet (see Sections 406.2.2 and 406.3.5.1), in order to provide the required clear height below the bottom of beams or stems, the height from the top of the floor to underside of the floor above needs to be approximately 9 feet. If the underside of the double tee flange is considered to be the "ceiling", the height of the required continuous opening above the 42" solid guard must be at least 5 feet. This means the top of the opening will be at least 8.5 feet (3.5 + 5 = 8.5) above the floor and about one foot above the bottom of the double tee stems. Parking garages are generally designed so that the double tees span perpendicular to the long wall, and a common construction technique is to support the bearing ends of the stems on corbels or ledges constructed as a part of spandrel beams. An opening extended one foot above the bottom of the double tee stem will encroach upon this bearing support. The only way to provide the additional one foot of opening height is to lower the guard, in which case the openings would need to be 57% (2/3.5 = 0.57) of the area of the guard. Obviously a guard with openings is less desirable than one that is solid, and will most likely cost more to construct.

It is being suggested that permitting the interior area to be calculated based on a height not to exceed 6 feet will provide adequate openings to adequately ventilate the open parking garage should a fire occur. The actual height in excess of 6 feet above the floor provides space for the smoke to accumulate above the heads of most occupants. There are at least two precedents in the code for requiring that a smoke layer be kept a minimum of 6 feet above the floor. The first is in Section 909.8.1 for smoke control provided by the exhaust method for large enclosed volumes, such as atriums and malls, and the second is in Section 1025.6.2.1 for smoke-protected assembly seating.

It should be pointed out that in the example described above, some openings will still need to be provided in the guard in order to meet the revised requirements.

Cost Impact: This code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The proposal decreases the amount of open area without proper justification. It was also suggested that the height be increased to 7 feet as that reflected the clear heights in most garages as opposed to the currently proposed 6 feet as an opening height.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Brian Miller, Precast/Prestressed Concrete Institute, requests Approval as Modified by this public comment.

Modify proposal as follows:

406.3.6 (Supp) Area and height increases. The allowable area and height of open parking garages shall be increased in accordance with the provisions of this section. Garages with sides open on three-fourths of the building's perimeter are permitted to be increased by 25 percent in area and one tier in height. Garages with sides open around the entire building's perimeter are permitted to be increased by 50 percent in area and one tier in height. For a side to be considered open under the above provisions, the total area of openings along the side shall not be less than 50 percent of the interior area of the side at each tier and such openings shall be equally distributed along the length of the tier. For purposes of calculating the interior area of the side, the height ~~need~~ shall not exceed ~~6~~ 7 feet (~~1829~~ 2134 mm).

Allowable tier areas in Table 406.3.5 shall be increased for open parking garages constructed to heights less than the table maximum. The gross tier area of the garage shall not exceed that permitted for the higher structure. At least three sides of each such larger tier shall have continuous horizontal openings not less than 30 inches (762 mm) in clear height extending for at least 80 percent of the length of the

sides and no part of such larger tier shall be more than 200 feet (60 960 mm) horizontally from such an opening. In addition, each such opening shall face a street or yard accessible to a street with a width of at least 30 feet (9144 mm) for the full length of the opening, and standpipes shall be provided in each such tier.

Open parking garages of Type II construction, with all sides open, shall be unlimited in allowable area where the building height does not exceed 75 feet (22 860 mm). For a side to be considered open, the total area of openings along the side shall not be less than 50 percent of the interior area of the side at each tier and such openings shall be equally distributed along the length of the tier. For purposes of calculating the interior area of the side, the height ~~need~~ shall not exceed ~~6~~ 7 feet (~~1829~~ 2134 mm). All portions of tiers shall be within 200 feet (60 960 mm) horizontally from such openings or other natural ventilation openings as defined in Section 406.3.3.1. These openings shall be permitted to be provided in courts with a minimum width of 30 feet (9144 mm) for the full width of the openings.

Commenter's Reason: The IBC General Code Development Committee suggested setting this value at 7 feet which is consistent with the minimum height requirement (see Sections 406.2.2 and 406.3.5.1) and will add clarity to the code.

Final Action: AS AM AMPC____ D

G82-07/08
407.8 (New), Chapter 35 (New)

Proposed Change as Submitted:

Proponent: Tom Lariviere, Fire Department, Madison, MS, representing the Joint Fire Service Review Committee

1. Add new text as follows:

407.8 Hyperbaric facilities. Group I-2 occupancies containing hyperbaric equipment shall meet the requirements contained in Chapter 19 of NFPA 99.

2. Add standard to Chapter 35 as follows:

NFPA 99–05 Standard for Health Care Facilities

Reason: This proposal will provide a reference standard and guidance for the installation of hyperbaric chambers into Group I-2 occupancies. This will only apply to Group I-2 occupancies and then only when a hyperbaric chamber is installed. This proposal will provide guidance for the designer and the code official regarding the installation and construction of the room containing hyperbaric chambers.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: Review of proposed new standard NFPA 99-05 indicated that, in the opinion of ICC Staff, the standard **did** comply with ICC standards criteria. This standard is already referenced in the IFC.

Committee Action: **Disapproved**

Committee Reason: It is unclear if the requirements intended by the reference to the standard were only for installation of hyperbaric equipment or was intended to be a more extensive reference to the standard. Also, it appears that the proposal incorrectly references Chapter 19 instead of Chapter 20 of the standard.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.
Public Comment 1:

Tom Lariviere, Fire Department, Madison, MS, representing the Joint Fire Service Review Committee, requests Approval as Modified by this public comment.

Modify proposal as follows:

407.8 Hyperbaric facilities. Hyperbaric facilities in Group I-2 occupancies ~~containing hyperbaric equipment~~ shall meet the requirements contained in Chapter ~~19~~ 20 of NFPA 99.

NFPA
99–05 Standard for Health Care Facilities

Commenter's Reason: This item was disapproved by the Code Development Committee for two reasons. First, the referenced chapter should have been Chapter 20 of NFPA 99. The correction has been made to reference Chapter 20.

Secondly, there was uncertainty whether the entire Group I-2 facility needed to comply, or just the hyperbaric chamber. The hyperbaric chamber is required to comply since the remainder of the facility is designed and constructed according to the IBC. The section has been revised to clearly state that it is the hyperbaric chamber that must comply.

This Public Comment will provide a reference standard and guidance for the installation of hyperbaric chambers into Group I-2 occupancies. This will only apply when a hyperbaric chamber is installed in a Group I-2 occupancy. This proposal will provide guidance for the designer and the code official regarding the installation and design for the hyperbaric chambers.

Public Comment 2:

John Williams Construction Review Services, Washington State Dept. of Health, requests Approval as Modified by this public comment.

Replace proposal as follows:

Section 421
HYPERBARIC FACILITIES

421.1 General. Buildings or structures, or portions thereof, containing hyperbaric facilities shall meet the requirements contained in Chapter 20 of NFPA 99.

NFPA 99–05 Standard for Health Care Facilities

Commenter's Reason: This change corrects the chapter reference to Chapter 20. It has also been modified so that it applies to hyperbaric facilities in all Occupancy Groups, not just I-2. The hyperbaric procedure is quick and is typically performed in an outpatient setting such as a clinic. Chapter 20 contains the specific requirements for the hyperbaric chambers and surrounding construction. The IFC already contains references to the medical gas piping sections of NFPA 99.

Final Action: AS AM AMPC____ D

G84-07/08
408.2

Proposed Change as Submitted:

Proponent: A. Brooks Ballard, Virginia Department of Corrections

Revise as follows:

408.2 (Supp) ~~Mixed~~ Other occupancies. Buildings or portions of buildings ~~with an occupancy in Group I-3 that are classified~~ in Group I-3 occupancies where security operations necessitate the locking of required means of egress shall be permitted to be classified as a different occupancy. Occupancies classified as other than Group I-3 shall meet the applicable requirements of this code for that ~~such~~ occupancy ~~occupancies . Where security operations necessitate the locking of required means of egress,~~ provided provisions ~~shall be~~ are made for the release of occupants at all times. Where the provisions of this code for occupancies other than Group I-3 are more restrictive than the provisions for Group I-3 occupancies, the Group I-3 occupancy provisions shall be permitted to be used.

Means of egress from detention and correctional occupancies that traverse other use areas shall, as a minimum, conform to requirements for detention and correctional occupancies.

Exception: It is permissible to exit through a horizontal exit into other contiguous occupancies that do not conform to detention and correctional occupancy egress provisions but that do comply with requirements set forth in the appropriate occupancy, as long as the occupancy is not a Group H use.

Reason: The purpose of the change is to clarify the existing provision to make it clear that buildings or portions of buildings in detention and correctional facilities where the doors are locked but otherwise the classification would be a different occupancy (Groups A, E, F, S, B, etc.) may be classified as the occupancy they fall under provided the occupants can exit in an emergency. The IBC Commentary and ICC Interpretation No. 2/308/98 already state this is the intent of the provision. New language is added to permit the use of any Group I-3 provisions which are less restrictive than the provisions of the occupancy in which the building is classified, with the caveat that such provisions may be prohibited from being used by other provisions of the code. While there are no specific prohibitions currently in the code, several proposals being submitted in conjunction with this proposal would provide specific prohibitions, such as the proposal to allow security glazing in smoke barriers in Group I-3 occupancies. Language was added to that proposal to limit its application to only occupancies associated with Group I-3 and not permit it to apply to other occupancies in the Code.

The proposal is necessary to permit building and portions of buildings in detention and correctional facilities which do not otherwise fall into the Group I-3 classification to be constructed at the least possible cost while providing the necessary safeguards and security to assure the safety of the occupants.

Cost Impact: The code change will not increase and may decrease the cost of construction.

Committee Action: **Approved as Modified**

Modify the proposal as follows:

408.2 (Supp) Other occupancies. Buildings or portions of buildings in Group I-3 occupancies where security operations necessitate the locking of required means of egress shall be permitted to be classified as a different occupancy. Occupancies classified as other than Group I-3 shall meet the applicable requirements of this code for that occupancy provided provisions are made for the release of occupants at all times. ~~Where the provisions of this code for occupancies other than Group I-3 are more restrictive than the provisions for Group I-3 occupancies, the Group I-3 occupancy provisions shall be permitted to be used.~~

Means of egress from detention and correctional occupancies that traverse other use areas shall, as a minimum, conform to requirements for detention and correctional occupancies.

Exception: It is permissible to exit through a horizontal exit into other contiguous occupancies that do not conform to detention and correctional occupancy egress provisions but that do comply with requirements set forth in the appropriate occupancy, as long as the occupancy is not a Group H use.

Committee Reason: The proposal clarifies application of this section which is intended to allow other types of occupancies within buildings containing Group I-3 occupancies.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, P.E., National Concrete Masonry Association, representing the Masonry Alliance for Codes and Standards (MACS), requests Approval as Modified by this public comment.

Further modify proposal as follows:

408.2 (Supp) Other occupancies. In buildings classified as Group I-3 occupancies, ~~or~~ portions of such buildings ~~in Group I-3~~ containing other occupancies where security operations necessitate the locking of the required means of egress shall be permitted to be classified as ~~a different occupancy~~ occupancies other than Group I-3. Such occupancies classified as other than Group I-3 shall meet the applicable requirements of this code for ~~that occupancy provided~~ those occupancies and provisions ~~are~~ shall be made for the release of the occupants in those occupancies at all times.

Means of egress from detention and correctional occupancies that traverse other use areas shall, as a minimum, conform to requirements for detention and correctional occupancies.

Exception: It is permissible to exit through a horizontal exit into other contiguous occupancies that do not conform to detention and correctional occupancy egress provisions but that do comply with requirements set forth in the appropriate occupancy, as long as the occupancy is not a Group H ~~use~~ occupancy.

Commenter's Reason: The purpose of this Public Comment is to correct what we believe to be an inadvertent error that occurred when this code change proposal was approved as modified. We agree with the intent of the code change proposal as modified by the Committee but believe that it could be inappropriately interpreted to allow a Group I-3 occupancy building to be classified as a different occupancy even in areas where inmates are locked in for obvious security reasons. Certainly this code change proposal is not intended to apply to an entire building being allowed to be classified as an occupancy different than a Group I-3 occupancy. Although a building having other occupancies may be located on a campus or property where the main function of the campus or property is to act as a Group I-3 occupancy, that building is not of necessity classified as a Group I-3 occupancy just because it is a portion of that campus or facility.

This code change proposal should focus on a building which may contain a Group I-3 occupancy but which may also contain other occupancies that do not house the inmates but provide support services and other functions for the building, yet may have the required means of egress locked for security purposes. As modified by this Public Comment, this section is made more clear that it only applies to portions of buildings of Group I-3 occupancies that may actually be other occupancies but, because of security purposes, are provided with locking of the required means of egress. So those other occupancies are permitted to be located within the Group I-3 building without having to meet the requirements for Group I-3 occupancies, even where the means of egress are locked, provided provisions are made for the release of the occupants of those occupancies at all times.

In summary, we believe this Public Comment will further clarify the intent of this section to allow mixed occupancies in a building classified as Group I-3 occupancy where those other occupancies may have their means of egress locked, as long as adequate provisions are made for the release of the occupants of those occupancies at all times they are occupied. Furthermore, the modification to this code change proposal will not allow portions of Group I-3 occupancies that contain inmates or other persons intentionally restrained within locked areas to be classified as other occupancies.

Final Action: AS AM AMPC____ D

G86-07/08
408.5

Proposed Change as Submitted:

Proponent: Don Lee, DLR Group, representing himself

Delete and substitute as follows:

~~**408.5 Vertical openings.** Vertical openings shall be enclosed in accordance with Section 707.~~

~~**Exception:** A floor opening between floor levels of residential housing areas is permitted without enclosure protection between the levels, provided that both of the following conditions are met:~~

~~1. The entire normally occupied areas so interconnected are open and unobstructed so as to enable observation of the areas by supervisory personnel.~~
~~2. Means of egress capacity is sufficient to provide simultaneous egress for all occupants from all interconnected levels and areas.~~

~~The height difference between the highest and lowest finished floor levels shall not exceed 23 feet (7010 mm). Each story, considered separately, has at least one-half of its individual required means of egress capacity provided by exits leading directly out of that story without traversing another story within the interconnected area.~~

408.5 Protection of vertical openings. Vertical openings shall be protected in accordance with Section 408.5.1 through 408.5.3.

408.5.1 Vertical opening enclosure. Any vertical openings shall be enclosed in accordance with Section 707 except as provided by 408.5.2 or 408.5.3.

408.5.2 Atriums. Atriums complying with 404 shall be permitted.

408.5.3 Floor openings. A floor opening between floor levels of residential housing areas is permitted without enclosure protection between the levels, provided the following conditions are met:

1. The entire normally occupied areas so interconnected are open and unobstructed so as to enable observation of the areas by supervisory personnel.
2. Means of egress capacity is sufficient to provide simultaneous egress for all occupants from all interconnected levels and areas.
3. The height difference between the highest and lowest finished floor levels shall not exceed 23 feet (7010 mm). Each floor level, considered separately, shall have at least one-half of the required means of egress capacity provided by exits leading directly out of that floor level without traversing another floor level within the interconnected area.

   Exception: When the height difference between the highest and lowest finished floor levels does not exceed 13 feet (7010 mm) egress may traverse another floor level in the interconnected area.

Reason: This change is intended to clarify the exiting from floor levels within the residential housing units. Without this change the "floor levels" get treated as stories and additional exits are required. Currently a residential housing unit with two floor levels and a very small occupant load can be required to have three exits which in a detention facility is problematic. This change would then allow the two level units to have just two exits with no direct egress from the upper floor level as long as common path and travel distances are met. The figures below illustrate the proposal and should be included in the commentary.

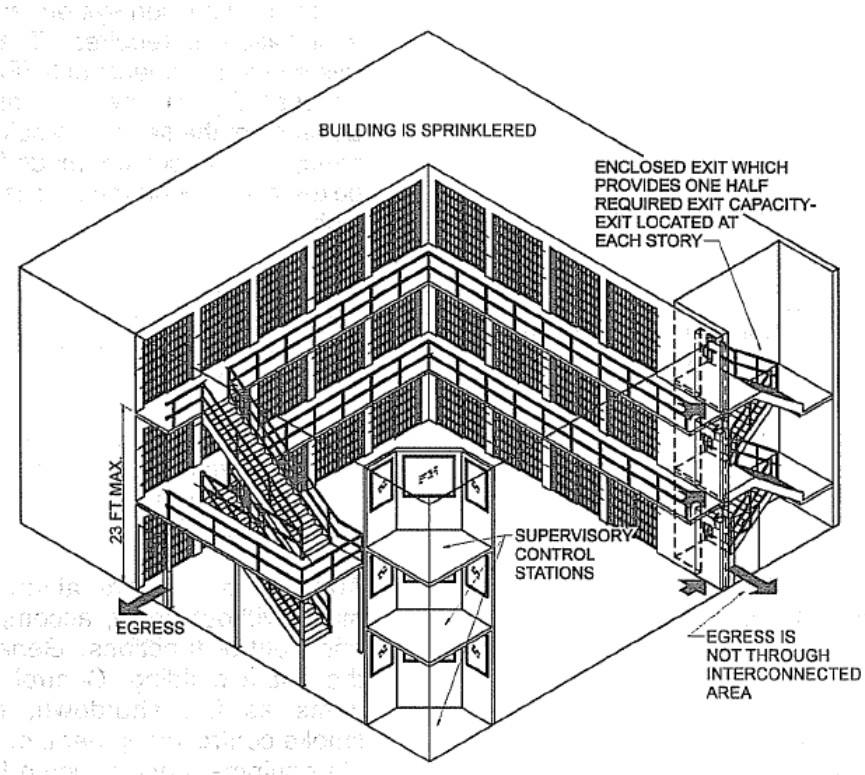

FIGURE 1 – 408.5.3 Item 3
MULTILEVEL RESIDENTIAL HOUSING WITHOUT VERTICAL OPENING ENCLOSURE

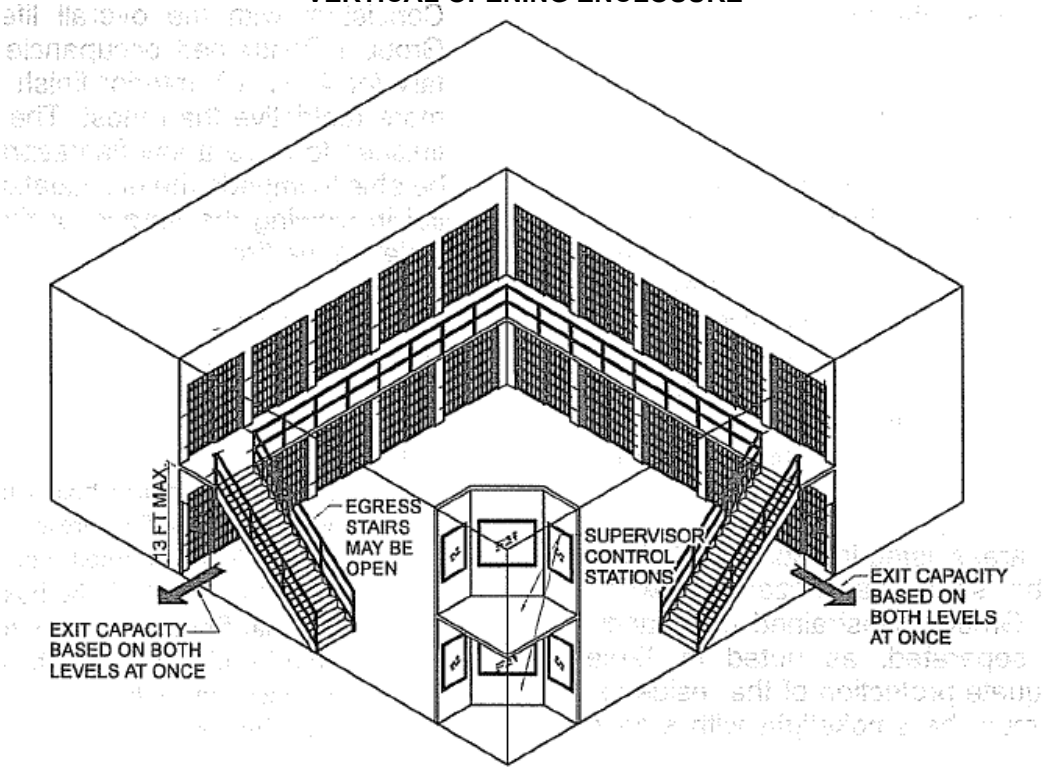

FIGURE 2 – 408.5.3 Item 3
EXCEPTION TO 408.5.3.3

Bibliography:
2006 NFPA 101, Life Safety Code, 22.2.5.1, 22.3.1, National Fire Protection Association
1999 *Standard Building Code*, 409.2.7, International Code Council
1999 *Standard Building Code* Commentary, 409.2.7, International Code Council, Figures for the code change
1997 *Uniform Building Code*, Appendix Chapter 3, Division 1 – Detention & Correctional Facilities, ICBO

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: Atriums are already allowed elsewhere in the code and such an allowance does not need to be restated. Generally the proposed language is unclear and needs to be revised to clarify intent -specifically, the term traverse is incorrectly used with regard to egress.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Don Lee, DLR Group, representing himself, requests Approval as Modified by this public comment.

Replace proposal as follows:

~~**408.5 Vertical openings.** Vertical openings shall be enclosed in accordance with Section 707.~~

~~**Exception:** A floor opening between floor levels of residential housing areas is permitted without enclosure protection between the levels, provided that both of the following conditions are met:~~

~~1. The entire normally occupied areas so interconnected are open and unobstructed so as to enable observation of the areas by supervisory personnel.~~
~~2. Means of egress capacity is sufficient to provide simultaneous egress for all occupants from all interconnected levels and areas.~~

~~The height difference between the highest and lowest finished floor levels shall not exceed 23 feet (7010 mm). Each story, considered separately, has at least one-half of its individual required means of egress capacity provided by exits leading directly out of that story without traversing another story within the interconnected area.~~

408.1.1 Definition. The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

CELL A room within a housing unit in a detention or correctional facility used for confinement of inmates or prisoners.

CELL TIER Levels of cells vertically stacked above one another within a housing unit.

HOUSING UNIT A dormitory or a group of cells with a common dayroom in Group I-3.

408.5 Protection of Vertical openings. Any vertical openings shall be enclosed in accordance with Section 707 or shall be in accordance with Section 408.5.1.

408.5.1 Floor Openings. Openings in floors within a housing unit are permitted without enclosure protection, provided all the following conditions are met:

1. The entire normally occupied areas so interconnected are open and unobstructed so as to enable observation of the areas by supervisory personnel.
2. Means of egress capacity is sufficient for all occupants from all interconnected cell tiers and areas.
3. The height difference between the floor levels of the highest and lowest cell tiers shall not exceed 23 feet (7010 mm).
4. Egress from any portion of a cell tier to an exit or exit access door shall not require travel on more than one additional floor level within the housing unit.

Commenter's Reason: This change is intended to correct and clarify the code as to the intent of multi-level housing units in I-3 occupancies. These levels are not mezzanines nor are they necessarily separate stories. At the Public Hearing a reason given for denial the committee said egress cannot traverse. At the same time the current code uses the wording. The current code language is confusing in that it starts talking about "floor levels" and then in the last paragraph talks about "stories." The addition of the definitions is aimed at bringing clarity to the section and carrying forth a concept used in legacy codes. The cell tiers are to be treated similar to mezzanines for area calculations but the mezzanine provisions of the code are too restrictive to allow use in this application.

The attached Figures 1 & 2 should be included in the Commentary.

Bibliography;
2006 NFPA 101, Life Safety Code, 22.2.5.1, 22.3.1, National Fire Protection Association
1999 Standard Building Code, 409.2.7, International Code Council
1999 Standard Building Code Commentary, 409.2.7, International Code Council, Figures for the code change
1997 Uniform Building Code, Appendix Chapter 3, Division 1 – Detention & Correctional Facilities, ICBO

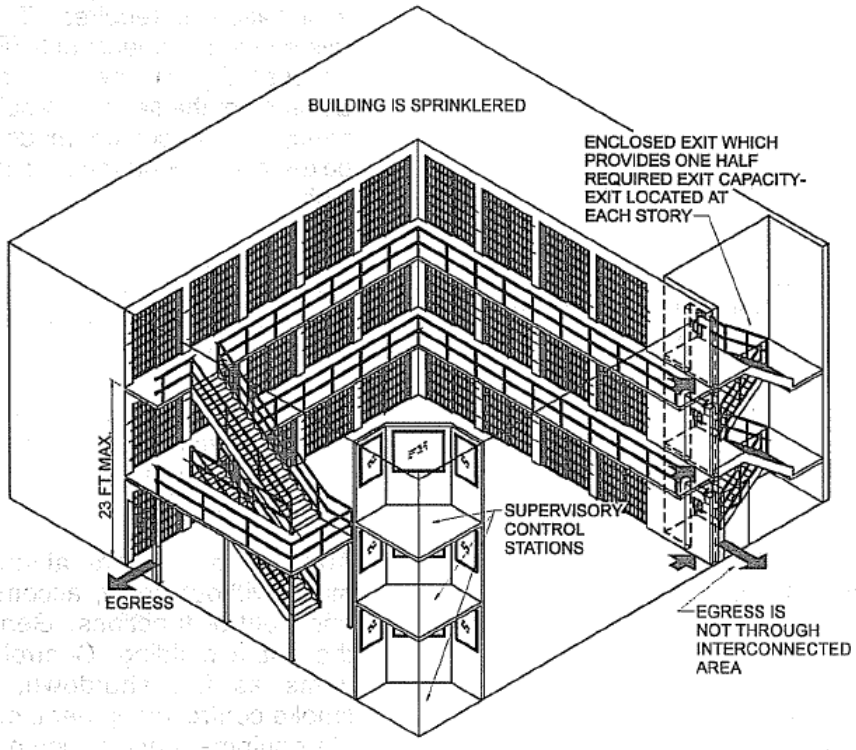

FIGURE 408.5.3(1)
MULTILEVEL RESIDENTIAL HOUSING WITHOUT VERTICAL OPENING ENCLOSURE

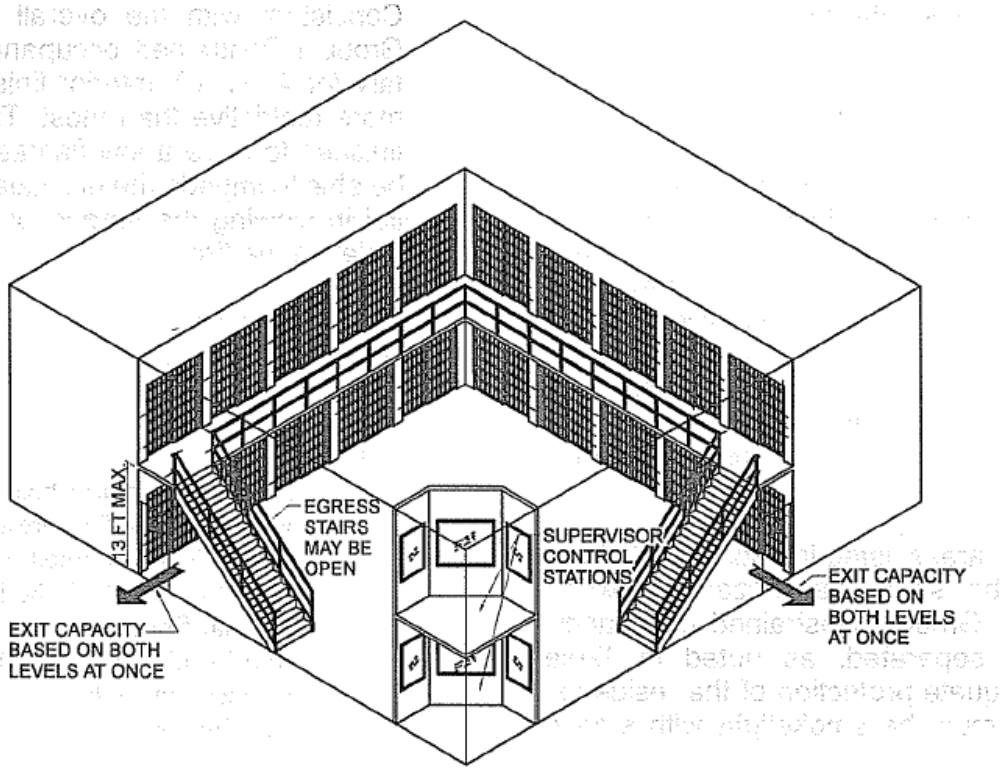

FIGURE 408.5.3(2)
EXCEPTION TO 408.5.3.3

Final Action: AS AM AMPC____ D

G87-07/08
408.5.1 (New)

Proposed Change as Submitted:

Proponent: A. Brooks Ballard, Virginia Department of Corrections

Add new text as follows:

408.5.1 Noncombustible shaft openings in communicating floor levels. Where vertical openings are permitted without enclosure protection in accordance with Section 408.5, noncombustible shafts serving floor levels within the story such as plumbing chases for individual cells at different levels within the story shall also be permitted without enclosure protection. Where additional stories are located above or below, the shaft shall be permitted to continue with fire and smoke damper protection provided at the fire resistance rated floor/ceiling assembly between the non-communicating stories.

Reason: Section 408.5 permits floor openings between floor levels of residential housing areas without enclosure protection between the levels provided the areas are open and egress capacity is sufficient. In such areas, it makes no sense to require a plumbing or mechanical chase to have to meet the shaft requirements as the floor areas are already open to each other. This proposal simply adds a subsection which recognizes that there is no need for such shafts to be protected at those levels. Should the chase continue to other floors which are not open to each other, this new subsection would require protection at the rated floor/ceiling assembly separating the non-communicating floors.

Cost Impact: The code change will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: There are numerous flaws with the terminology. For example, the term floor level is used very differently throughout the IBC than as applied in this proposal. In addition, the proponent discussed maximum opening size and story limitations which are not specifically addressed in this proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

A. Brooks Ballard, Virginia Department of Corrections, requests Approval as Modified by this public comment.

Modify proposal as follows:

408.5.1 ~~Noncombustible~~ Shaft openings in communicating floor levels. Where ~~vertical~~ a floor opening~~s~~ ~~are~~ is permitted between communicating floor levels of residential housing, ~~without enclosure protection~~ in accordance with the exception to Section 408.5~~, noncombustible shafts serving floor levels within the story such as~~ plumbing chases ~~for~~ serving vertically stacked individual cells ~~at different levels~~ contained within the ~~story~~ area shall ~~also~~ be permitted without enclosure ~~protection. Where additional stories are located above or below, the shaft shall be permitted to continue with fire and smoke damper protection provided at the fire resistance rated floor/ceiling assembly between the non-communicating stories~~.

Commenter's Reason: To remove flaws in terminology and to clarify the intent of the original submitted change.

Final Action: AS AM AMPC____ D

G88-07/08
408.6.4 (New)

Proposed Change as Submitted:

Proponent: A. Brooks Ballard, Virginia Department of Corrections

Add new text as follows:

408.6.4 Fire barriers. Windows and doors in fire barriers with a fire resistance rating of 1 hour constructed in accordance with Section 706 shall be permitted to have security glazing installed provide that the following conditions are met.

1. The total area of glazing at each floor level shall not exceed 5,000 square inches (3 m^2) and individual panels of glazing shall not exceed 1,296 square inches (0.84 m^2).
2. The glazing shall be protected on both sides by an automatic fire sprinkler system. The sprinkler system shall be designed to wet completely the entire surface of any glazing affected by fire when actuated.
3. The glazing shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler system operates.
4. Obstructions, such as curtain rods, drapery traverse rods, curtains, drapes or similar materials shall not be installed between the automatic sprinklers and the glazing.

Reason: This change extends the methodology already permitted for glazing in exit enclosures to security glazing in fire barriers in Group I-3 occupancies. The glazing would not have to meet the requirements of Section 715, Opening protectives, but would have equivalent protection through the limitations of condition numbers 1-4 which require protection through the use of an automatic sprinkler (deluge) system and which limit the size of the glazing and provide other conditions. The change is necessary to track and contain inmate movement for the protection of other inmates and administrative personnel. This change would be applicable to other occupancies in detention and correctional occupancies accordance with Section 408.2.

Cost Impact: The code change will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The provisions were felt to be located within the smoke barrier requirements which was confusing. The testing demonstrating the performance of such provisions was not provided.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

A. Brooks Ballard, Virginia Department of Corrections, requests Approval as Modified by this public comment.

Modify proposal as follows:

408.6 Smoke barrier. Occupancies in Group I-3 shall have smoke barriers complying with Section 408.7 and Section 709 to divide every story occupied by residents for sleeping, or any other story having an occupant load of 50 or more persons, into at least two smoke compartments.

Exception: Spaces having a direct exit to one of the following, provided that the locking arrangement of the doors involved complies with the requirements for doors at the smoke barrier for the use condition involved:

1. A public way.
2. A building separated from the resident housing area by a 2-hour fire-resistance-rated assembly or 50 feet (15 240 mm) of open space.
3. A secured yard or court having a holding space 50 feet (15 240 mm) from the housing area that provides 6 square feet (0.56 m2) or more of refuge area per occupant, including residents, staff and visitors.

~~**408.6.4 Fire barriers**~~ **408.7 Security glazing.** In occupancies in Group I-3, windows and doors in 1 hour fire barriers ~~with a fire resistance rating of 1 hour~~ constructed in accordance with Section 706, fire partitions constructed in accordance with Section 708 and smoke barriers constructed in accordance with Section 709 shall be permitted to have security glazing installed provided that the following conditions are met.

1. ~~The total area of glazing at each floor level shall not exceed 5,000 square inches (3 m^2) and~~ Individual panels of glazing shall not exceed 1,296 square inches (0.84 m^2).
2. The glazing shall be protected on both sides by an automatic fire sprinkler system. The sprinkler system shall be designed to, when actuated, wet completely the entire surface of any glazing affected by fire ~~when actuated~~.
3. The glazing shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler system operates.
4. Obstructions, such as curtain rods, drapery traverse rods, curtains, drapes or similar materials shall not be installed between the automatic sprinklers and the glazing.

(Renumber subsequent sections)

Commenter's Reason: The intent of the changes remains to permit openings in walls in of I-3 occupancies, similar to those allowed in the stairway enclosures. The modification will address the three most common types of walls, fire barriers, fire partitions and smoke barriers, which can occur within this type of facility. It is not the intent to permit this in fire walls or any wall requiring a 2-hour or higher rating. Although this could be located in Chapter 7, it is for use within Use I-3 only and may be less confusing and more applicable in the special requirements section for I-3. As an additional note, in the original reason the term 'deluge' was included by mistake and should be deleted for purposes of explanation in the commentary.

-Technical requirements were taken from 1991 test results performed on polycarbonate (Lexan) security glazing by Southwest Research Institute, National Research Council of Canada at Inchcape Testing Services (Warnock Hersey). These tests show one and two hour performance per ASTM E-119 fuel load. Similar results are shown in ICC ES Legacy Report NER-516 in the testing of regular glass with sprinkler protection.

- There is currently no security glazing available (except those that are wire glass laminates) which have fire ratings. A product that is promoted as vandal resistant is not security glazing. To call a product 'security glazing' it needs to meet requirements from ASTM F1915 or from HP White or WMFL forced entry tests.

Bibliography:

ICC ES Legacy Report NER-516, ICC Evaluation Service, Inc.
"Fire Test of a LEXAN Polycarbonate Glazing Assembly Protected by a Sprinkler",
Report No. CR- 6485.1, dated 14 June 1991, National Fire Laboratory, National Research Council of Canada

Final Action: AS AM AMPC____ D

G92-07/08

411.7, 411.7.1 (New)

THIS CODE CHANGE WILL BE HEARD ON THE IBC MEANS OF EGRESS PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: Bob Eugene, Underwriters Laboratories Inc.

Revise as follows:

411.7 (Supp) Exit marking. Exit signs shall be installed at the required exit or exit access doorways of amusement buildings <u>in accordance with this section and in accordance with Section 1011</u>. Approved directional exit markings shall also be provided. Where mirrors, mazes or other designs are utilized that disguise the path of egress travel such that they are not apparent, approved and listed low-level exit signs that comply with Section 1011.4, and directional path markings listed in accordance with UL 1994, shall be provided and located not more than 8 inches (203 mm) above the walking surface and on or near the path of egress travel. Such markings shall become visible in an emergency. The directional exit marking shall be activated by the automatic fire detection system and the automatic sprinkler system in accordance with Section 907.2.11.2.

<u>411.7.1 Externally illuminated exit signs.</u> <u>Where demonstrated to be reliable and sufficient and where approved, externally illuminated exit signs shall be permitted to be installed.</u>

Reason: The proposed change includes the requirement that it meet the exit sign requirements of section 1011. By including this reference the exit sign will clearly provide the use of the different types, duration and listing for the exits signs. As new technology for the illumination of the exit signs changes, so should be code sections that regulate them. The language in the IBC section 1011.4 includes the new self-luminous and photoluminescent exit sign types. The new Section 411.7.1 provides direction for this new type of exit sign. In some situations, not all types of signs can be used and adding this new section highlights the need to assess the normal lighting levels in the area it is to be installed. This is so that in areas with normal low lighting, a sign that depends on normal light levels might not be appropriate for some type of signs, such as the photoluminescent type signs.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Approved as Modified**

Modify the proposal as follows:

411.7 (Supp) Exit marking. Exit signs shall be installed at the required exit or exit access doorways of amusement buildings in accordance with this section and in accordance with Section 1011. Approved directional exit markings shall also be provided. Where mirrors, mazes or other designs are utilized that disguise the path of egress travel such that they are not apparent, approved and listed low-level exit signs that comply with Section 1011.4, and directional path markings listed in accordance with UL 1994, shall be provided and located not more than 8 inches (203 mm) above the walking surface and on or near the path of egress travel. Such markings shall become visible in an emergency. The directional exit marking shall be activated by the automatic fire detection system and the automatic sprinkler system in accordance with Section 907.2.11.2.

~~**411.7.1 Externally illuminated exit signs.** Where demonstrated to be reliable and sufficient and where approved, externally illuminated exit signs shall be permitted to be installed.~~

Committee Reason: Section 411.7.1 was deleted because the term 'demonstrated to be reliable and sufficient' is vague and unenforceable. In addition, the proposal does not indicate who would be responsible to demonstrate this to the code official. The proposed language in Section 411.7, by its reference to Section 1011, would address exterior exit signage adequately.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bob Eugene, Underwriters Laboratories Inc., requests Approval as Modified by this public comment.

Further modify proposal as follows:

411.7 (Supp) Exit marking. Exit signs shall be installed at the required exit or exit access doorways of amusement buildings in accordance with this section and in accordance with Section 1011. Approved directional exit markings shall also be provided. Where mirrors, mazes or other designs are utilized that disguise the path of egress travel such that they are not apparent, approved and listed low-level exit signs that comply with Section 1011.4, and directional path markings listed in accordance with UL 1994, shall be provided and located not more than 8 inches (203 mm) above the walking surface and on or near the path of egress travel. Such markings shall become visible in an emergency. The directional exit marking shall be activated by the automatic fire detection system and the automatic sprinkler system in accordance with Section 907.2.11.2.

411.7.1 Photoluminescent exit signs. Where photoluminescent exit signs are installed, activating light source and viewing distance shall be in accordance with the listing and markings of the signs.

Commenter's Reason: The new Section 411.7.1 provides direction for photoluminescent of exit sign. Photoluminescent exit signs are excited by specific sources of light as indicated in the listing and labeling. In some situations, not all types of signs can be used and adding this new section highlights the need to assess the normal lighting levels in the area where such signs are to be installed.

Final Action: AS AM AMPC____ D

G97-07/08
Table [F] 415.3.1

THIS CODE CHANGE WILL BE HEARD ON THE IFC PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: Lon Santis, Institute of Makers of Explosives

Delete table and substitute as follows:

~~**[F] TABLE 415.3.1**~~
~~**MINIMUM SEPARATION DISTANCES FOR BUILDINGS CONTAINING EXPLOSIVE MATERIALS**~~

~~QUANTITY OF EXPLOSIVE MATERIAL[a]~~		~~MINIMUM DISTANCE (feet)~~		
		~~Lot lines[b] and inhabited buildings[c]~~		~~Separation of magazines[d, e, f]~~
~~Pounds over~~	~~Pounds not over~~	~~Barricaded[d]~~	~~Unbarricaded~~	
~~2~~	~~5~~	~~70~~	~~140~~	~~12~~
~~5~~	~~10~~	~~90~~	~~180~~	~~16~~
~~10~~	~~20~~	~~110~~	~~220~~	~~20~~
~~20~~	~~30~~	~~125~~	~~250~~	~~22~~
~~30~~	~~40~~	~~140~~	~~280~~	~~24~~
~~40~~	~~50~~	~~150~~	~~300~~	~~28~~
~~50~~	~~75~~	~~170~~	~~340~~	~~30~~
~~75~~	~~100~~	~~190~~	~~380~~	~~32~~
~~100~~	~~125~~	~~200~~	~~400~~	~~36~~
~~125~~	~~150~~	~~215~~	~~430~~	~~38~~

QUANTITY OF EXPLOSIVE MATERIAL[a]		MINIMUM DISTANCE (feet)		
		Lot lines[b] and inhabited buildings[c]		Separation of magazines[d, e, f]
Pounds over	Pounds not over	Barricaded[d]	Unbarricaded	
150	200	235	470	42
200	250	255	510	46
250	300	270	540	48
300	400	295	590	54
400	500	320	640	58
500	600	340	680	62
600	700	355	710	64
700	800	375	750	66
800	900	390	780	70
900	1,000	400	800	72
1,000	1,200	425	850	78
1,200	1,400	450	900	82
1,400	1,600	470	940	86
1,600	1,800	490	980	88
1,800	2,000	505	1,010	90
2,000	2,500	545	1,090	98
2,500	3,000	580	1,160	104
3,000	4,000	635	1,270	116
4,000	5,000	685	1,370	122
5,000	6,000	730	1,460	130
6,000	7,000	770	1,540	136
7,000	8,000	800	1,600	144
8,000	9,000	835	1,670	150
9,000	10,000	865	1,730	156
10,000	12,000	875	1,750	164
12,000	14,000	885	1,770	174
14,000	16,000	900	1,800	180
16,000	18,000	940	1,880	188
18,000	20,000	975	1,950	196
20,000	25,000	1,055	2,000	210
25,000	30,000	1,130	2,000	224
30,000	35,000	1,205	2,000	238
35,000	40,000	1,275	2,000	248
40,000	45,000	1,340	2,000	258

QUANTITY OF EXPLOSIVE MATERIAL[a]		MINIMUM DISTANCE (feet)		
		Lot lines[b] and inhabited buildings[c]		Separation of magazines[d, e, f]
Pounds over	Pounds not over	Barricaded[d]	Unbarricaded	
45,000	50,000	1,400	2,000	270
50,000	55,000	1,460	2,000	280
55,000	60,000	1,515	2,000	290
60,000	65,000	1,565	2,000	300
65,000	70,000	1,610	2,000	310
70,000	75,000	1,655	2,000	320
75,000	80,000	1,695	2,000	330
80,000	85,000	1,730	2,000	340
85,000	90,000	1,760	2,000	350
90,000	95,000	1,790	2,000	360
95,000	100,000	1,815	2,000	370
100,000	110,000	1,835	2,000	390
110,000	120,000	1,855	2,000	410
120,000	130,000	1,875	2,000	430
130,000	140,000	1,890	2,000	450
140,000	150,000	1,900	2,000	470
150,000	160,000	1,935	2,000	490
160,000	170,000	1,965	2,000	510
170,000	180,000	1,990	2,000	530
180,000	190,000	2,010	2,010	550
190,000	200,000	2,030	2,030	570
200,000	210,000	2,055	2,055	590
210,000	230,000	2,100	2,100	630
230,000	250,000	2,155	2,155	670
250,000	275,000	2,215	2,215	720
275,000	300,000	2,275	2,275	770

For SI: 1 pound = 0.454 kg, 1 foot = 304.8 mm.

a. The number of pounds of explosives listed is the number of pounds of trinitrotoluene (TNT) or the equivalent pounds of other explosive.

b. The distance listed is the distance to lot line, including lot lines at public ways.

c. For the purpose of this table, an inhabited building is any building on the same property that is regularly occupied by people. Where two or more buildings containing explosives or magazines are located on the same property, each building or magazine shall com ply with the minimum distances specified from inhabited buildings and, in addition, they shall be separated from each other by not less than the distance shown for "Separation of magazines," except that the quantity of explosive materials contained in detonator buildings or magazines shall govern in regard to the spacing of said buildings or magazines from buildings or magazines, as a group, shall be considered as one building or magazine, and the total quantity of explosive materials stored in such group shall be treated as if the explosive were in a single building or magazine located on the site of any building or magazine of the group, and shall comply with the minimum distance specified from other magazines or in habited buildings.

~~d. Barricades shall effectively screen the building containing explosives from other buildings, public ways or magazines. Where mounds or reverted walls of earth are used for barricades, they shall not be less than 3 feet in thickness. A straight line from the top of any side wall of the building containing explosive materials to the eave line of any other building, magazine or a point 12 feet above the centerline of a public way shall pass through the barricades.~~

~~e. Magazine is a building or structure, other than an operating building, approved for storage of explosive materials. Portable or mobile magazines not exceeding 120 square feet (11 m^2) in area need not comply with the requirements of this code, however, all magazines shall comply with the International Fire Code.~~

~~f. The distance listed is permitted be reduced by 50 percent where approved natural or artificial barriers are provided in accordance with the requirements in Note d.~~

[F]TABLE 415.3.1 (IFC [F] 3304.5.2(1))
AMERICAN TABLE OF DISTANCES FOR STORAGE OF EXPLOSIVES AS APPROVED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES AND REVISED JUNE 1991[a]

QUANTITY OF EXPLOSIVE MATERIALS[c]		DISTANCES IN FEET							
		Inhabited buildings		Public highways with traffic volume less than 3,000 vehicles per day		Public highways with traffic volume greater than 3,000 vehicles per day and passenger railways		Separation of magazinesd	
Pounds over	Pounds not over	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded
0	5	70	140	30	60	51	102	6	12
5	10	90	180	35	70	64	128	8	16
10	20	110	220	45	90	81	162	10	20
20	30	125	250	50	100	93	186	11	22
30	40	140	280	55	110	103	206	12	24
40	50	150	300	60	120	110	220	14	28
50	75	170	340	70	140	127	254	15	30
75	100	190	380	75	150	139	278	16	32
100	125	200	400	80	160	150	300	18	36
125	150	215	430	85	170	159	318	19	38
150	200	235	470	95	190	175	350	21	42
200	250	255	510	105	210	180	378	23	46
250	300	270	540	110	220	201	402	24	48
300	400	295	590	120	240	221	442	27	54
400	500	320	640	130	260	238	476	29	58
500	600	340	680	135	270	253	506	31	62
600	700	355	710	145	290	266	532	32	64
700	800	375	750	150	300	278	556	33	66
800	900	390	780	155	310	289	578	35	70
900	1,000	400	800	160	320	300	600	36	72
1,000	1,200	425	850	165	330	318	636	39	78
1,200	1,400	450	900	170	340	336	672	41	82
1,400	1,600	470	940	175	350	351	702	43	86
1,600	1,800	490	980	180	360	366	732	44	88
1,800	2,000	505	1,010	185	370	378	756	45	90
2,000	2,500	545	1,090	190	380	408	816	49	98
2,500	3,000	580	1,160	195	390	432	864	52	104
3,000	4,000	635	1,270	210	420	474	948	58	116
4,000	5,000	685	1,370	225	450	513	1,026	61	122
5,000	6,000	730	1,460	235	470	546	1,092	65	130
6,000	7,000	770	1,540	245	490	573	1,146	68	136
7,000	8,000	800	1,600	250	500	600	1,200	72	144
8,000	9,000	835	1,670	255	510	624	1,248	75	150
9,000	10,000	865	1,730	260	520	645	1,290	78	156
10,000	12,000	875	1,750	270	540	687	1,374	82	164
12,000	14,000	885	1,770	275	550	723	1,446	87	174
14,000	16,000	900	1,800	280	560	756	1,512	90	180
16,000	18,000	940	1,880	285	570	786	1,572	94	188
18,000	20,000	975	1,950	290	580	813	1,626	98	196
20,000	25,000	1,055	2,000	315	630	876	1,752	105	210
25,000	30,000	1,130	2,000	340	680	933	1,866	112	224
30,000	35,000	1,205	2,000	360	720	981	1,962	119	238
35,000	40,000	1,275	2,000	380	760	1,026	2,000	124	248
40,000	45,000	1,340	2,000	400	800	1,068	2,000	129	258
45,000	50,000	1,400	2,000	420	840	1,104	2,000	135	270
50,000	55,000	1,460	2,000	440	880	1,140	2,000	140	280
55,000	60,000	1,515	2,000	455	910	1,173	2,000	145	290
60,000	65,000	1,565	2,000	470	940	1,206	2,000	150	300
65,000	70,000	1,610	2,000	485	970	1,236	2,000	155	310
70,000	75,000	1,655	2,000	500	1,000	1,263	2,000	160	320

QUANTITY OF EXPLOSIVE MATERIALS[c]		DISTANCES IN FEET							
		Inhabited buildings		Public highways with traffic volume less than 3,000 vehicles per day		Public highways with traffic volume greater than 3,000 vehicles per day and passenger railways		Separation of magazinesd	
Pounds over	Pounds not over	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded
75,000	80,000	1,695	2,000	510	1,020	1,293	2,000	165	330
80,000	85,000	1,730	2,000	520	1,040	1,317	2,000	170	340
85,000	90,000	1,760	2,000	530	1,060	1,344	2,000	175	350
90,000	95,000	1,790	2,000	540	1,080	1,368	2,000	180	360
95,000	100,000	1,815	2,000	545	1,090	1,392	2,000	185	370
100,000	110,000	1,835	2,000	550	1,100	1,437	2,000	195	390
110,000	120,000	1,855	2,000	555	1,110	1,479	2,000	205	410
120,000	130,000	1,875	2,000	560	1,120	1,521	2,000	215	430
130,000	140,000	1,890	2,000	565	1,130	1,557	2,000	225	450
140,000	150,000	1,900	2,000	570	1,140	1,593	2,000	235	470
150,000	160,000	1,935	2,000	580	1,160	1,629	2,000	245	490
160,000	170,000	1,965	2,000	590	1,180	1,662	2,000	255	510
170,000	180,000	1,990	2,000	600	1,200	1,695	2,000	265	530
180,000	190,000	2,010	2,010	605	1,210	1,725	2,000	275	550
190,000	200,000	2,030	2,030	610	1,220	1,755	2,000	285	570
200,000	210,000	2,055	2,055	620	1,240	1,782	2,000	295	590
210,000	230,000	2,100	2,100	635	1,270	1,836	2,000	315	630
230,000	250,000	2,155	2,155	650	1,300	1,890	2,000	335	670
250,000	275,000	2,215	2,215	670	1,340	1,950	2,000	360	720
275,000	300,000[b]	2,275	2,275	690	1,380	2,000	2,000	385	770

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. This table applies only to the manufacture and permanent storage of commercial explosive materials. It is not applicable to transportation of explosives or any handling or temporary storage necessary or incident thereto. It is not intended to apply to bombs, projectiles or other heavily encased explosives.
b. Storage in excess of 300,000 pounds of explosive materials in one magazine is not allowed.
c. Where a manufacturing building on an explosive materials plant site is designed to contain explosive materials, such building shall be located with respect to its proximity to inhabited buildings, public highways and passenger railways based on the maximum quantity of explosive materials permitted to be in the building at one time.
d. Where two or more storage magazines are located on the same property, each magazine shall comply with the minimum distances specified from inhabited buildings, railways and highways, and, in addition, they should be separated from each other by not less than the distances shown for separation of magazines, except that the quantity of explosives in detonator magazines shall govern in regard to the spacing of said detonator magazines from magazines containing other explosive materials. Where any two or more magazines are separated from each other by less than the specified separation of magazines distances, then two or more such magazines, as a group, shall be considered as one magazine, and the total quantity of explosive materials stored in such group shall be treated as if stored in a single magazine located on the site of any magazine in the group and shall comply with the minimum distances specified from other magazines, inhabited buildings, railways and highways.

Reason: This revision to replace current Table 415.3.1 with IFC Table 3304.5.2(1) would make the IBC and IFC consistent with each other. Currently, code officials are confused by the inconsistency. The change would also make the IBC consistent with Federal regulations of ATF, OSHA, and MSHA; state regulations; and industry standards.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the committee felt that, based on testimony, a fix is needed but this is not it and that Table 415.3.1, now that explosives are resolved, needs to more closely reflect what should be required for materials under item 2 of Section 415.3.1. It was also indicated that it is questionable whether the IFC should be regulating issues of public highways, traffic, etc. as in the proposed table.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lon Santis, Institute of Makers of Explosives, requests Approval as Modified by this public comment.

Replace proposal as follows:

[F] 415.3.1 Group H occupancy minimum fire separation distance. Regardless of any other provisions, buildings containing Group H occupancies shall be set back to the minimum fire separation distance as set forth in Items 1 through 4 below. Distances shall be measured from the walls enclosing the occupancy to lot lines, including those on a public way. Distances to assumed lot lines established for the purpose of determining exterior wall and opening protection are not to be used to establish the minimum fire separation distance for buildings on sites where explosives are manufactured or used when separation is provided in accordance with the quantity distance tables specified for explosive materials in the *International Fire Code.*

1. Group H-1. Not less than 75 feet (22 860 mm) and not less than required by the *International Fire Code*.

   Exceptions:

   1. Fireworks manufacturing buildings separated in accordance with NFPA 1124.
   2. Buildings containing the following materials when separated in accordance with approved standards ~~Table 415.3.1~~:
      2.1. Organic peroxides, unclassified detonable.
      2.2. Unstable reactive materials, Class 4.
      2.3. Unstable reactive materials, Class 3 detonable.
      2.4. Detonable pyrophoric materials.

2. Group H-2. Not less than 30 feet (9144 mm) where the area of the occupancy exceeds 1,000 square feet (93 m^2) and it is not required to be located in a detached building.
3. Groups H-2 and H-3. Not less than 50 feet (15 240 mm) where a detached building is required (see Table 415.3.2).
4. Groups H-2 and H-3. Occupancies containing materials with explosive characteristics shall be separated as required by the *International Fire Code*. ~~Where separations are not specified, the distances required shall not be less than the distances required by Table 415.3.1.~~

~~**[F]TABLE 415.3.1**~~
~~**MINIMUM SEPARATION DISTANCES FOR BUILDINGS CONTAINING EXPLOSIVE MATERIALS**~~

(Delete Table 415.3.1 in its entirety)

Reason: Table 415.3.1 was never intended to apply as used in the IBC. This change makes the IBC and IFC consistent as originally proposed. The IFC provides adequate separations for explosives materials and reference to distances "not specified" is not necessary and confusing.

Final Action: AS AM AMPC____ D

G101-07/08
[F] 415.8.5.2.2

THIS CODE CHANGE WILL BE HEARD ON THE IFC PORTION OF THE HEARING ORDER.

Proposed Change as Submitted:

Proponent: Joseph T. Holland, III, Hoover Treated Wood Products

Revise as follows:

[F] 415.8.5.2.2 Liquid storage rooms. Liquid storage rooms shall be constructed in accordance with the following requirements:

1. Rooms in excess of 500 square feet (46.5 m^2) shall have at least one exterior door approved for fire department access.
2. Rooms shall be separated from other areas by fire barriers having a fire-resistance rating of not less than 1-hour for rooms up to 150 square feet (13.9 m^2) in area and not less than 2 hours where the room is more than 150 square feet (13.9 m^2) in area.
3. Shelving, racks and wainscoting in such areas shall be of noncombustible construction or wood of not less than 1inch (25 mm) nominal thickness or fire-retardant-treated wood in accordance with Section 2303.2.
4. Rooms used for the storage of Class I flammable liquids shall not be located in a basement.

Reason: Permit FRTW to be used for shelving, racks, and wainscoting in HPM facility.
Fire-retardant-treated wood has a Class A flame spread. It is recognized for application where noncombustible materials are required. The use of FRTW can result in the reduced possibility that the wood will become involved in a fire or spread the fire.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The proposal does not include a minimum thickness criterion such as exists for untreated wood in the current text. There needs to be a minimum thickness specified to allow the bulk needed for the treated wood to char under fire exposure conditions.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph Holland, Hoover Treated Wood Products, requests Approval as Submitted.

Commenter's Reason: The committee felt the FRTW needed a minimum thickness like untreated wood. FRTW does not react in a fire like untreated wood. It won't spread the fire and because of the treatment it will char and will self extinguish when the source of ignition is consumed or put out. The minimum thickness will be a function of the load expected to be on the shelves.

Final Action: AS AM AMPC____ D

G102-07/08
419.1

Proposed Change as Submitted:

Proponent: Tim Pate, City & County of Broomfield Building Department, CO, representing the Colorado Chapter of ICC

Revise as follows:

419.1 (Supp) General. A live/work unit is a dwelling unit or sleeping unit in which a significant portion of the space includes a nonresidential use that is operated by the tenant and shall comply with Section 419.

> **Exception:** Dwelling or sleeping units that include an office that is less than 10 percent of the area of the dwelling unit and is not available to the public to transact business shall not be classified as a live/work unit.

Reason: The wording in this exception would essentially allow someone to have a 3,000 square foot dwelling unit and have a 299 square foot public business on the main floor with storefront entry and not be required to follow any handicap accessibility requirements into or through this business area since it would not be classified a Live/Work Unit and section 419.7 would not apply. This issue was brought up when this original code change was brought forward in Orlando. The proponent Dave Collins admitted that this is a problem but he failed to fix it for the Final Action Hearings in Rochester. This new wording will fix this problem.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: The 2007 Supplement includes a new section 419, *Live/Work Units*.

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal as it would be difficult to determine and enforce whether the space is "available to the public to transact business."

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tim Pate, City and County of Broomfield Building Department, representing the Colorado Chapter of ICC, requests Approval as Modified by this public comment.

Modify proposal as follows:

419.1 (Supp) General. A live/work unit is a dwelling unit or sleeping unit in which a significant portion of the space includes a nonresidential use that is operated by the tenant and shall comply with Section 419.

Exception: Dwelling or sleeping units that include ~~a~~n private office not intended for public use and ~~that~~ is less than 10 percent of the area of the dwelling unit ~~and is not available to the public to transact business~~ shall not be classified as a live/work unit. For the purposes of this section a private office is an office intended for use by the tenant and not for public use.

Commenter's Reason: This modification will try to accommodate the General Committees comments that it would be too hard to determine what "being available to the public to transact business" means. As I explained in my original reason statement a person could have a 3,000 square foot dwelling unit and a 299 square foot main floor office that is open to the public as a business and they would not have to comply with any of the specific other code requirements for that type of use since you would not classify it as a live work unit per this exception.

I have changed the wording in the exception to add the reference to "private" office and added wording to define what a private office is. This should clarify that home offices are allowed. This is what the original proponent who wrote this code change intended – we still need to allow the typical home offices but have higher regulations for the business uses on the main floor.

The definition of private office is based on the same premise of the private bathroom located off a private office in Section 1109.2 for accessibility requirements for bathrooms.

Final Action: AS AM AMPC____ D

G103-07/08
419.2

Proposed Change as Submitted:

Proponent: Tim Pate, City & County of Broomfield Building Department, CO, representing the Colorado Chapter of ICC

Revise as follows:

419.2 (Supp) Occupancies. Live/work units shall be classified as a Group R-2 occupancy. Separation requirements found in Section 508.3 shall not apply when the live/work unit is in compliance with Section 419. High-hazard and storage occupancies shall not be permitted in a live/work unit. The aggregate of storage in the non-residential portion of ~~in~~ the live/work unit shall be limited to 10 percent of the space dedicated to nonresidential activities.

Reason: This new wording is required to clarify that the 10% limit of storage square footage should only be based on the square footage of the non-residential area and not the entire area of the live/work area. The present wording would mean you would have to include all of the closet areas in the residential portion. This would include kitchen pantry and all closets in halls and bedrooms. This was brought up as a problem when this code change was brought through in Orlando. The proponent Dave Collins admitted that it was a problem and not his intent but he failed to fix it when it went through the Final Action Hearings in Rochester. This new wording will fix this problem.

Cost Impact: The code change proposal will not increase the cost of construction.

Individual Consideration Agenda

Committee Action: **Approved as Submitted**

Committee Reason: The proposal clarifies the storage limitation allowed in a live/work unit is for the non-residential portion of the unit.

Assembly Action: **None**

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Maureen Traxler, City of Seattle Department of Planning and Development, requests Approval as Modified by this public comment.

Modify proposal as follows:

419.2 (Supp) Occupancies. Live/work units shall be classified as a Group R-2 occupancy. Separation requirements found in Section 508.3 shall not apply when the live/work unit is in compliance with Section 419. High-hazard and storage occupancies shall not be permitted in a live/work unit. The aggregate area of storage in the non-residential portion of the live/work unit shall be limited to 10 percent of the space dedicated to nonresidential activities.

Commenter's Reason: This comment adds a word that appears to have been inadvertently omitted from the sentence.

Final Action: AS AM AMPC____ D

G104-07/08
419.2, 419.3, 508.2.4, 508.3.3

Proposed Change as Submitted:

Proponent: Steven R. Winkel, FAIA, PE, The Preview Group, Inc., representing the American Institute of Architects; Stephan Kiefer, CBO, City of Livermore Building Division, CA

1. Revise as follows (2007 Supplement Live work units):

419.2 (Supp) Occupancies. Live/work units shall be classified as a Group R-2 occupancy. Separation requirements found in Sections 420 and 508 ~~508.3~~ shall not apply within the live/work unit when the live/work unit is in compliance with Section 419. High-hazard and storage occupancies shall not be permitted in a live/work unit. The aggregate of storage in the live/work unit shall be limited to 10 percent of the space dedicated to nonresidential activities.

2. Revise as follows (2006 Code Section 419, Group I-1, R-1, R-2 and R-3):

419.2 (Supp) Separation walls. Walls separating dwelling units in the same building ~~and~~ walls separating sleeping units in the same building and walls separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as fire partitions in accordance with Section 708.

419.3 (Supp) Horizontal separation. Floor assemblies separating dwelling units in the same buildings and floor assemblies separating sleeping units in the same building and floor assemblies separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as horizontal assemblies in accordance with Section 711.

3. Revise as follows:

508.2.4 (Supp) Separation of occupancies. No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Incidental accessory occupancies required to be separated or protected by Section 508.2.5.
3. ~~Group R occupancies shall be separated from other accessory occupancies in accordance with Section 508.4.4.~~ Group I-1, R-1, R-2 and R-3 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from accessory occupancies contiguous to them per the requirements of Section 419.

508.3.3 (Supp) Separation. No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.3.3.
2. ~~All Group R occupancies shall be separated from other occupancies in accordance with Section 508.4.4~~. Group I-1, R-1, R-2 and R-3 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from other occupancies contiguous to them in accordance with the requirements of Section 419.

Reason: This proposal is an amendment to the changes made by G140-06/07 during the last code change cycle. The changes made by G140-06/07 had an overbroad scope that we believe went beyond the intent of what that code change proposal was attempting to accomplish. This amendment adjusts the scope of that prior code change to clarify the application of separation requirements while retaining what we believe was its intended scope of application. G140-06/07 as adopted requires broad application of separated occupancy provisions for all R occupancies for what otherwise should be considered as accessory or nonseparated occupancies. It is our belief that the problem G140-06/07 was attempting to address was to define where separations are required between dwelling units or sleeping units and the other portions of what are otherwise considered accessory or nonseparated occupancies. This condition occurs at the walls or floors where a group of dwelling or sleeping units ends in relationship to the rest of the mixed use building. The purpose of this proposal is the same as what we believe were the goals of G140-06/07, which is to clarify that separations between dwelling or sleeping units are still required, including at the perimeter wall or floor of a group of dwelling units or sleeping units. The original proposal was meant to apply for accessory or nonseparated uses as does the new proposal. The proposal defines when the accessory or nonseparated parts of a mixed use

facility are to provide separations for dwelling units or sleeping units. The previous change applies broadly throughout R occupancies and effectively negates the use of accessory and nonseparated code provisions in those occupancies. We believe this proposal more accurately defines where the rated partitions and horizontal assemblies that are to separate portions of a building from each other begin and end. We consider that this proposal defines what is required at the wall or floor that surrounds a group of dwelling units or sleeping units where the surrounding wall or floor abuts another occupancy in a mixed use building. For example the wall at a sleeping unit in an R-1 occupancy (dwelling unit at an R-2 occupancy) which is contiguous to an adjacent retail space or restaurant would need to be rated based on the presence of sleeping or dwelling units, and the fact that the walls between the units and the other occupancy are contiguous. However, under the new proposal other parts of what otherwise could be considered as non-sleeping spaces in the R occupancy, such as the lobby, a restaurant or a gift shop could be treated as accessory or nonseparated uses in the way they relate to each other in the public parts of the facility. That would not be the case if the language from G140-6/07 remains in the code. The currently adopted language applies throughout the R occupancy, not just at the dwelling units or sleeping units. While the impact of the original proposal would be the greatest in R-1 occupancies where such mixed uses occur most often, we believe the requirements for separations between dwelling units or sleeping units should apply in all occupancies covered by Section 420 and the scope of application should be clarified for all of the occupancies covered by Section 420.

We have also included clarifications related to the new provisions for live/work units contained in Section 419 to make it clear that the supplementary separation requirements contained in Sections 420 and 508 are to be applied between separate live work units, not within the live/work unit. This clarifies that if the live/work units meets the criteria of Section 419 then the dwelling and livelihood related uses inside the unit are allowed to be nonseparated.

The modifications to Section 420 are to clarify the requirements for fire barriers and horizontal assemblies by adding the requirement for separation from contiguous occupancies in addition to the separations between dwelling units or sleeping units already contained in this code section.

Cost Impact: The code change proposal will not increase the cost of construction from the provisions contained in the 2007 Accumulative Supplement.

Analysis: Section 419 as referenced in items 2,3 and 4 of this proposal refers to the 2006 section titled Group I-1, R-1, R-2 and R-3. Section 420 as referenced in Item 1 of this proposal is intended to reference the same section but has been renumbered to work with the introduction of the new Section 419 (Supp) dealing with Live/Work units.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal clarifies the separation requirements in the current Section 419 of the code and how it applies to live/work units and mixed use occupancy requirements.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment:

Mike Ashley, CBO, Alliance for Fire and Smoke Containment and Control (AFSCC) and Rick Thornberry, PE, The Code Consortium, Inc., Cellulose Insulation Manufacturers Association (CIMA), request Approval as Modified by this public comment.

Modify proposal as follows:

419.2 (Supp) Separation walls. Walls separating dwelling units in the same building and walls separating sleeping units in the same building ~~and walls separating dwelling or sleeping units from other occupancies contiguous to them in the same building~~ shall be constructed as fire partitions in accordance with Section 708. Walls separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as fire barriers in accordance with Section 706.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: (Ashley) The purpose of this Public Comment is to correct what appears to be an inadvertent technical error in the requirements for walls separating dwelling units and sleeping units from other occupancies contiguous to them in the same building. When Exception 3 to Section 508.2.4(Supp) Separation of Occupancies and Exception 2 to Section 508.3.3(Supp) Separation where revised in this code change proposal, they referred back to Section 419 of the Supplement for the separation requirements. Those Exceptions required the dwelling units and sleeping units to be separated from accessory occupancies as well as from other occupancies in accordance with Section 508.4.4 of the Supplement. This Section requires such separations to meet the requirements for fire barriers in accordance with 508.4.4.1 which specifies fire barriers constructed in accordance with Section 706 for those wall separations. However, Section 419.2(Supp) Separation Walls as revised by this code change proposal includes walls separating dwelling or sleeping units from other occupancies contiguous to them in the same building in the same requirements for walls separating dwelling units in the same building and walls separating sleeping units in the same building which are only required to be constructed as fire partitions in accordance with Section 708. In effect, this is a lessening of the requirements for the separation walls that separate the dwelling or sleeping units from other occupancies as compared to from each other in the same occupancy.

Therefore, we have submitted this Public Comment which revises Section 419.2(Supp) Separation Walls to clarify these requirements accordingly so that walls separating dwelling or sleeping units from other occupancies contiguous to them in the same building are constructed as fire barriers in accordance with Section 706 and not as fire partitions in accordance with Section 708. This implements the requirements of the Supplement which does not result in a technical change. However, if this Public Comment is not approved, then a technical change will occur to reduce the separation requirements as previously noted without any technical justification.

Commenter's Reason: (Thornberry) This Public Comment corrects what appears to have been an inadvertent error that occurred in the requirements for the separation of dwelling units and sleeping units from other occupancies contiguous to them in the same building. The reformatting of this code change inadvertently included such separations within the same section for separation between dwelling units and sleeping units in the same building which are only required to be fire partitions. However, the separations required between dwelling units and sleeping units and adjacent or contiguous occupancies in the same building are currently required to be constructed as fire barriers. Therefore, this Public Comment proposed modifications to retain the current code requirements for the separation walls of dwelling units and sleeping units where they are separated from contiguous occupancies in the same building. We don't believe it was the intent to reduce the construction requirements for such separation walls with this code change proposal which was basically a reformatting of those provisions.

Final Action: AS AM AMPC____ D

G105-07/08, Part I

419, 310.1 (IFC [B] 202), 508.1; IRC R101.2

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I.

Proposed Change as Submitted:

Proponent: Tom Rubottom, City of Lakewood, CO, representing himself

PART I – IBC GENERAL

Delete without substitution:

~~**SECTION 419 (Supp)**~~
~~**LIVE/WORK UNITS**~~

~~**419.1 (Supp) General.** A live/work unit is a dwelling unit or sleeping unit in which a significant portion of the space includes a nonresidential use that is operated by the tenant and shall comply with Section 419.~~

~~**Exception:** Dwelling or sleeping units that include an office that is less than 10 percent of the area of the dwelling unit shall not be classified as a live/work unit.~~

~~**419.1.1 (Supp) Limitations.** The following shall apply to all live/work areas:~~

1. ~~The live/work unit is permitted to be a maximum of 3,000 square feet (279 m_2);~~
2. ~~The nonresidential area is permitted to be a maximum 50 percent of the area of each live/work unit;~~
3. ~~The nonresidential area function shall be limited to the first or main floor only of the live/work unit; and~~
4. ~~A maximum of five nonresidential workers or employees are allowed to occupy the non residential area at any one time.~~

~~**419.2 (Supp) Occupancies.** Live/work units shall be classified as a Group R-2 occupancy. Separation requirements found in Section 508.3 shall not apply when the live/work unit is in compliance with Section 419. High hazard and storage occupancies shall not be permitted in a live/work unit. The aggregate of storage in the live/work unit shall be limited to 10 percent of the space dedicated to nonresidential activities.~~

~~**419.3 (Supp) Means of egress.** Except as modified by this section, the provisions for Group R-2 occupancies in Chapter 10 shall apply to the entire live/work unit.~~

~~**419.3.1 (Supp) Egress capacity**. The egress capacity for each element of the live/work unit shall be based on the occupancy load for the occupancy served in accordance with Table 1004.1.1.~~

~~**419.3.2 (Supp) Sliding doors.** Where doors in a means of egress are of the horizontal-sliding type, the force to slide the door to its fully open position shall not exceed 50 pounds (220 N) with a perpendicular force against the door of 50 pounds (220 N).~~

~~**419.3.3 (Supp) Spiral stairs.** Spiral stairs that conform to the requirements of Section 1009.8 shall be permitted.~~

~~**419.3.4 (Supp) Locks.** Egress doors shall be permitted to be locked in accordance with Exception 4 of Section 1008.1.8.3.~~

~~**419.4 (Supp) Vertical openings.** Floor openings between floor levels of a live/work unit are permitted without enclosure.~~

~~**419.5 (Supp) Fire protection.** The live/work unit shall be provided with a monitored fire alarm system where required by Section 907.2.9 and a fire sprinkler system in accordance with Section 903.2.7.~~

~~**419.6 (Supp) Structural.** Floor loading for the areas within a live/work unit shall be designed to conform to Table 1607.1 based on the function within the space.~~

~~**419.7 (Supp) Accessibility.** Accessibility shall be designed in accordance with Chapter 11.~~

~~**419.8 (Supp) Ventilation.** The applicable requirements of the *International Mechanical Code* shall apply to each area within the live/work unit for the function within that space.~~

310.1 (IFC [B] 202) (Supp) Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code* in accordance with Section 101.2. Residential occupancies shall include the following:

R-1 Residential occupancies containing sleeping units where the occupants are primarily transient in nature, including:

Boarding houses (transient)
Hotels (transient)
Motels (transient)

Congregate living facilities (transient) with 10 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

R-2 Residential occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

Apartment houses
Boarding houses (not transient)
Convents
Dormitories
Fraternities and sororities
Hotels (nontransient)
~~Live/work units~~
Monasteries
Motels (nontransient)
Vacation timeshare properties

Congregate living facilities with 16 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

R-3 Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two dwelling units.
Adult care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.
Child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.

Congregate living facilities with 16 or fewer persons.
Adult care and child care facilities that are within a single-family home are permitted to comply with the *International Residential Code*

.

R-4 Residential occupancies shall include buildings arranged for occupancy as residential care/assisted living facilities including more than five but not more than 16 occupants, excluding staff.

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code, or shall comply with the *International Residential Code.*

508.1 General. Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section 509.
2. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a separate and detached building or structure.
3. ~~Live/Work Units in accordance with Section 419 are not considered separate occupancies.~~

Reason: Section 419 as written has major flaws and creates more problems than it solves. Example: A 3,000 square foot live/work unit could contain a 1,500 square foot restaurant containing a 500 square foot kitchen and a 1,000 square foot dining area. Restaurants of this size would probably not require more than 5 employees.

The occupant load of the space would be Kitchen 500/200 = 3; Dining 1,000/15 = 67.

Section 419.2 would classify this area as Group R-2, rather than Group A-2.

Section 419.3 would require the means of egress to comply as a Group R-2 except for specific modifications made by Section 419.

Section 419 would not require panic hardware, egress illumination provided with emergency power, posting of occupant load, exits signs and enclosed stairways.

Section 419 would not require toilet room in the restaurant or a service sink.

This same restaurant across the street or next door that did not have a dwelling unit connected would be required to comply.

Cost Impact: The code change proposal will increase the cost of construction.

PART I – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: It is inappropriate to delete the live/work unit requirements. They are a helpful tool for design. Perhaps the focus of the proponent should be to prohibit Group A occupancies from being located in live/work units.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Tom Rubottom, City of Lakewood, CO, representing himself, requests Approval as Modified by this public comment for Part I.

Replace proposal as follows:

419.1.1 (Supp) Limitations. The following shall apply to all live/work areas:

1. The live/work unit is permitted to be a maximum of 3,000 square feet (279 m^2);
2. The nonresidential area is permitted to be a maximum 50 percent of the area of each live/work unit;
3. The nonresidential area shall be limited to business or retail sales use with an occupant load of less than 50.
4. The nonresidential area function shall be limited to the first or main floor only of the live/work unit; and
5. A maximum of five nonresidential workers or employees are allowed to occupy the non-residential area at any one time.

419.3 (Supp) Means of egress. ~~Except as modified by this section, the provisions for Group R-2 occupancies in~~ Chapter 10 shall apply to the entire live/work unit.

Exception: Floor openings between floor levels of a live/work unit are permitted without enclosure.

~~**419.4 Vertical openings.** Floor openings between floor levels of a live/work unit are permitted without enclosure.~~

(Renumber subsequent sections)

Commenter's Reason: The committee's reason for disapproval was as follows: 'It is inappropriate to delete the live/work unit requirements. They are a helpful tool for design. Perhaps the focus of the proponent should be to prohibit Group A occupancies from being located in live/work units".

The modifications presented are an attempt to satisfy the committee's guidance and provide more control of the fire and life safety design of live/work units.

The revision of Section 419.3 has been made as the work portion of the unit should follow the same means of egress rules as any other similar use, with the exception that floor openings are not required to be enclosed; which was the main obstacle to the design of these types of occupancies.

Public Comment 2:

Tom Rubottom, City of Lakewood, CO, representing himself, requests Approval as Modified by this public comment for Part I.

Replace proposal as follows:

419.1.1 (Supp) Limitations. The following shall apply to all live/work areas:

1. The live/work unit is permitted to be a maximum of 3,000 square feet (279 m^2);
2. The nonresidential area is permitted to be a maximum 50 percent of the area of each live/work unit;
3. The nonresidential area function shall be limited to the first or main floor only of the live/work unit; and
4. A maximum of five nonresidential workers or employees are allowed to occupy the non-residential area at any one time.
5. The nonresidential area is limited to a maximum occupant load of less than 50.

Commenter's Reason: The committee's reason for disapproval was as follows: 'It is inappropriate to delete the live/work unit requirements. They are a helpful tool for design. Perhaps the focus of the proponent should be to prohibit Group A occupancies from being located in live/work units".

The modifications presented are an attempt to satisfy the committee's guidance and provide a little more control on the use of live/work units.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

G105-07/08, Part II - IRC BUILDING/ENERGY

Revise as follows:

R101.2 (Supp) Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above-grade in height with a separate means of egress and their accessory structures.

~~**Exception:** Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family dwellings or townhouses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section 903.3.1.3 of the *International Building Code*.~~

Reason: Same as Part I.

Cost Impact: Same as Part I.

PART II – IRC-B/E
Committee Action: **Disapproved**

Committee Reason: Taking the exception out of the IRC that deals with live/work units would be a mistake. This language needs to remain in the code to allow these type of units to be established under the IRC. The density of our metropolitan areas is an issue and live work units enable us to more effectively utilize confined spaces.

Assembly Action: **None**

G108 -07/08
421 (New), Table 421.1 (New)

Proposed Change as Submitted:

Proponent: Ronald O. Hamburger, SE, Simpson Gumpertz & Heger, Inc., representing the National Council of Structural Engineers Association Ad Hoc Joint Industry Committee on Structural Integrity

1. Add new text as follows:

SECTION 421
BUILDINGS REQUIRING A RISK ASSESSMENT

421.1 General. In addition to the other requirements of this code, buildings and other structures meeting the criteria indicated in Table 421.1 shall be in accordance with Sections 421.2 through 421.4.

TABLE 421.1
BUILDINGS AND OTHER STRUCTURES REQUIRING A RISK ASSESSMENT

1. Buildings more than 420 feet in height with an occupant load greater than 5,000.
2. Buildings and other structures with an occupant load greater than 10,000.
3. Buildings and other structures deemed by a jurisdiction to be at higher than normal risk of being subjected to acts characterized as terrorist threats.

421.2 Risk assessment. A risk assessment report performed by an approved agency with expertise in risk characterization for accidental and intentional hazards including terrorism threat and vulnerability assessment shall be provided to the building official. The assessment shall conform to generally accepted principles for risk analysis and follow industry guidelines for identifying and characterizing terrorism threats and evaluating vulnerability to extreme loads and events. Thorough documentation of the assessment, including assumptions, information sources, calculations and analyses, and referenced guidelines shall be submitted to the authority having jurisdiction for review and approval. Following acceptance of the risk assessment, the reports and other data submitted shall be returned to the building owner. Retention of these documents by the building official shall not be required.

421.3 Peer review. The building official is authorized to require an independent review of the risk assessment. The review shall be performed by one or more approved individuals with expertise in risk characterization for accidental and intentional hazards including terrorism threat and vulnerability assessment. The review shall include the assumptions used, the methods of analysis, and the findings. Upon completion of the review, the reviewer(s) shall submit a report to the building official, indicating the scope of review performed and the findings of that review.

421.4 Mitigation. Risks identified in the risk assessment shall be mitigated in an approved manner. Acceptable mitigation shall include measures to reduce the risk, or the acceptance of the risk as reasonable or unavoidable.

Reason: This proposal was developed by a broad industry coalition that included participation by the National Council of Structural Engineering Associations, the Structural Engineering Institute of the American Society of Civil Engineers, the American Institute of Architects, the American Concrete Institute, the American Forest & Paper Association, the American Iron and Steel Institute, the American Institute of Steel Construction, the Masonry Alliance for Codes and Standards, The Masonry Society, the Portland Cement Association, the Steel Joist Institute, the Precast/Prestressed Concrete Institute. Corresponding members included the International Code Council and the National Fire Protection Association. In addition, there was nonvoting participation by the National Institute of Building Sciences, and the National Institute of Standards and Technology.

The terrorist attacks on Oklahoma City's Alfred P. Murrah Building, New York's World Trade Center and the Pentagon have made it clear that persons and groups with political agendas, both domestic and foreign, will attempt attacks against government and financial centers, and iconic and other buildings and structures that will render a graphic and large statement about their causes. Federal agencies, as well as many state and local governments and some private developers have adopted policies of requiring new buildings and structures to be constructed with safeguards against possible attacks. These safe guards take many forms and include such things as siting, enhanced structural design requirements, increased security including access restrictions, monitoring, and inspections; and protection of ventilation systems, to name just a few.

In developing this proposal, the coalition was confronted with the many difficulties associated with setting prescriptive minimum criteria for the design of buildings to protect against attack. Not the least of these is that terrorists are clever and quite capable of developing weapons and methods of attack that are capable of overwhelming any prescriptive criteria placed in building codes or otherwise maintained in the public record. The second is that the factors and characteristics that place a particular building at higher risk of attack than other structures are complex and vary greatly from community to community and even from neighborhood to neighborhood

Recognizing this, many government agencies and some private owners have resorted to building-specific risk assessments as a means of identifying appropriate protective measures for individual buildings and structures. These risk assessments might take into consideration a wide assortment of factors such as the location of the building, its occupancy and function, the ownership, the tenants, the site, the surrounding community, and the architectural design. The risks considered within the assessment may go well beyond code prescribed risks and include such risks as intentional attacks with weapons, collateral effects of attacks on neighboring properties, accidental explosions, biological or chemical attacks, car/truck/train impact and other low-probability events. Commonly included with a risk assessment is a recommended program of strategies that are deemed appropriate to reduce the effect of the assessed risks. For some risks addressed in the assessment an appropriate strategy may be to take accept the risk without further action, due to the cost or other unfavorable consequences of attempting to reduce the risk.

This proposal requires such risk assessments for those few structures that could be a target of attack in any community due to their size (over 420 feet in height and an occupant load greater than 5,000) or large occupant load (an occupancy load greater than 10,000). It also provides the opportunity for building officials and other authorities having jurisdiction to designate those special structures, which in their communities, also could be potential targets of attack. The proposal does not specify specific protective measures. Rather, it is intended that the design team, owner and building official will work in a collaborative manner to identify those risks that are significant to the particular building or structure and to take appropriate measures to mitigate these risks.

The proposal requires that documentation of the risk assessment, upon completion and acceptance be returned to the building owner, who may at his discretion, destroy these, so that a public record does not exist of the design criteria, and hence so that terrorists may not have access to the design basis for a building or identification of its vulnerabilities.

Cost Impact: For the overwhelming majority of buildings and structures, this proposal will have no impact on cost. For those relatively few buildings and structures that are designated as requiring a risk assessment, the cost of the assessment itself will result in a small increase in design costs. To the extent that mitigation measures are identified and included in the design, it will increase construction costs, to an extent that will be different for each affected structure.

Committee Action: **Disapproved**

Committee Reason: The committee had a concern that the proposal would be difficult to enforce. Determining "higher than normal risk" would be difficult. Additionally, documents like the ICCPC already provide the necessary framework and process to address the issues of concern of this proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Paul K. Heilstedt, PE, FAIA, Chair, ICC Code Technology Committee (CTC), Gerry Jones/Herman Brice, Co-chairs, NIBS/MMC Committee for Translating the NIST World Trade Center Investigation Recommendations into Building Codes, request Approval as Modified by this public comment.

Modify proposal as follows:

SECTION 421
BUILDINGS REQUIRING A RISK ASSESSMENT

421.1 General. In addition to the other requirements of this code, buildings and other structures meeting the criteria indicated in Table 421.1 shall be in accordance with Sections 421.2 through 421.4.

TABLE 421.1
BUILDINGS AND OTHER STRUCTURES REQUIRING A RISK ASSESSMENT

1. Buildings more than 420 feet in height with an occupant load greater than ~~5,000~~ 10,000.
2. Buildings and other structures with an occupant load greater than ~~10,000~~ 20,000.
~~3. Buildings and other structures deemed by a jurisdiction to be at higher than normal risk of being subjected to acts characterized as terrorist threats.~~

421.3 Peer review. The building official is authorized to require an independent review of the risk assessment. The review shall be performed by one or more approved ~~individuals~~ entities with expertise in risk characterization for accidental and intentional hazards including terrorism threat and vulnerability assessment. The review shall include the assumptions used, the methods of analysis, and the findings. Upon completion of the review, the reviewer(s) shall submit a report to the building official, indicating the scope of review performed and the findings of that review.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The CTC feels that such a risk assessment is long overdue in the code. In an effort to incorporate some form of risk assessment into the code for the first time, the proposal has been further revised in an effort to respond to the concerns raised in Palm Springs. The fact that the original proposal was developed by such a broad industry coalition is a testament to such need.

During the testimony at the Palm Springs hearings, it was noted that the proposal impacts a large portion of the current building stock and arguably, the occupant threshold values are somewhat arbitrary. The CTC believes that increasing the occupant load is needed in order to limit the applicability to only those buildings with very large occupant loads. The basis for the occupant load revisions is:

- The high rise occupant load of 5000 has been increased to 10,000. This occupant load approximates a: Group B; 35 story building with 12 foot floor-to-floor heights; and 28,500 square foot per floor. This equates to 285 occupants per floor (occupant load factor of 100 gross per IBC Table 1004.1.1) times 35 floors = 9975 occupants.
- The other occupant load threshold has been increased to 20, 000 to approximate a typical large stadium.

The code committee correctly notes that the proposal in its current form may be difficult to enforce. The CTC concurs and for this reason has submitted this public comment which proposes the deletion of Item 3 which is clearly a subjective determination for which guidance in the code is not provided. Enforcement, with the modifications noted, should put the enforcement community at ease as the determination as to which buildings require a risk assessment is no longer a subjective determination.

There was considerable discussion by the CTC relative to the retention of documents by the building official in Section 421.2. One view held that this should be a determination made by the local authority as to whether or not to retain the documents. In the interest of public safety and in order to provide specific direction to the local authority, it was determined that the code should explicitly state that such documents need not be retained in order to preclude someone from requesting such documents of the local authority under the guise that it is public information. The change to 421.3 is purely editorial, noting that it may or may not be an "individual" who is performing the review.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in Aprril/2005, the CTC has held fifteen meetings - all open to the public. This public comment is a result of the CTC's investigation of the area of study entitled "NIST World Trade Center Recommendations". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html

Public Comment 2:

Gary Lewis, Construction Official, City of Summit, NJ and Dr. Rafaat Hussein, Ph.D., P.E. requests Approval as Modified by this public comment.

Modify proposal as follows:

SECTION 421
BUILDINGS REQUIRING A RISK ASSESSMENT

421.1 General. In addition to the other requirements of this code, buildings and other structures meeting the criteria indicated in Table 421.1 shall be in accordance with Sections 421.2 through 421.4.

TABLE 421.1
BUILDINGS AND OTHER STRUCTURES REQUIRING A RISK ASSESSMENT

1. Buildings more than 420 feet in height ~~with an occupant load greater than 5,000~~.
2. Buildings and other structures with Group A ocupancies with an occupant load greater than 10,000.
3. Buildings and other structures with an occupant load greater than 20,000 ~~deemed by a jurisdiction to be at higher than normal risk of being subjected to acts characterized as terrorist threats~~.

421.2 Risk assessment. A risk assessment report performed by an approved agency with expertise in risk characterization for accidental and intentional hazards including terrorism threat and vulnerability assessment shall be provided to the building official. The assessment shall conform to generally accepted principles for risk analysis and follow industry ~~guidelines~~ practices for identifying and characterizing terrorism threats and evaluating building or facility vulnerability to extreme loads and events. ~~Thorough~~ Documentation of the assessment, including assumptions, information sources, calculations and analyses, ~~and~~ referenced guidelines, and proposed mitigation methods shall be submitted to the building official ~~authority having jurisdiction~~ for review and approval. Following acceptance of the risk assessment, the reports and other data submitted shall be returned to the building owner. Retention of these documents by the building official shall not be required.

421.3 Peer review. The building official is authorized to require an independent peer review of the risk assessment. The review shall be performed, at the owner's expense, by one or more approved ~~individuals~~ entities with expertise in risk characterization for accidental and intentional hazards including terrorism threat and vulnerability assessment. The review shall include the assumptions used, the methods of analysis, findings, and the proposed mitigation methods. Upon completion of the review, the reviewer (s) shall submit a report to the building official, indicating the scope of the review performed and the findings of that review.

421.4 Mitigation. Risks identified in the risk assessment shall be mitigated in an approved manner. ~~Acceptable mitigation shall include measures to reduce the risk, or the acceptance of the risk as reasonable or unavoidable.~~

Commenter's Reason: The ICC and the code community at large have been struggling since the tragic events of 9/11 to develop an appropriate response to the prospect of terrorism and terror-related events within the built environment. The ICC formulated an Ad Hoc Committee on Terrorism Resistant Buildings to deal with the issue, and assigned another standing committee, the Code Technology Committee, to review the National Institute of Science and Technology's (NIST) Final Report of the National Construction Safety Team on the Collapses of the World Trade Center Towers.

Throughout that process, it has become apparent that the model building and fire codes do contain some vulnerabilities that had not previously been anticipated, and the codes are currently being amended. More so, however, that process has made clear that the solution to terrorism prevention in high-risk buildings and facilities lies not exclusively within the model codes, but rather in a deliberate, thorough threat assessment and risk analysis of each iconic structure *individually*, with mitigation measures tailored to the level of threat determined by the analysis in each case.

This is not a new concept. The federal government has been conducting such analyses on select federal facilities for years now, as have a number of private developers of high-risk projects such as arenas. It is important to note that this provision does not change anything required of construction under the IBC, nor does it require that the building official become an expert in homeland security matters. A project developer of a building under the very limited scope of this proposal --- 420 feet represents about 38 stories, or very large assembly arenas or super malls --- would simply have to engage an additional expert as part of their design team to conduct a threat assessment and risk analysis. We would suggest to the membership that such a review is already being conducted now anyway in many cases, driven by the private sector.

It is anticipated that the building code official would engage a peer reviewer if deemed necessary, one with the same or similar qualifications as the entity doing the initial assessment, at the owner's expense, to review the assessment report and issue a response, ultimately resulting in consensus between the experts as to the level of risk and the appropriate mitigation measures to be taken during the project and post-occupancy.

The structural engineering community brought forth this proposal in Palm Springs, among other reasons because the load or threat to be considered and designed for in the realm of terrorism is not readily quantifiable, thereby making the solution impossible on a broad brush basis. We believe that a very limited, judicious approach to threat assessment and risk analysis is the overall best response to the threat of terrorism beyond some of the basic vulnerabilities that required model code amendment.

Interested parties can find additional resources on this subject via the following links:

http://www.tswg.gov/
http://www.fema.gov/pdf/plan/prevent/rms/155/e155_unit_iv.pdf
http://www.fema.gov/library/viewRecord.do?id=1939
http://www.fema.gov/plan/prevent/rms/rmsp452.shtm
http://www.fema.gov/rebuild/mat/index.shtm
http://www.fema.gov/about/regions/regionii/toolkit_risk.shtm

Final Action: AS AM AMPC____ D

G109-07/08, Part I
421 (New), 202 (New), Chapter 35 (New); IRC R325 (New), Chapter 43 (New)

THIS CODE CHANGE WILL BE HEARD ON THE IBC STRUCTURAL PORTION OF THE HEARING ORDER.

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I.

Proposed Change as Submitted:

Proponent: Marc Levitan, LSU Hurricane Center, representing the ICC/NSSA Storm Shelter Committee

PART I – IBC GENERAL

1. Add new text as follows:

SECTION 421
STORM SHELTERS

421.1 General. In addition to other applicable requirements in this code, storm shelters shall be constructed in accordance with ICC/NSSA-500.

421.1.1 Scope. This section applies to the construction of storm shelters constructed as separate detached buildings or constructed as safe rooms within buildings for the purpose of providing safe refuge from storms that produce high winds, such as tornados and hurricanes. Such structures shall be designated to be hurricane shelters, tornado shelters, or combined hurricane and tornado shelters.

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

STORM SHELTER. A building, structure, or portions(s) thereof, constructed in accordance with ICC-500 and designated for use during a severe wind storm event such as a hurricane or tornado.

Community Storm Shelter. A storm shelter not defined as a Residential Storm Shelter.

Residential Storm Shelter. A storm shelter serving occupants of dwelling units and having an occupant load not exceeding 16 persons.

2. Add new definition as follows:

SECTION 202
DEFINITIONS

STORM SHELTER. See Section 421.2

3. Add standard to Chapter 35 as follows:

ICC ICC 500-08 ICC/NSSA Standard on the Design and Construction of Storm Shelters

Reason: These proposed changes to the IBC are intended to bring the new ICC Storm Shelter standard into the code as a referenced document for the construction of storm shelters. This standard establishes minimum requirements for structures and spaces designated as hurricane, tornado, or combination shelters. The standard addresses the design of such shelters from the perspective of the structural requirements for high wind conditions, as well as addressing minimum requirements for the interior environment during a storm event. A companion change is being proposed for the IRC.

Cost Impact: This code change will not increase the cost of construction.

PART I – IBC STRUCTURAL
Committee Action: **Disapproved**

Committee Reason: The committee supports the addition of the proposed storm shelter reference standard to the building code and does not take any technical issues with that document. The committee's disapproval is based on the standard not yet being finalized and it is hoped that the proponent will submit a public comment to allow this standard to be accepted at the final action hearings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Marc Levitan, LSU Hurricane Center, representing the ICC/NSSA Storm Shelter Committee, requests Approval as Submitted for Part I.

Commenter's Reason: The IBC-Structural Committee disapproved this code change because the standard proposed for inclusion in the code, ICC 500, was not finalized. Since that time, the ICC/NSSA Storm Shelter Committee has completed its work, submitted the standard to ANSI for approval, received approval, and published the standard. Other than the objections stated regarding the completion of the standard, the committee had no other technical concerns or issues regarding this proposed code change. Given that the standard proposed for reference is now complete and in compliance with the ICC criteria for referenced standards given in ICC Council Policy no. CP 28, the ICC/NSSA Storm Shelter Committee request approval of the proposed code change G109-07/08 Part I "As Submitted."

Public Comment 2:

Joseph J. Messersmith, Jr., PE, Portland Cement Association, requests Approval as Submitted for Part I.

Commenter's Reason: As indicated in the committee reason, the change to reference ICC/NSSA-500 in the IBC was disapproved because the standard was not complete. It should be noted that Part II of this change to reference this new standard in the IRC was approved as modified in Palm Springs. Since the Palm Springs hearings, the standard has been completed and the membership is urged to overturn the motion for disapproval and subsequently vote to approve Part I of the change.

Public Comment 3:

Roger Robertson, Chesterfield County Virginia, representing the ICC Storm Shelter Committee, requests Approval as Submitted for Part I.

Commenter's Reason: The IBC General Committee disapproved the proposal based on the standard not yet having received ANSI accreditation. The committee suggested a public comment requesting approval be submitted once accreditation was received.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

G109-07/08, PART II – IRC BUILDING/ENERGY

1. Add new text as follows:

SECTION R325
STORM SHELTERS

R325.1 General. This section applies to the construction of storm shelters constructed as separate detached buildings or constructed as safe rooms within buildings for the purpose of providing safe refuge from storms that produce high winds, such as tornados and hurricanes. In addition to other applicable requirements in this code, storm shelters shall be constructed in accordance with ICC/NSSA-500.

2. Add standard to Chapter 43 follows:

ICC 500 -08	ICC/NSSA Standard on the Design and Construction of Storm Shelters

Reason: Same as Part I.

Cost Impact: Same as Part I.

PART II – IRC
Committee Action: **Approved as Modified**

Modify proposal as follows:

R325.1 General. This section applies to the construction of storm shelters when constructed as separate detached buildings or when constructed as safe rooms within buildings for the purpose of providing safe refuge from storms that produce high winds, such as tornados and hurricanes. In addition to other applicable requirements in this code, storm shelters shall be constructed in accordance with ICC/NSSA-500.

(Portions of proposal not shown remain unchanged)

Committee Reason: This change brings a new standard into the code for the construction of storm shelters. The modification clarifies that a storm shelter is not required but when one is constructed it must comply with ICC/NSSA-500.

Assembly Action: None

G110-07/08
Chapter 5

Proposed Change as Submitted:

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise as follows:

CHAPTER 5
GENERAL BUILDING ~~HEIGHTS AND AREAS~~ COMPARTMENTATION AND HEIGHT

501.1 Scope. The provisions of this chapter control the height and ~~area of~~ the type and number of fire compartments within all structures hereafter erected and additions to existing structures

[F] 501.2 (Supp) Address identification. New and existing buildings shall be provided with approved address numbers or letters. Each character shall be a minimum 4 inches (102 mm) high and a minimum of 0.5 inch (12.7 mm) wide. They shall be installed on a contrasting background and be plainly visible from the street or road fronting the property. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other approved sign or means shall be used to identify the structure.

SECTION 502
DEFINITIONS

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

AREA, ~~BUILDING~~ FIRE COMPARTMENT. The area included within surrounding exterior walls, compartment walls, (or exterior walls and firewalls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the ~~building~~ fire compartment area if such areas are included within the horizontal projection of the roof or floor above.

(Supp) BASEMENT. A story that is not a story above grade plane (See "Story above grade plane" in Section 202).

EQUIPMENT PLATFORM. An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, stairs and ladders necessary to access the platform (see Section 505.5).

FIRE COMPARTMENT. An area enclosed and bounded by fire walls, fire barrier walls, exterior walls, or fire-resistance-rated horizontal assemblies of a building.

GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

HEIGHT, BUILDING. The vertical distance from grade plane to the average height of the highest roof surface.

MEZZANINE. An intermediate level or levels between the floor and ceiling of any story and in accordance with Section 505.

SECTION 503
GENERAL HEIGHT AND FIRE COMPARTMENT AREA LIMITATIONS

503.1 (Supp) General. The height and maximum area of any fire compartment and the number of fire compartments in a buildings shall not exceed the limits specified in Tables 503.1(1), 503.1(2), 503.1(3) and 503.1(4) based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. Each portion of a building separated by one or more fire walls complying with Section 705 shall be considered to be a separate building.

(Delete existing Table 503 entire in its entirety and replace with Tables 503.1(1) through 503.1(4))

~~**TABLE 503**~~
~~**ALLOWABLE HEIGHT AND BUILDING AREASa**~~
~~**Height limitations shown as stories and feet above grade plane.**~~
~~**Area limitations as determined by the definition of "Area, building," per story**~~

TABLE 503.1(1)
MAXIMUM BUILDING HEIGHT (Feet and Stories)

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE VA	TYPE IV	TYPE IIIB	TYPE VB
Feet	UL	160	65	55	65	50	65	55	40
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL
S-2	UL	11	5	4	4	5	5	4	2
F-2	UL	11	5	3	4	3	5	3	2
B	UL	11	5	4	5	3	5	4	2
R-1, R-2, R-4	UL	11	4	4	4	3	4	4	2
R-3	UL	11	4	4	4	3	4	4	3
M	UL	11	4	4	4	3	4	4	1
F-1	UL	11	4	2	3	2	4	2	1
S-1	UL	11	4	3	3	3	4	3	1
A-3, A-4	UL	11	3	2	3	2	3	2	1
M	UL	11	4	4	4	2	4	4	1
A-2	UL	11	3	2	3	2	3	2	1
I-1	UL	9	4	3	4	3	4	3	2
H-4	UL	7	5	3	5	3	5	3	2
H-3	UL	6	4	2	4	2	4	2	1
U	UL	5	4	2	3	2	4	2	1
A-1	UL	5	3	2	3	2	3	2	1
I-4	UL	5	3	2	3	1	2	3	1
E	UL	5	3	2	3	1	3	2	1
H-5	4	4	3	3	3	3	3	3	2
I-2	UL	4	2	1	1	1	1	NP	NP

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE VA	TYPE IV	TYPE IIIB	TYPE VB
I-3	UL	4	2	1	2	2	2	1	1
H-2	UL	3	2	1	2	1	2	1	1
H–1	1	1	1	1	1	1	1	1	NP

UL = unlimited in height
NP = not permitted

TABLE 503.1(2)
MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITHOUT SPRINKLERS [a, b]

OCCUPANCY	TYPE IA/IB	TYPE IIA	TYPE IIIA	TYPE IV AND VA	TYPE IIB AND IIIB	TYPE VB
S-2, F-2	30,267	16,933	16,933	10,933	7,867	4,800
A-3, A-4, B, H-4, I, R, E	26,706	14,941	14,941	9,647	6,941	4,235
A-1, A-2, M	22,700	12,700	12,700	8,200	5,900	3,600
F-1, S-1, H-5	19,739	11,043	11,043	7,130	5,130	3,130
H–1, H-2, H-3	NP	NP	NP	NP	NP	NP

a. One or more fire compartment in the building does not have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.

NP = Not Permitted

TABLE 503.1(3)
MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITH SPRINKLERS[a, b]

OCCUPANCY	TYPE IA/IB	TYPE IIA	TYPE IIIA	TYPE IV AND VA	TYPE IIB AND IIIB	TYPE VB
S-2, F-2	722,400	290,667	290,667	172,000	130,667	82,667
A-3, A-4, B, H-4, I, R, E	637,412	256,471	256,471	151,765	115,294	72,941
A-1, A-2, M	387,000	109,000	109,000	64,500	49,000	31,000
F-1, S-1, H-5	168,261	70,139	70,139	41,504	31,530	19,948
H–1, H-2, H-3	30,960	17,440	17,440	10,320	7,840	4,960

a. All fire compartments in the building have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.

-

TABLE 503.1(4)
GROSS AREA FACTOR

ACTUAL BUILDING HEIGHT, STORIES	NUMBER OF STORIES PERMITTED								
	1	2	3	4	5	6	7	8	9
1	4	8	12	16	20	24	28	32	36
2	-	6	9	12	15	18	21	24	27
3	-	-	6	8	10	12	14	16	18

503.2 Building area. The maximum allowable building area shall not exceed the maximum area of fire compartments in accordance with Tables 503.1(2) or 503.1(3) multiplied by the number in Table 503.1(4). A building shall be considered one fire compartment except where subdivided by compartment fire barriers conforming with this section.

503.2.1 Enclosure. Each fire compartment shall be enclosed by exterior walls, roof, fire rated horizontal assemblies or fire compartment barrier walls. If a building has more than one fire compartment, each fire compartment shall be separated by horizontal or vertical compartment barrier having a fire resistance rating determined in accordance with Table 503.2.2.

503.2.2 Fire compartment barriers. Fire compartment barriers separating a building into fire compartments shall comply with Sections 503.2.2.1 and 503.2.2.2 and Table 503.2.2.

TABLE 503.2.2
FIRE COMPARTMENT FIRE RESISTANCE (hrs)

	SPRINKLERED	NON-SPRINKLERED
Assembly		
A-1	1	2
A-2	1	2
A-3	1	2
A-4	1	2
A-5	NA	NA
Business		
B	1	2
Educational		
E	1	2
Factory and Industry		
F-1	2	3
F-2	1	2
Hazardous		
H-1	3	4

	SPRINKLERED	NON-SPRINKLERED
H-2	3	4
H-3	2	3
H-4	1	2
H-5	1	2
Institutional		
I-1	1	2
I-2	1	2
I-3	1	2
I-4	1	2
Mercantile		
M	1	2
Residential		
R-1	1	2
R-2	1	2
R-3	1	2
R-4	1	2
Storage		
S-1	2	3
S-2	1	2
Utility		
U	½	1

NA = Not Applicable

503.2.2.1 Horizontal fire compartment barriers. Horizontal fire compartment barriers shall be constructed in accordance with Section 711.

503.2.2.2 Vertical fire barriers. Vertical fire compartment barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, including but not limited to spaces such as above a suspended ceiling.

503.2.2.2.1 Vertical continuity. Fire compartment barriers shall extend from the foundation to the underside of the roof deck.

Exceptions:

1. Two-hour fire-resistance-rated walls shall be permitted to terminate at the underside of the roof sheathing, deck or slab provided:
   1.1. The lower roof assembly within 4 feet (1220 mm) of the wall has not less than a 1-hour fire-resistance rating and the entire length and span of supporting elements for the rated roof assembly has a fire-resistance rating of not less than 1 hour.
   1.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire wall.
   1.3. Each building shall be provided with not less than a Class B roof covering.

2. Walls shall be permitted to terminate at the underside of noncombustible roof sheathing, deck, or slabs where both buildings are provided with not less than a Class B roof covering. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire compartment barrier.
3. In buildings of Type III, IV and V construction, walls shall be permitted to terminate at the underside of combustible roof sheathing or decks provided:
   3.1. There are no openings in the roof within 4 feet (1220 mm) of a fire wall,
   3.2. The roof is covered with a minimum Class B roof covering, and
   3.3. The roof sheathing or deck is constructed of fire-retardant-treated wood for a distance of 4 feet (1220 mm) on both sides of the wall or the roof is protected with 5/8 inch (15.9 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of 2-inch (51 mm) nominal ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm) on both sides of the fire wall.
4. Buildings located above a parking garage designed in accordance with Section 509.2 shall be permitted to have the fire compartment barriers for the buildings located above the parking garage extend from the horizontal separation between the parking garage and the buildings.

503.2.2.2.2 Supporting construction. The supporting construction for fire compartment barrier walls shall be protected to afford the required fire-resistance rating of the fire compartment barrier supported.

Exceptions:

1. The supporting construction for a 1 hr. fire compartment barrier wall in buildings of Type IIB, IIIB and VB construction, not protected throughout by sprinklers in accordance with Section 903.3.1.1 or 903.3.1.2, shall be supported by a structure having a layer of 20 minute fire-resistance rated finish protection.
2. The supporting construction for a 1 hr. fire compartment barriers in buildings of Type IIB, IIIB and VB construction that are protected by sprinklers throughout in accordance with Section 903.3.1.1 or 903.3.1.2 shall not be required to be protected.

503.2.2.3 Glazed openings. Glazed openings in fire compartment barriers shall be limited to those in fire doors complying with 715.4.

503.2.2.4 Fire compartment doors. Doors in fire compartment barriers shall have a fire protection rating of at least 1 hour in accordance with Table 503.2.2.4. Doors in fire compartment barriers shall limit temperature rise to 450°F (250°C) when tested in accordance with NFPA 252.

TABLE 503.2.2.4
FIRE PROTECTION RATING OF DOORS IN FIRE COMPARTMENT BARRIERS (HRS)

FIRE COMPARTMENT BARRIER	DOOR IN FIRE COMPARTMENT BARRIER
1 hr.	1 hr.
2 hr.	1½ hr.
3 hr.	2 hr.

503.2.2.5 Other openings fire compartment barriers. Openings in 1-hour fire compartment barriers for air-handling shall be protected with fire dampers having a fire protection rating of 1 hour.

503.3 Smoke management for adjacent fire compartments. Where adjacent fire compartments share a common fire compartment wall or horizontal assembly, or both, for the purpose of creating separate fire compartments, a method of smoke management shall be provided in accordance with Section 503.3.1 for such fire compartments that meet any of the following conditions:

1. The fire compartment is not protected with an automatic sprinkler system in accordance with Section 903.3.1 and contains one or more stories located more than one story above grade plane or
2. The fire compartment contains one or more stories located more than two stories above grade plane having any of the following occupancies:
   2.1. Group A occupancy with an occupant load of 300 or more persons;
   2.2. Group I-1 occupancy; or
   2.3. Group I-2 occupancy.

503.4 Smoke management methods. Smoke management as required by Section 503.3 shall comply with any one or a combination of any of the following methods, as applicable:

1. Door openings, joints and penetrations in fire compartment separation walls and horizontal assemblies shall be protected as required for smoke barriers in accordance with the following:
   1.1. Door openings shall comply with Section 715.4.3.1.
   1.2. Penetrations shall comply with Section 712.5.
   1.3. Joints shall comply with Section 713.6.
   1.4. Ducts and air transfer openings shall comply with Section 716.5.5.
2. Openings in fire compartment separation horizontal assemblies shall be protected by shaft enclosures in accordance with Section 707. For the purpose of smoke management at fire compartment separations, Section 707.2 shall not apply.
3. Exit stair enclosures penetrating a fire compartment separation horizontal assembly shall be protected as for smokeproof enclosures in accordance with Section 909.20.
4. One or more of the following mechanical methods shall be permitted to be used for smoke management in lieu of Items 1 and 2 above:
   4.1. The pressurization method in accordance with Section 909.6
   4.2. The air flow design method in accordance with Section 909.7 for buildings protected by an automatic sprinkler system in accordance with Section 903.3.1
   4.3. The exhaust method in accordance with Section 909.8 for buildings protected by an automatic sprinkler system in accordance with Section 903.3.1

~~**503.1.1**~~ **503.5 Special industrial occupancies.** Buildings and structures designed to house special industrial processes that require large areas and unusual heights to accommodate craneways or special machinery and equipment, including, among others, rolling mills; structural metal fabrication shops and foundries; or the production and distribution of electric, gas or steam power, shall be exempt from the height and area limitations of Table ~~503~~ 503.1(1) through 503.1(3).

~~**503.1.2**~~ **503.6 Buildings on same lot.** Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the height of each building and the aggregate maximum area of fire compartments ~~area of buildings~~ are within the limitations of Table ~~503~~ 503.1(1) through 503.1(3) as modified by Sections 504 ~~and 506~~. The provisions of this code applicable to the aggregate building shall be applicable to each building.

~~**503.1.3**~~ **503.7 Type I construction.** Buildings of Type I construction permitted to be of unlimited tabular heights ~~and areas~~ or number of fire compartments are not subject to the special requirements that allow unlimited fire compartments ~~area buildings~~ in Section 507 or unlimited height in Sections 503.5~~1.1~~ and 504.3 or increased height and areas for other types of construction.

SECTION 504
HEIGHT

504.1 General. The height permitted by Table 503.1(1) shall be increased in accordance with this section.

Exception: The height of one-story aircraft hangars, aircraft paint hangars and buildings used for the manufacturing of aircraft shall not be limited if the building is provided with an automatic fire-extinguishing system in accordance with Chapter 9 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503.1(1) for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. ~~These increases are permitted in addition to the area increase in accordance with Sections 506.2 and 506.3.~~ For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503.1(1) for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

504.3 Roof structures. Towers, spires, steeples and other roof structures shall be constructed of materials consistent with the required type of construction of the building except where other construction is permitted by Section 1509.2.1. Such structures shall not be used for habitation or storage. The structures shall be unlimited in height if of noncombustible materials and shall not extend more than 20 feet (6096 mm) above the allowable height if of combustible materials (see Chapter 15 for additional requirements).

SECTION 505
MEZZANINES

505.1 General. A mezzanine or mezzanines in compliance with Section 505 shall be considered a portion of the story below. Such mezzanines shall not contribute to either the ~~building~~ fire compartment area or number of stories as regulated by Section 503.1. The area of the mezzanine shall be included in determining the fire area defined in Section 702. The clear height above and below the mezzanine floor construction shall not be less than 7 feet (2134 mm).

505.2 Area limitation. The aggregate area of a mezzanine or mezzanines within a room shall not exceed one-third of the floor area of that room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the mezzanine is located. In determining the allowable mezzanine area, the area of the mezzanine shall not be included in the floor area of the room.

Exceptions:

1. The aggregate area of mezzanines in buildings and structures of Type I or II construction for special industrial occupancies in accordance with Section 503.5~~1.1~~ shall not exceed two-thirds of the floor area of the room.
2. The aggregate area of mezzanines in buildings and structures of Type I or II construction shall not exceed one-half of the floor area of the room in buildings and structures equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 and an approved emergency voice/alarm communication system in accordance with Section 907.2.12.2.

505.3 Egress. Each occupant of a mezzanine shall have access to at least two independent means of egress where the common path of egress travel exceeds the limitations of Section 1014.3. Where a stairway provides a means of exit access from a mezzanine, the maximum travel distance includes the distance traveled on the stairway measured in the plane of the tread nosing. Accessible means of egress shall be provided in accordance with Section 1007.

Exception: A single means of egress shall be permitted in accordance with Section 1015.1.

505.4 (Supp) Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. A mezzanine having two or more means of egress is not required to be open to the room in which the mezzanine is located if at least one of the means of egress provides direct access to an exit from the mezzanine level.
3. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the aggregate floor area of the enclosed space does not exceed 10 percent of the mezzanine area.
4. In industrial facilities, mezzanines used for control equipment are permitted to be glazed on all sides.
5. In other than Groups H and I occupancies no more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a mezzanine having two or more means of egress shall not be required to be open to the room in which the mezzanine is located.

505.5 (Supp) Equipment platforms. Equipment platforms in buildings shall not be considered as a portion of the floor below. Such equipment platforms shall not contribute to either the building area or the number of stories as regulated by Section 503.1. The area of the equipment platform shall not be included in determining the fire area

in accordance with Section 903. Equipment platforms shall not be a part of any mezzanine and such platforms and the walkways, stairs and ladders providing access to an equipment platform shall not serve as a part of the means of egress from the building.

505.5.1 Area limitations. The aggregate area of all equipment platforms within a room shall not exceed two-thirds of the area of the room in which they are located. Where an equipment platform is located in the same room as a mezzanine, the area of the mezzanine shall be determined by Section 505.2 and the combined aggregate area of the equipment platforms and mezzanines shall not exceed two-thirds of the room in which they are located.

[F] 505.5.2 Fire suppression. Where located in a building that is required to be protected by an automatic sprinkler system, equipment platforms shall be fully protected by sprinklers above and below the platform, where required by the standards referenced in Section 903.3.

505.5.3 Guards. Equipment platforms shall have guards where required by Section 1013.1.

~~**SECTION 506**~~
~~**AREA MODIFICATIONS**~~

~~**506.1 General.** The areas limited by Table 503 shall be permitted to be increased due to frontage *(I_f)* and automatic sprinkler system protection *(I_s)* in accordance with the following:~~

$$A_a = \{A_t + [A_t \times I_f] + [A_t \times I_s]\}$$ ~~**(Equation 5-1)**~~

~~where:~~

~~A_a = Allowable area per story (square feet).~~
~~A_t = Tabular area per story in accordance with Table 503 (square feet).~~
~~I_f = Area increase factor due to frontage as calculated in accordance with Section 506.2.~~
~~I_s = Area increase factor due to sprinkler protection as calculated in accordance with Section 506.3.~~

~~**506.2 Frontage increase.** Every building shall adjoin or have access to a public way to receive an area increase for frontage. Where a building has more than 25 percent of its perimeter on a public way or open space having a minimum width of 20 feet (6096 mm), the frontage increase shall be determined in accordance with the following:~~

$$I_f = [F / P - 0.25]W / 30$$ ~~**(Equation 5-2)**~~

~~where:~~

~~I_f = Area increase due to frontage.~~
~~F = Building perimeter that fronts on a public way or open space having 20 feet (6096 mm) open minimum width (feet).~~
~~P = Perimeter of entire building (feet).~~
~~W = Width of public way or open space (feet) in accordance with Section 506.2.1.~~

~~**506.2.1 (Supp) Width limits.** The value of *W* shall be at least 20 feet (6096 mm). Where the value of *W* varies along the perimeter of the building, the calculation performed in accordance with Equation 5-2 shall be based on the weighted average of each portion of exterior wall and open space where the value of *W* is greater than or equal to 20 feet (6096 mm). Where the value of *W* exceeds 30 feet (9144 mm), a value of 30 feet (9144 mm) shall be used in calculating the weighted average, regardless of the actual width of the open space.~~

~~**Exception:** The value of *W* divided by 30 shall be permitted to be a maximum of 2 when the building meets all requirements of Section 507 except for compliance with the 60 foot (18 288 mm) public way or yard requirement, as applicable.~~

~~**506.2.2 Open space limits.** Such open space shall be either on the same lot or dedicated for public use and shall be accessed from a street or approved fire lane.~~

~~**506.3 (Supp) Automatic sprinkler system increase.** Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by an additional 200 percent (I_s = 2) for buildings with more than one story above grade plane and an additional 300 percent (I_s = 3) for buildings with no more than one story above grade plane. These increases are permitted in addition to the height and story increases in accordance with Section 504.2.~~

~~**Exception:** The area limitation increases shall not be permitted for the following conditions:~~

1. ~~The automatic sprinkler system increase shall not apply to buildings with an occupancy in Group H-1.~~
2. ~~The automatic sprinkler system increase shall not apply to the building area of an occupancy in Group H-2 or H-3. For buildings containing such occupancies, the allowable area shall be determined in accordance with Section 508.3.3.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.~~
3. ~~Fire-resistance rating substitution in accordance with Table 601, Note e.~~

~~**506.4 (Supp) Buildings with more than one story.** The total allowable building area of a building with more than one story shall be determined in accordance with this section. The actual aggregate building area at all stories in the building shall not exceed the total allowable building area.~~

~~**Exception:** A single basement need not be included in the total allowable building area, provided such basement does not exceed the area permitted for a building with no more than one story above grade plane.~~

~~**506.4.1 (Supp) Area determination.** The maximum area of a building with more than one story above grade plane shall be determined by multiplying the allowable area of the first story (A_a), as determined in Section 506.1, by the number of stories above grade plane as listed below:~~

1. ~~For buildings with two stories above grade plane, multiply by 2;~~
2. ~~For buildings with three or more stories above grade plane, multiply by 3; and~~
3. ~~No story shall exceed the allowable area per story (A_a), as determined in Section 506.1, for the occupancies on that story.~~

~~**Exceptions:**~~

1. ~~Unlimited area buildings in accordance with Section 507.~~
2. ~~The maximum area of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.2 shall be determined by multiplying the allowable area per story (A_a), as determined in Section 506.1, by the number of stories above grade plane.~~

~~**506.4.1.1 (Supp) Mixed occupancies.** In buildings with mixed occupancies, the allowable area per story (A_a) shall be based on the most restrictive provisions for each occupancy when the mixed occupancies are treated according to Section 508.3.2. When the occupancies are treated according to Section 508.3.3 as separated occupancies, the maximum total building area shall be such that the sum of the ratios for each such area on all floors as calculated according to Section 508.3.3.2 shall not exceed 2 for two-story buildings and 3 for buildings three stories or higher.~~

SECTION ~~507~~ 506
FIRE COMPARTMENTS PERMITTED TO BE UNLIMITED IN AREA ~~BUILDINGS~~

~~**507.1**~~ **506.1 General.** The area of a fire compartment shall not be limited and only one fire compartment is required in buildings meeting the requirements of Sections 506~~7~~.2 through 506~~7~~.11. ~~The area of buildings of the occupancies and configurations specified herein shall not be limited.~~

~~**507.2**~~ **506.2 (Supp) Nonsprinklered, one story.** The area of the fire compartment in a Group F-2 or S-2 occupancy ~~building~~ no more than one-story in height, shall not be limited when the building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~**507.3**~~ **506.3 (Supp) Sprinklered, one story.** The area of the fire compartment in a Group B, F, M or S occupancy ~~building~~ no more than one-story above grade plane, or the fire compartment in a Group A-4 occupancy ~~building~~ no more than one-story above grade plane, of other than Type V construction, shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) n width.

Exceptions:

1. ~~Buildings and~~ The fire compartment in structures of Type I and II construction for rack storage facilities that do not have access by the public shall not be limited in height, provided that such ~~buildings~~ fire compartment conform to the requirements of Sections 506~~7~~.2 and 903.3.1.1 and NFPA 230.
2. The automatic sprinkler system shall not be required in ~~areas~~ parts of fire compartments that are occupied for indoor participant sports, such as tennis, skating, swimming and equestrian activities in occupancies in Group A-~~4~~, provided that:
   2.1. Exit doors directly to the outside are provided for occupants of the participant sports areas; and
   2.2. The ~~building~~ fire compartment is equipped with a fire alarm system with manual fire alarm boxes installed in accordance with Section 907.
3. Group A-1 and A-2 occupancies of other than Type V construction shall be permitted, provided:
   3.1. All assembly occupancies are separated from other spaces as required for separated occupancies in Section 508.4.4 with no reduction allowed in the fire-resistance rating of the separation based upon the installation of an automatic sprinkler system;
   3.2. Each Group A occupancy shall not exceed the maximum allowable area permitted in Section 503.1; and
   3.3. All required exits shall discharge directly to the exterior.

~~507.4~~ 506.4 (Supp) Two story. The area of the fire compartment in a Group B, F, M or S occupancy ~~building~~ no more than two stories above grade plane shall not be limited when the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.5~~ 506.5 Reduced open space. The permanent open space of 60 feet (18 288 mm) required in Sections 507.2, 507.3, 507.4, 507.6 and 507.10 shall be permitted to be reduced to not less than 40 feet (12 192 mm), provided the following requirements are met:

1. The reduced open space shall not be allowed for more than 75 percent of the perimeter of the building.
2. The exterior wall facing the reduced open space shall have a minimum fire-resistance rating of 3 hours.
3. Openings in the exterior wall facing the reduced open space shall have opening protectives with a minimum fire protection rating of 3 hours.

~~507.6~~ 506.6 (Supp) Group A-3 buildings. The area of the fire compartment in a Group A-3 occupancy ~~building~~ no more than one-story above grade plane, used as a place of religious worship, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor swimming pool or tennis court of Type II construction shall not be limited when all of the following criteria are met:

1. The fire compartment ~~building~~ shall not have a stage other than a platform.
2. The fire compartment ~~building~~ shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
3. The assembly floor shall be located at or within 21 inches (533 mm) of street or grade level and all exits are provided with ramps complying with Section 1010.1 to the street or grade level.
4. The building shall be surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.7~~ 506.7 (Supp) Group H occupancies. Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited area fire compartments ~~buildings~~ containing Group F and S occupancies, in accordance with Sections 507.3 and 507.4 and the limitations of this section. The aggregate floor area of the Group H occupancies located at the perimeter of the unlimited area fire compartment ~~building~~ shall not exceed 10 percent of the area of the building nor the area limitations for the Group H occupancies as specified in Tables 503.1(2) and 503.1(3) ~~as modified by Section 506.2~~, based upon the percentage of the perimeter of each Group H floor area that fronts on a street or other unoccupied space. The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the fire compartment area limitations for the Group H occupancies as specified in Tables 503.1(2) and 503.1(3). Group H occupancies shall be separated from the rest of the unlimited area building and from each other in accordance with Table 508.4. For two-story unlimited area fire compartments ~~buildings~~, the Group H occupancies shall not be located more than one story above grade plane unless permitted by the allowable height in stories and feet as set forth in Table 503.1(1) based on the type of construction of the unlimited area building.

~~507.8~~ **506.8 (Supp) Aircraft paint hangar.** The area of the fire compartment for a Group H-2 aircraft paint hangar no more than one-story above grade plane, shall not be limited where such aircraft paint hangar complies with the provisions of Section 412.4 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

~~507.9~~ **506.9 (Supp) Group E buildings.** The area of the fire compartment for a Group E occupancy ~~building~~ no more than one-story above grade plane, of Type II, IIIA or IV construction shall not be limited when the following criteria are met:

1. Each classroom shall have not less than two means of egress, with one of the means of egress being a direct exit to the outside of the building complying with Section 1018.
2. The fire compartment ~~building~~ is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
3. The fire compartment ~~building~~ is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.10~~ **506.10 (Supp) Motion picture theaters.** In fire compartment ~~buildings~~ of Type II construction, the area of the fire compartment for a motion picture theater located on the first story above grade plane shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

~~507.11~~ **506.11 Covered mall buildings and anchor stores.** The area of the fire compartment for a covered mall buildings and anchor stores not exceeding three stories in height that comply with Section 402.6 shall not be limited.

SECTION ~~508~~ 507
MIXED USE AND OCCUPANCY

~~508.1~~ **507.1 (Supp) General.** Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section 509.
2. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a separate and detached building or structure.
3. Live/Work Units in accordance with Section 419 are not considered separate occupancies.

~~508.2~~ **507. 2 (Supp) Accessory occupancies** Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections 508.2.1 through 508.2.5.3.

~~508.2.1~~ **507.2.1 (Supp) Area limitations.** Aggregate accessory occupancies shall not occupy more than 10 percent of the area of the story in which they are located and shall not exceed the tabular values in Tables 503.1(2) and 503.1(3), ~~without area increases in accordance with Section 506 for such accessory occupancies~~

~~508.2.2~~ **507.2.2 (Supp) Occupancy classification.** Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

~~508.2.3~~ **507.2.3 (Supp) Allowable area and height.** The allowable area of the fire compartment and height of the building shall be based on the allowable area and height for the main occupancy in accordance with Section 503.1. The height of each accessory occupancy shall not exceed the tabular values in Table 503.1(1), without increases in accordance with Section 504 for such accessory occupancies. The area of the accessory occupancies shall be in accordance with Section 508.2.1

~~508.2.4~~ **507.2.4 (Supp) Separation of occupancies.** No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.

2. Incidental accessory occupancies required to be separated or protected by Section 508.2.5.
3. Group R occupancies shall be separated from other accessory occupancies in accordance with Section 508.4.4

~~508.2.5~~ 507.2.5 (Supp) Separation of incidental accessory occupancies. The incidental accessory occupancies listed in Table 508.2.5 shall be separated from the remainder of the building or equipped with an automatic fire-extinguishing system, or both, in accordance with Table 508.2.5.

Exception: Incidental accessory occupancies within and serving a dwelling unit are not required to comply with this section.

TABLE ~~508.2.5~~ 507.2.5 (Supp)
INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic fire-extinguishing system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen cut-off rooms, not classified as Group H	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing system
Laboratories and vocational shops, not classified as Group H, located in Group E or I-2 occupancies	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Group I-3 cells equipped with padded surfaces	1 hour
Group I-2 waste and linen collection rooms	1 hour
Waste and linen collection rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Stationary storage battery systems having a liquid capacity of more than 100 gallons used for facility standby power, emergency power or uninterrupted power supplies	1-hour in Group B, F, M, S and U occupancies. 2-hour in Group A, E, I and R occupancies

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.9 kPa,
1 British thermal unit per hour = 0.293 watts, 1 horsepower = 746 watts,
1 gallon = 3.785 L.

~~508.2.5.1~~ 507.2.5.1 (Supp) Fire resistance rated separation. Where Table 508.2.5 specifies a fire-resistance rated separation, the incidental accessory occupancies shall be separated from the remainder of the building by a fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.

~~508.2.5.2~~ 507.2.5.2 (Supp) Nonfire-resistance rated separation and protection. Where Table 508.2.5 permits an automatic fire extinguishing system without a fire barrier, the incidental accessory occupancies shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the fire-resistance-rated floor/ceiling assembly above or fire-resistance-rated roof/ceiling assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic closing upon detection of smoke in accordance with Section 715.4.7.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80.

~~508.2.5.3~~ 507.2.5.3 (Supp) Protection. Where an automatic fire-extinguishing system or an automatic sprinkler system is provided in accordance with Table 508.2.5, only the space occupied by the incidental accessory occupancy need be equipped with such a system.

~~508.3~~ 507.3 (Supp) Nonseparated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

~~508.3.1~~ **507.3.1 (Supp) Occupancy classification.** Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space except that the most restrictive applicable provisions of Section 403 and Chapter 9 shall apply to the building or portion thereof in which the nonseparated occupancies are located.

~~508.3.2~~ **507.3.2 (Supp) Allowable fire compartment area and height.** The allowable fire compartment area and height of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1.

~~508.3.3~~ **507.3.3 (Supp) Separation.** No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.3.3.
2. All Group R occupancies shall be separated from other occupancies in accordance with Section 508.4.4.

~~508.4~~ **507.4 (Supp) Separated occupancies.** Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

TABLE ~~508.4~~ 507.4 (Supp)
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

OCCUPANCY	A[d], E		I		R[c]		F-2, S-2[b,c], U[c]		B, F-1, M, S-1		H-1		H-2		H-3, H-4, H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A[d], E[d]	N	N	1	2	1	2	N	1	1	2	NP	NP	3	4	2	3[a]
I	--	--	N	N	1	NP	1	2	1	2	NP	NP	3	NP	2	NP
R[c]	--	--	--	--	N	N	1	2	1	2	NP	NP	3	NP	2	NP
F-2, S-2[b,c], U[d]	--	--	--	--	--	--	N	N	1	2	NP	NP	3	4	2	3[a]
B, F-1, M, S-1	--	--	--	--	--	--	--	--	N	N	NP	NP	2	3	1	2[a]
H-1	--	--	--	--	--	--	--	--	--	--	N	NP	NP	NP	NP	NP
H-2	--	--	--	--	--	--	--	--	--	--	--	--	N	NP	1	NP
H-3, H-4, H-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	NP

For SI: 1 square foot = 0.0929 m^2.

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.4.2.
b. Areas used only for private or pleasure vehicles shall be allowed to reduce separation by 1 hour.
c. See Section 406.1.4.
d. Commercial kitchens need not be separated from the restaurant seating areas that they serve.

~~508.4.1~~ **507.4.1 (Supp) Occupancy classification.** Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building.

~~508.4.2~~ **507.4.2 (Supp) Allowable fire compartment area.** In each story, the ~~building~~ fire compartment area shall be such that the sum of the ratios of the actual building area of each separated occupancy divided by the allowable area of each separated occupancy fire compartment shall not exceed one.

~~508.4.3~~ **507.4.3 (Supp) Allowable height.** Each separated occupancy shall comply with the height limitations based on the type of construction of the building in accordance with Section 503.1.

Exception: Special provisions permitted by Section 509.

~~508.4.4~~ **507.4.4 (Supp) Separation.** Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4.

~~508.4.4.1~~ 507.4.4.1 **(Supp) Construction.** Required separations shall be fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies.

SECTION ~~509~~ 508
SPECIAL PROVISIONS

~~509.1~~ 508.1 **(Supp) General.** The provisions in this section shall permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable heights and areas of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in this section for such condition and other applicable requirements of this code. The provisions of Sections 509.2 through 509.8 are to be considered independent and separate from each other.

~~509.2~~ 508.2 **(Supp) Horizontal building separation allowance**. A building shall be considered as separate and distinct buildings for the purpose of determining fire compartment area limitations, continuity of fire walls, limitation of number of stories and type of construction where all of the following conditions are met:

1. The buildings are separated with a horizontal assembly having a minimum 3-hour fire-resistance rating.
2. The building below the horizontal assembly is no more than one story above grade plane
3. The building below the horizontal assembly is of Type IA construction.
4. Shaft, stairway, ramp and escalator enclosures through the horizontal assembly shall have not less than a 2-hour fire-resistance rating with opening protectives in accordance with Table 715.4.

   Exception: Where the enclosure walls below the horizontal assembly have not less than a 3-hour fire resistance rating with opening protectives in accordance with Table 715.4, the enclosure walls extending above the horizontal assembly shall be permitted to have a 1-hour fire-resistance rating, provided:

   1. The building above the horizontal assembly is not required to be of Type I construction;
   2. The enclosure connects less than four stories; and
   3. The enclosure opening protectives above the horizontal assembly have a minimum 1-hour fire protection rating.

5. The building or buildings above the horizontal assembly shall be permitted to have multiple Group A uses, each with an occupant load of less than 300, or Group B, M, R or S uses.
6. The building below the horizontal assembly shall be protected throughout by an approved automatic sprinkler system in accordance with Section 903.3.1.1, and shall be permitted to be any of the following occupancies:

   1. Group S-2 parking garage used for the parking and storage of private motor vehicles;
   2. Multiple Group A, each with an occupant load of less than 300;
   3. Group B;
   4. Group M;
   5. Group R; and
   6. Uses incidental to the operation of the building (including entry lobbies, mechanical rooms, storage areas and similar uses).

7. The maximum building height in feet shall not exceed the limits set forth in Section 503 for the building having the smaller allowable height as measured from the grade plane.

~~509.3~~ 508.3 **(Supp) Group S-2 enclosed parking garage with Group S-2 open parking garage above.** A Group S-2 enclosed parking garage with no more than one story above grade plane and located below a Group S-2 open parking garage shall be classified as a separate and distinct building for the purpose of determining the type of construction where the following conditions are met:

1. The allowable area of the building shall be such that the sum of the ratios of the actual area divided by the allowable area for each separate occupancy shall not exceed 1.0.
2. The Group S-2 enclosed parking garage is of Type I or II construction and is at least equal to the fire resistance requirements of the Group S-2 open parking garage.
3. The height and the number of tiers of the Group S-2 open parking garage shall be limited as specified in Table 406.3.5.
4. The floor assembly separating the Group S-2 enclosed parking garage and Group S-2 open parking garage shall be protected as required for the floor assembly of the Group S-2 enclosed parking garage. Openings between the Group S-2 enclosed parking garage and Group S-2 open parking garage, except exit openings, shall not be required to be protected.

5. The Group S-2 enclosed parking garage is used exclusively for the parking or storage of private motor vehicles, but shall be permitted to contain an office, waiting room and toilet room having a total area of not more than 1,000 square feet (93 m_2), and mechanical equipment rooms incidental to the operation of the building.

~~509.4~~ 508.4 **Parking beneath Group R.** Where a maximum one-story above grade plane Group S-2 parking garage, enclosed or open, or combination thereof, of Type I construction or open of Type IV construction, with grade entrance, is provided under a building of Group R, the number of stories to be used in determining the minimum type of construction shall be measured from the floor above such a parking area. The floor assembly between the parking garage and the Group R above shall comply with the type of construction required for the parking garage and shall also provide a fire-resistance rating not less than the mixed occupancy separation required in Section 508.3.3.

~~509.5~~ 508.5 **(Supp) Group R-1 and R-2 buildings of Type IIIA construction.** The height limitation for buildings of Type IIIA construction in Groups R-1 and R-2 shall be increased to six stories and 75 feet (22 860 mm) where the first-floor construction above the basement has a fire-resistance rating of not less than 3 hours and the floor area is subdivided by 2-hour fire-resistance-rated fire walls into areas of not more than 3,000 square feet (279 m^2).

~~509.6~~ 508.6 **(Supp) Group R-1 and R-2 buildings of Type IIA construction.** The height limitation for buildings of Type IIA construction in Groups R-1 and R-2 shall be increased to nine stories and 100 feet (30 480 mm) where the building is separated by not less than 50 feet (15 240 mm) from any other building on the lot and from lot lines, the exits are segregated in an area enclosed by a 2-hour fire-resistance-rated fire wall and the first-floor construction has a fire-resistance rating of not less than $1^1/_2$ hours.

~~509.7~~ 508.7 **Open parking garage beneath Groups A, I, B, M and R.** Open parking garages constructed under Groups A, I, B, M and R shall not exceed the height and area limitations permitted under Section 406.3. The height and fire compartment area of the portion of the building above the open parking garage shall not exceed the limitations in Section 503 for the upper occupancy. The height, in both feet and stories, of the portion of the building above the open parking garage shall be measured from grade plane and shall include both the open parking garage and the portion of the building above the parking garage.

~~509.7.1~~ 508.7.1 **Fire separation.** Fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711 between the parking occupancy and the upper occupancy shall correspond to the required fire-resistance rating prescribed in Table 508.3.3 for the uses involved. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking structure, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. Means of egress for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by fire barriers having at least a 2-hour fire-resistance rating as required by Section 706 with self-closing doors complying with Section 715 or horizontal assemblies having at least a 2-hour fire-resistance rating as required by Section 711, with self-closing doors complying with Section 715. Means of egress from the open parking garage shall comply with Section 406.3.

~~509.8~~ 508.8 **(Supp) Group B or M with Group S-2 open parking garage below**. Group B or M occupancies located no higher than the first story above grade plane shall be considered as a separate and distinct building for the purpose of determining the type of construction where all of the following conditions are met:

1. The buildings are separated with a horizontal assembly having a minimum 2-hour fire-resistance rating.
2. The occupancies in the building below the horizontal assembly are limited to Groups B and M.
3. The occupancy above the horizontal assembly is limited to a Group S-2 open parking garage.
4. The building below the horizontal assembly is of Type I or II construction but not less than the type of construction required for the Group S-2 open parking garage above.
5. The height and area of the building below the horizontal assembly does not exceed the limits set forth in Section 503.
6. The height and area of the Group S-2 open parking garage does not exceed the limits set forth in Section 406.3. The height, in both feet and stories, of the Group S-2 open parking garage shall be measured from grade plane and shall include the building below the horizontal assembly.
7. Exits serving the Group S-2 open parking garage discharge directly to a street or public way and are separated from the building below the horizontal assembly by 2-hour fire barriers constructed in accordance with Section 706 or 2-hour horizontal assemblies constructed in accordance with Section 711, or both.

~~509.9~~ 508.9 (Supp) Multiple buildings above an enclosed or open Group S-2 parking garage. Where two or more buildings are provided above the horizontal assembly separating a Group S-2 open or closed parking garage from the buildings above in accordance with the special provisions in Sections 509.2 and 509.3, the buildings above the horizontal assembly shall be regarded as separate and distinct buildings and shall comply with all other provisions of this code as applicable to each separate and distinct building.

Reason: At the Orlando 2006 Code Development Hearing, the Height and Area Study Group (now renamed the CTC Balanced Fire Protection Features Study Group) was formed for the purpose of examining the contentious Height and Area code proposals in a more comprehensive way than the code hearing itself could provide.

We started with a review of the legacy code consolidation and IBC development. The foundation of that process was the concept that as the IBC began to be adopted across the previous regional boundaries the new code would not generally create non-conforming buildings in entire legacy code regions. The starting point was that for each occupancy and construction type, the largest maximum allowable area in any one of the codes should be the prevailing value. Once that area was determined, then the Table 503 tabular values could be reverse-calculated to meet the non-conforming objective.

The Study Group debated this approach and reconstructed Table 503 independently. At the conclusion of that effort, we discovered that 48 of the 225 cells in Table 503 did not meet the "largest maximum area" statement in that the building areas were larger than any legacy code, while 10 cells were smaller than any of the legacy codes.

We then asked ourselves: "Is the best way to address this issue and the others on our list to work at revising the table and modifiers, or to look at the bigger question of building safety in a more comprehensive way?"

We concluded that the better approach for us to develop and present to the membership was the latter, and we changed gears from a historically-focused approach focused strictly on height and area to a forward-looking one that asked "What can we do to improve building safety using the concepts of balanced fire protection?"

To address building safety holistically and to efficiently incorporate changing technology, we are better served to make a significant shift in Chapter 5 (Height and Area) and incorporate a conceptual approach that meets the following goals:

- Create buildings that meet an acceptable level of safety for communities, occupants and emergency responders.
- Describe methods, materials, and systems that are flexible enough to adapt to a differing community conditions, changing materials and methodologies, and individual building needs.
- Design a building code that is simple, straightforward, and understandable.

Supporting Concepts

"Building Safety" is defined as the aggregate features in a building that are provided to protect structures, occupants and emergency responders, and property from losses associated with anticipated hazards, primarily from fire and collapse.

The goal of building safety is best achieved through the interaction of all the hazard mitigation processes (Active and Passive and Emergency Response) to produce an/the acceptable level of risk (level of safety). Building safety success can be defined as meeting the goals of life and property loss that are acceptable and economically supportable. This is the core concept of acceptable risk.

Acceptable building safety risk is that level of loss that each entity impacted can accept if a hazardous event occurs. It is created by aggregating the hazards and adjusting mitigations to create the agreed upon risk level. It can be measured as a quantitative value, qualitative value, or both. On a national scale and state scale, this loss is currently represented by national death and property loss figures. On a community scale, this is usually represented by the community loss goals and economic "scale" measured against the cost of providing an emergency prevention and response system. On an individual level, acceptable risk is a often a contractual condition between a building owner/occupant and an insurance provider.

Compartmentation Approach

The ICC CTC BFP Study Group debated the origins and basis of the height and area tables in the legacy codes, as well as the current IBC, attempting to identify some rational basis and evolution related to the stated goals of the codes. The lengthy exercise proved informative yet futile in meeting this objective, although the disparity in positions related to the current table's interpretation and application became more obvious and focused. This also resulted in some short term fixes being proposed to address concerns expressed about the table and identified the need to develop a long term resolution of the issue.

As a result, the Study Group looked for an alternate approach that is both rational and can stand the test of time in terms of flexibility to accommodate the code development process, as well as meet defined goals of life safety, firefighter safety, property protection, and social and environmental demands (community disruption, loss of jobs, homelessness, tax base erosion, business interruption, environmental needs, etc.).

The discussion shifted from overall building size to what is necessary to meet the above goals and specific building elements/systems having a significant impact on the stated goals were identified and agreed upon:

- compartmentation
- exiting
- smoke management
- automatic sprinklers
- fire-resistive construction
- structural integrity
- improved inspection and maintenance programs

Compartmentation became the basis of this effort with the other elements/ systems influencing the compartment's characteristics. This approach was chosen as it is based on a rational analysis of fire containment which takes into consideration the ability of the responding fire department to control and extinguish a fire within the compartment while performing search and rescue and evacuation assistance operations. We believe it is supportable when considered from a rational assessment perspective that includes such factors as technical soundness, appropriate and valid fire data, scientific basis, field experience, cost effectiveness, and the needs of stakeholders. Specifically, the compartment is intended to keep a fire to a manageable size for the responding fire department, with or without fire sprinkler protection, limit the spread of smoke, and provide a level of redundancy to help limit loss potential.

FIRE FLOW

The CTC Features Study Group developed the shortened table of allowable compartment areas based on assumptions about available fire flow, fire ignition and development hazards of specific occupancies, and the allowable range of area increases for fire sprinkler protection area related to the impact of reductions in required fire flow.

The base table values for occupancy compartment size without fire sprinkler protection are based on the minimum fire flow for total building area tabulated in Appendix B of the International Fire Code for commercial structures (1,500 gpm). It should also be noted that 1,500 gpm is the basic fire flow used in the Insurance Services Office (ISO) rating system. The use of 1,500 is predicated on an assumption that a first alarm complement of fire apparatus and firefighters from most mid-size and larger cities and towns are capable of deploying this flow via a combination of hand-lines and master streams (ground monitors or aerial streams). The fire flow table is independent of occupancy. Therefore the base areas from Table B105.1 were then adjusted up or down based on the occupancy hazard factors from the ISO process.

For the areas of compartments within buildings protected by fire sprinklers, the Study Group believed it prudent to encourage sprinkler protection by starting with a base area allowed for a larger fire flow. Sprinkler protection should allow for the extended time necessary to assemble the resources to develop a larger fire flow. As with buildings without sprinkler protection, the base area was adjusted using the occupancy hazard factors from the ISO process. The last adjustment for the proposed table was for sprinkler protection. The IFC allows the required fire flow to be reduced by up to 75%. An evaluation of Table B105.1 values will demonstrate that a 50% reduction in required fire flow will permit a ~3.7 times area increase. A 60% reduction in required fire flow would result in a ~5 times area increase. A 70% decrease in required fire flow would result in a ~10 times area increase. Finally a 75% reduction in required fire flow would result in a ~14 times area increase. The entire range of increases was used based on construction type (contribution to fuel load) and occupancy hazard. No sprinkler related increases were proposed for H1, H2, and H3 occupancies.

SMOKE COMPARTMENTATION

An important component of providing safety for occupants in a building is to limit the spread of smoke from a fire to other portions of the building. While the BFP Features Study Group felt fire barrier construction would be sufficient to limit the spread of smoke in most cases, we recognized there are some cases where the occupants are more vulnerable and need extra protection, either because they are expected to be defended in place, or because more time is needed to evacuate.

Addressing the specific provisions:

1. These requirements only apply where fire compartments abut each other, not to walls or floors within the fire compartment. (See charging paragraph in Section 503.3.) Smoke migration within the compartment is addressed by other current code requirements.
2. Buildings with non-sprinklered two-story compartments will require smoke management, since there is nothing to slow the fire from producing more smoke. However, single story compartments that are located at the first story are exempt, since the occupants are able to readily escape. (See Section 503.3, Item 1 and Item 2.)
3. Where a Group A occupancy with 300 or more occupants, a Group I-1, or a Group I-2 occupancy is located on the 3rd story above grade plane or higher, smoke management will be required. This recognizes that occupancies with more vulnerable populations should be better protected from smoke and the increased risk of being above grade. Three stories was chosen as the threshold in recognition that the code generally allows two stories to be open to each other, allowing smoke migration between the stories. (See Section 503.3, Item 2)
4. Section 503.4.1 lays out what constitutes “smoke management.” It is recognized that rated floor and wall construction generally provides adequate protection for the passage of smoke. The goal of this proposal is to limit smoke migration through openings in the fire-resistance rated assemblies that define the fire compartment. However, the section allows several essentially equivalent methods to accomplish the goal.
5. Section 503.4, Item 1 requires door openings, penetrations, joints, and duct and air transfer openings to be protected as for smoke barriers. Doors will be required to be smoke- and draft-control assemblies. Penetration and joint systems will need to carry a leakage rating (with an “L” label). Smoke dampers will be required for duct and air transfer openings.
6. Section 503.4, Item 2 requires shaft construction for openings in floors between compartments (for openings other than for exit stair enclosures). In this case, because an unprotected opening would allow smoke migration between compartments, none of the exceptions to shaft construction in Section 707.2 are allowed to be used.
7. Section 503.4, Item 3 allows a smokeproof enclosure to serve as one of the options to limit smoke migration through exit stairs that connect adjacent fire compartments. This could be used in lieu of providing the smoke gaskets for the doors as referred to in Section 503.4, Item 1.1. A smokeproof stair not only prevents smoke from migrating between the compartments, but also provides added protection for occupants who may be using the stairs to evacuate.
8. 1.Section 503.4, Item 4 specifies the mechanical methods that are allowed to be used as an alternative to providing the physical barriers in Items 1 and 2. A system that utilizes pressure differentials between the compartment where the fire is burning and adjacent compartments could be designed to adequately limit smoke migration. While the air flow or exhaust methods could also be designed to limit smoke migration, they are predicated on removing smoke being produced by a sprinklered fire, and are not adequate to deal with smoke migration from a non-sprinklered fire. That being the case, they are limited in this proposal to those buildings that are sprinklered.

The Features Study Group will continue work on this subject and many of the other elements of the I-Codes that affect the height and area of buildings. Further study is planned on the thresholds for fire suppression as currently determined in Chapter 9, the integration of the compartment approach to the provisions for high rise buildings will be further investigated along with other specific subjects not yet identified.

It is often difficult to isolate a groups thought on a single approach to a subject. Compartmentation as a solution has been the focus for a significant change to this subject by this group. Much of the basis for what is shown in this code change is attributable to the appendix of the IFC and the ISO fire flow calculation method. Integrating those approaches with the occupancy base in the IBC a system for determining the maximum area of a building was derived.

Cost Impact: This new approach to regulation of building height and area will not increase the cost of overall construction.

Committee Action: Disapproved

Committee Reason: The proposal introduced a new concept for heights and areas based upon ISO fire flow requirements. The proposal was developed through the Balanced Fire Protection Features Study Group of the Code Technology Committee of ICC. The proponents asked for specific feedback from the committee. A variety of reasons for disapproval were provided by the committee. More specifically there was some concern with large size of the sprinklered fire compartments and the need to reduce the number of significant figures in the table. Additionally, more technical and scientific justification was requested as well as a definition for “fire compartment area.” Finally, the concept of frontage should be addressed as the code has always given credit for such open areas.

Assembly Action: None

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group, requests Approval as Modified by this public comment.

Modify proposal as follows:

CHAPTER 5
GENERAL BUILDING COMPARTMENTATION AND HEIGHT

SECTION 501
GENERAL

501.1 Scope. The provisions of this chapter control the height and the type and number of fire compartments within all structures hereafter erected and additions to existing structures.

[F] 501.2 (Supp) Address identification. New and existing buildings shall be provided with approved address numbers or letters. Each character shall be a minimum 4 inches (102 mm) high and a minimum of 0.5 inch (12.7 mm) wide. They shall be installed on a contrasting background and be plainly visible from the street or road fronting the property. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other approved sign or means shall be used to identify the structure.

SECTION 502
DEFINITIONS

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

AREA, FIRE COMPARTMENT. The area included within surrounding exterior walls~~,~~ or vertical fire compartment barriers ~~walls (or exterior walls and fire walls)~~ exclusive of vent shafts and courts. Areas of ~~the building~~ fire compartments not provided with surrounding walls shall be included in the fire compartment area if such areas are included within the horizontal projection of the roof or floor above.

(Supp) BASEMENT. A story that is not a story above grade plane (See "Story above grade plane" in Section 202).

EQUIPMENT PLATFORM. An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, stairs and ladders necessary to access the platform (see Section 505.5).

FIRE COMPARTMENT. An area enclosed and bounded by fire walls, vertical or horizontal fire barriers ~~walls~~, or exterior walls~~, or fire-resistance-rated horizontal assemblies of a building~~.

FIRE COMPARTMENT BARRIER. A horizontal or vertical fire-resistance rated assembly of materials designed to restrict the spread of fire and smoke from one fire compartment to another.

GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

HEIGHT, BUILDING. The vertical distance from grade plane to the average height of the highest roof surface.

MEZZANINE. An intermediate level or levels between the floor and ceiling of any story and in accordance with Section 505.

SECTION 503
GENERAL HEIGHT AND FIRE COMPARTMENT AREA LIMITATIONS

503.1 (Supp) General. The height and maximum area of any fire compartment and the number of fire compartments in a building shall not exceed the limits specified in Tables 503.1(1), 503.1(2), 503.1(3) and 503.1(4) based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. Each portion of a building separated by one or more fire walls complying with Section 705 shall be considered to be a separate building.

(Delete existing Table 503 in its entirety and replace with Tables 503.1(1) through 503.1(4))

Table 503.1(1)
MAXIMUM BUILDING HEIGHT (Feet and Stories)

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE VA	TYPE IV	TYPE IIIB	TYPE VB
Feet	UL	160	65	55	65	50	65	55	40
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL
S-2	UL	11	5	4	4	5	5	4	2
F-2	UL	11	5	3	4	3	5	3	2
B	UL	11	5	4	5	3	5	4	2
R-1, R-2, R-4	UL	11	4	4	4	3	4	4	2
R-3	UL	11	4	4	4	3	4	4	3
M	UL	11	4	4	4	3	4	4	1
F-1	UL	11	4	2	3	2	4	2	1
S-1	UL	11	4	3	3	3	4	3	1
A-3, A-4	UL	11	3	2	3	2	3	2	1
M	UL	11	4	4	4	2	4	4	1
A-2	UL	11	3	2	3	2	3	2	1
I-1	UL	9	4	3	4	3	4	3	2
H-4	UL	7	5	3	5	3	5	3	2
H-3	UL	6	4	2	4	2	4	2	1
U	UL	5	4	2	3	2	4	2	1
A-1	UL	5	3	2	3	2	3	2	1
I-4	UL	5	3	2	3	1	2	3	1
E	UL	5	3	2	3	1	3	2	1
H-5	4	4	3	3	3	3	3	3	2
I-2	UL	4	2	1	1	1	1	NP	NP
I-3	UL	4	2	1	2	2	2	1	1
H-2	UL	3	2	1	2	1	2	1	1
H-1	1	1	1	1	1	1	1	1	NP

UL = unlimited in height
NP = not permitted

Staff Note: *Because proposed Table 503.1(1) was significantly re-formatted, it is shown as a complete replacement of the table, however, only the cell which is shaded contains a substantive change from the table in the original proposal.*

TABLE 503.1(1)
MAXIMUM BUILDING HEIGHT (Feet and Stories)

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE IIIB	TYPE IV	TYPE VA	TYPE VB
Feet	UL	160	65	55	65	55	65	50	40
A-1	UL	5	3	2	3	2	3	2	1
A-2, A-3, A-4	UL	11	3	2	3	2	3	2	1
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	UL	11	5	4	5	4	5	3	2
E	UL	5	3	2	3	2	3	1	1
F-1	UL	11	4	2	3	2	4	2	1
F-2	UL	11	5	3	4	3	5	3	2
H–1	1	1	1	1	1	1	1	1	NP
H-2	UL	3	2	1	2	1	2	1	1
H-3	UL	6	4	2	4	2	4	2	1
H-4	UL	7	5	3	5	3	5	3	2
H-5	4	4	3	3	3	3	3	3	2
I-1	UL	9	4	3	4	3	4	3	2
I-2	UL	4	2	1	1	NP	1	1	NP
I-3	UL	4	2	1	2	1	2	2	1
I-4	UL	5	3	2	3	3	2	1	1
M	UL	11	4	4	4	4	4	2	1
R-1, R-2, R-4	UL	11	4	4	4	4	4	3	2
R-3	UL	11	4	4	4	4	4	3	3
S-1	UL	11	4	3	3	3	4	3	1
S-2	UL	11	5	4	4	4	5	5	2
U	UL	5	4	2	3	2	4	2	1

UL = unlimited in height
NP = not permitted

~~**TABLE 503.1(2)**~~

~~**MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITHOUT SPRINKLERS [a, b]**~~

~~OCCUPANCY~~	~~TYPE IA/IB~~	~~TYPE IIA~~	~~TYPE IIIA~~	~~TYPE IV AND VA~~	~~TYPE IIB AND IIIB~~	~~TYPE VB~~
~~S-2, F-2~~	~~30,267~~	~~16,933~~	~~16,933~~	~~10,933~~	~~7,867~~	~~4,800~~
~~A-3, A-4, B, H-4, I, R, E~~	~~26,706~~	~~14,941~~	~~14,941~~	~~9,647~~	~~6,941~~	~~4,235~~
~~A-1, A-2, M~~	~~22,700~~	~~12,700~~	~~12,700~~	~~8,200~~	~~5,900~~	~~3,600~~
~~F-1, S-1, H-5~~	~~19,739~~	~~11,043~~	~~11,043~~	~~7,130~~	~~5,130~~	~~3,130~~
~~H-1, H-2, H-3~~	~~NP~~	~~NP~~	~~NP~~	~~NP~~	~~NP~~	~~NP~~

~~a. One or more fire compartment in the building does not have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~
~~b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.~~

~~NP = Not Permitted~~

Staff Note: *Because proposed Table 503.1(2) was significantly re-formatted, it is shown as a complete replacement of the table, however, only the cell which is shaded contains a substantive change from the table in the original proposal. Also note that most of the numbers for limiting the area of a fire compartment have been rounded to the nearest thousand. Finally the line for Group A-5 is simply replacing information previously contained in a footnote.*

TABLE 503.1(2)
MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITHOUT SPRINKLERS[a]

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE IIIB	TYPE IV	TYPE VA	TYPE VB
A-1, A-2, M	23,000	23,000	13,000	6,000	13,000	6,000	8,000	8,000	4,000
A-3, A-4, B, E, H-4, I, R	27,000	27,000	15,000	7,000	15,000	7,000	10,000	10,000	4,000
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL
F-1, H-5, S-1	20,000	20,000	11,000	5,000	11,000	5,000	7,000	7,000	3,000
F-2, S-2	30,000	30,000	17,000	8,000	17,000	8,000	11,000	11,000	5,000
H–1, H-2, H-3	NP	NP	NP	NP	NP	NP	NP	NP	NP

a. One or more fire compartment in the building does not have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
NP = not permitted
UL = unlimited

~~**TABLE 503.1(3)**~~
~~**MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITH SPRINKLERS[a, b]**~~

~~OCCUPANCY~~	~~TYPE IA/IB~~	~~TYPE IIA~~	~~TYPE IIIA~~	~~TYPE IV AND VA~~	~~TYPE IIB AND IIIB~~	~~TYPE VB~~
~~S-2, F-2~~	~~722,400~~	~~290,667~~	~~290,667~~	~~172,000~~	~~130,667~~	~~82,667~~
~~A-3, A-4, B, H-4, I, R, E~~	~~637,412~~	~~256,471~~	~~256,471~~	~~151,765~~	~~115,294~~	~~72,941~~
~~A-1, A-2, M~~	~~387,000~~	~~109,000~~	~~109,000~~	~~64,500~~	~~49,000~~	~~31,000~~
~~F-1, S-1, H-5~~	~~168,261~~	~~70,139~~	~~70,139~~	~~41,504~~	~~31,530~~	~~19,948~~
~~H-1, H-2, H-3~~	~~30,960~~	~~17,440~~	~~17,440~~	~~10,320~~	~~7,840~~	~~4,960~~

~~a. All fire compartments in the building have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~
~~b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.~~

Staff Note: *Because proposed Table 503.1(3) was significantly re-formatted, it is shown as a complete replacement of the table, however, only the cell which is shaded contains a substantive change from the table in the original proposal. Also note that most of the numbers for limiting the area of a fire compartment have been rounded to the nearest thousand. Finally the line for Group A-5 is simply replacing information previously contained in a footnote.*

TABLE 503.1(3)
MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITH SPRINKLERS[a]

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE IIIB	TYPE IV	TYPE VA	TYPE VB
A-1, A-2, M	UL	UL	109,000	49,000	109,000	49,000	65,000	65,000	31,000
A-3, A-4, B, E, H-4, I, R	UL	UL	UL	115,000	UL	115,000	152,000	152,000	73,000
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL
F-1, H-5, S-1	168,000	168,000	70,000	32,000	70,000	32,000	42,000	42,000	20,000
F-2, S-2	UL	UL	UL	131,000	UL	131,000	172,000	172,000	83,000
H–1, H-2, H-3	31,000	31,000	17,000	8,000	17,000	8,000	10,000	10,000	5,000

a. All fire compartments in the building have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
UL = Unlimited

TABLE 503.1(4)
GROSS AREA FACTOR

ACTUAL BUILDING HEIGHT, STORIES	NUMBER OF STORIES PERMITTED								
	1	2	3	4	5	6	7	8	9 or more
1	4	8	12	16	20	24	28	32	36
2	-	6	9	12	15	18	21	24	27
3 or more	-	-	6	8	10	12	14	16	18

503.2 Building area. The maximum allowable building area shall not exceed the maximum area of fire compartments in accordance with Tables 503.1(2) or 503.1(3) multiplied by the ~~number~~ gross area factor in Table 503.1(4). A building shall be considered one fire compartment except where subdivided by fire compartment ~~fire~~ barriers conforming with ~~this section~~ Sections 503.2 through 503.4.

503.2.1 Enclosure. Each fire compartment shall be enclosed by exterior walls, roof, fire resistance rated horizontal assemblies, or fire compartment barrier walls. If a building has more than one fire compartment, each fire compartment shall be separated by horizontal or vertical fire compartment barriers having a fire resistance rating determined by Table 503.2.2.

503.2.2 Fire compartment barriers. Fire compartment barriers separating a building into fire compartments shall comply with Sections 503.2.2.1 and 503.2.2.2 and Table 503.2.2.

TABLE 503.2.2
FIRE RESISTANCE RATINGS OF FIRE COMPARTMENT BARRIERS (hours)

OCCUPANCY	SPRINKLERED	NON-SPRINKLERED
H-1, H-2	3	4
F-1, H-3, S-1	2	3
A-1, A-2, A-3, A-4, B, E, F-2, H-4, H-5, I, M, R, S-2	1	2
U	½	1
A-5	NA	NA

NA = Not Applicable

~~**TABLE 503.2.2**~~
~~**FIRE COMPARTMENT FIRE RESISTANCE (hrs)**~~

	~~SPRINKLERED~~	~~NON-SPRINKLERED~~
~~Assembly~~		
~~A-1~~	~~1~~	~~2~~
~~A-2~~	~~1~~	~~2~~
~~A-3~~	~~1~~	~~2~~
~~A-4~~	~~1~~	~~2~~
~~A-5~~	~~NA~~	~~NA~~
~~Business~~		
~~B~~	~~1~~	~~2~~
~~Educational~~		
~~E~~	~~1~~	~~2~~

Factory and Industry		
F-1	2	3
F-2	1	2
Hazardous		
H-1	3	4
H-2	3	4
H-3	2	3
H-4	1	2
H-5	1	2
Institutional		
I-1	1	2
I-2	1	2
I-3	1	2
I-4	1	2
Mercantile		
M	1	2
Residential		
R-1	1	2
R-2	1	2
R-3	1	2
R-4	1	2
Storage		
S-1	2	3
S-2	1	2
Utility		
U	½	1

NA = Not Applicable

503.2.2.1 Horizontal fire compartment barriers. Horizontal fire compartment barriers shall be constructed in accordance with Section 711.

Exception: The supporting construction for a 1-hour fire-resistance rated horizontal fire compartment barrier in buildings of Type IIB, IIIB and VB construction that are protected by sprinklers throughout in accordance with Section 903.3.1.1 shall not be required to be protected.

503.2.2.2 Vertical fire compartment barriers. Vertical fire compartment barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, including but not limited to spaces such as above a suspended ceiling.

503.2.2.2.1 Vertical continuity. Fire Vertical fire compartment barriers shall extend from the foundation to the underside of the roof deck.

Exceptions:

1. Two-hour fire-resistance-rated ~~walls~~ vertical fire compartment barriers shall be permitted to terminate at the underside of the roof sheathing, deck or slab provided:
   1.1. The lower roof assembly within 4 feet (1220 mm) of the ~~wall~~ fire compartment barriers has not less than a 1-hour fire-resistance rating and the entire length and span of supporting elements for the rated roof assembly has a fire-resistance rating of not less than 1 hour.
   1.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire ~~wall~~ compartment barrier.
   1.3. Each ~~building~~ fire compartment shall be provided with not less than a Class B roof covering.
2. ~~Walls~~ Vertical fire compartment barriers shall be permitted to terminate at the underside of noncombustible roof sheathing, deck, or slabs where both ~~buildings~~ fire compartments are provided with not less than a Class B roof covering. Openings in the roof shall not be located within 4 feet (1220 mm) of the vertical fire compartment barrier.
3. In buildings of Type III, IV and V construction, ~~walls~~ vertical fire compartment barriers shall be permitted to terminate at the underside of combustible roof sheathing or decks provided:
   3.1. There are no openings in the roof within 4 feet (1220 mm) of the ~~fire wall~~ vertical fire compartment barrier,
   3.2. The roof is covered with a minimum Class B roof covering, and
   3.3. The roof sheathing or deck is constructed of fire-retardant-treated wood for a distance of 4 feet (1220 mm) on both sides of the ~~wall~~ vertical fire compartment barrier or the roof is protected with 5/8 inch (15.9 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of 2-inch (51 mm) nominal ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm) on both sides of the ~~fire wall~~ vertical fire compartment barrier.
4. ~~Buildings~~ Fire compartments located above a parking garage designed in accordance with Section 509.2 shall be permitted to have the vertical fire compartment barriers for the buildings located above the parking garage extend from the horizontal separation between the parking garage and the ~~buildings~~ fire compartments.

503.2.2.2.2 Supporting construction. The supporting construction for vertical fire compartment barriers ~~walls~~ shall be protected to afford the required fire-resistance rating of the fire compartment barrier supported.

Exceptions:

~~1. The supporting construction for a 1 hr. 1-hour fire-resistance rated vertical fire compartment barrier wall in buildings of Type IIB, IIIB and VB construction, not protected throughout by sprinklers in accordance with Section 903.3.1.1 or 903.3.1.2, shall be supported by a structure having a layer of 20 minute fire-resistance rated finish protection.~~

~~2.~~ The supporting construction for ~~a 1 hr.~~ 1-hour fire-resistance rated vertical fire compartment barriers in buildings of Type IIB, IIIB and VB construction that are protected by sprinklers throughout in accordance with Section 903.3.1.1 ~~or 903.3.1.2~~ shall not be required to be protected.

503.2.2.3 Glazed openings. Glazed openings in fire compartment barriers shall be limited to those in fire doors complying with Section 715.4.

503.2.2.4 Fire compartment barrier doors. Doors in fire compartment barriers shall have a fire protection rating of at least 1 hour in accordance with Table 503.2.2.4. Doors in fire compartment barriers shall limit temperature rise to 450°F (250°C) when tested in accordance with NFPA 252.

TABLE 503.2.2.4
FIRE PROTECTION RATINGS OF DOORS IN FIRE COMPARTMENT BARRIERS ~~(hrs)~~

REQUIRED FIRE RESISTANCE RATING OF FIRE COMPARTMENT BARRIER (hours)	~~DOOR IN FIRE COMPARTMENT BARRIER~~ MINIMUM FIRE PROTECTION RATING OF DOOR (hours)
1 ~~hr.~~	1 ~~hr.~~
2 ~~hr.~~	1½ ~~hr.~~
3 ~~hr.~~	2 ~~hr.~~

503.2.2.5 ~~Other~~ Duct and air transfer openings in fire compartment barriers. Openings for duct and air transfer openings in ~~1 hour~~ fire compartment barriers ~~air handling~~ shall be protected in accordance with Sections 707 and 716 with fire dampers having a minimum fire protection rating of 1 hour.

503.2.2.6 Penetrations through fire compartment barriers. Penetrations through fire compartment barriers shall be protected in accordance with Section 712.

503.2.2.7 Joints in fire compartment barriers. Joints in fire compartment barriers shall be protected in accordance with Section 713.

503.3 Smoke management for adjacent fire compartments. Where adjacent fire compartments share a common vertical or horizontal fire compartment barrier ~~wall or horizontal assembly,~~ or both, ~~for the purpose of creating separate fire compartments, a~~ method of smoke management shall be provided in accordance with Section 503.3.1 for such fire compartments that meet any of the following conditions:

1. The fire compartment is not protected with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and contains one or more stories located more than one story above grade plane; or

2. The fire compartment contains one or more stories located more than two stories above grade plane having any of the following occupancies:
   2.1 A Group A occupancy with an occupant load of 300 or more ~~persons;~~
   2.2 A Group I-1 occupancy; or
   2.3 A Group I-2 occupancy.

503.4 Smoke Management Methods. Smoke management as required by Section 503.3 shall comply with any one or a combination of any of the following methods ~~as applicable:~~

1. Door openings, joints and penetrations in vertical and horizontal fire compartment barriers ~~separation walls and horizontal assemblies~~ shall be protected as required for smoke barriers in accordance with the following:
   1.1 Door openings shall comply with Section 715.4.3.1.
   1.2 Penetrations shall comply with Section 712.5.
   1.3 Joints shall comply with Section 713.6.
   1.4 Ducts and air transfer openings shall comply with Section 716.5.5.

2. Openings in horizontal fire compartment barriers ~~separation horizontal assemblies~~ shall be protected by shaft enclosures in accordance with Section 707. For the purpose of smoke management at fire compartment barriers ~~separations~~, Section 707.2 shall not apply.
3. Exit stair enclosures penetrating a horizontal fire compartment barrier ~~separation horizontal assembly~~ shall be protected as for smokeproof enclosures in accordance with Section 909.20.
4. One or more of the following mechanical methods shall be permitted to be used for smoke management in lieu of Items 1 and 2 above:
   4.1 The pressurization method in accordance with Section 909.6
   4.2 The air flow design method in accordance with Section 909.7 for buildings protected by an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   4.3 The exhaust method in accordance with Section 909.8 for buildings protected by an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2

503.5 Special industrial occupancies. Buildings and structures designed to house special industrial processes that require large areas and unusual heights to accommodate craneways or special machinery and equipment, including, among others, rolling mills; structural metal fabrication shops and foundries; or the production and distribution of electric, gas or steam power, shall be exempt from the height and area limitations of Tables 503.1(1) through 503.1(3).

503.6 Buildings on same lot. Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the height of each building and the aggregate ~~maximum~~ area of fire compartments in buildings are within the limitations of Tables 503.1(1) through 503.1(3) as modified by Sections 503.2 and 504. The provisions of this code applicable to the aggregate building shall be applicable to each building.

503.7 Type I construction. Buildings of Type I construction permitted to be of unlimited tabular heights or number of fire compartments are not subject to the special requirements that allow unlimited fire compartments in Section 507 or unlimited height in Sections 503.5 and 504.3 or increased height and areas for other types of construction.

SECTION 504
HEIGHT

504.1 General. The height permitted by Table 503.1(1) shall be increased in accordance with this section.

Exception: The height of one-story aircraft hangars, aircraft paint hangars and buildings used for the manufacturing of aircraft shall not be limited if the building is provided with an automatic fire-extinguishing system in accordance with Chapter 9 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

504.2 (Supp) Automatic sprinkler system increase. Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the value specified in Table 503.1(1) for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2, the value specified in Table 503.1(1) for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.

Exceptions:

1. Buildings, or portions of buildings, classified as a Group I-2 occupancy of Type IIB, III, IV or V construction.
2. Buildings, or portions of buildings, classified as a Group H-1, H-2, H-3 or H-5 occupancy.
3. Fire-resistance rating substitution in accordance with Table 601, Note e.

504.3 Roof structures. Towers, spires, steeples and other roof structures shall be constructed of materials consistent with the required type of construction of the building except where other construction is permitted by Section 1509.2.1. Such structures shall not be used for habitation or storage. The structures shall be unlimited in height if of noncombustible materials and shall not extend more than 20 feet (6096 mm) above the allowable height if of combustible materials (see Chapter 15 for additional requirements).

SECTION 505
MEZZANINES

505.1 General. A mezzanine or mezzanines in compliance with Section 505 shall be considered a portion of the story below. Such mezzanines shall not contribute to either the fire compartment area or number of stories as regulated by Section 503.1. The area of the mezzanine shall be included in determining the fire area defined in Section 702. The clear height above and below the mezzanine floor construction shall not be less than 7 feet (2134 mm).

505.2 Area limitation. The aggregate area of a mezzanine or mezzanines within a room shall not exceed one-third of the floor area of that room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the mezzanine is located. In determining the allowable mezzanine area, the area of the mezzanine shall not be included in the floor area of the room.

Exceptions:

1. The aggregate area of mezzanines in buildings and structures of Type I or II construction for special industrial occupancies in accordance with Section 503.5 shall not exceed two-thirds of the area of the room.
2. The aggregate area of mezzanines in buildings and structures of Type I or II construction shall not exceed one-half of the area of the room in buildings and structures equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 and an approved emergency voice/alarm communication system in accordance with Section 907.2.12.2.

505.3 Egress. Each occupant of a mezzanine shall have access to at least two independent means of egress where the common path of egress travel exceeds the limitations of Section 1014.3. Where a stairway provides a means of exit access from a mezzanine, the maximum travel distance includes the distance traveled on the stairway measured in the plane of the tread nosing. Accessible means of egress shall be provided in accordance with Section 1007.

Exception: A single means of egress shall be permitted in accordance with Section 1015.1.

505.4 Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. A mezzanine having two or more means of egress is not required to be open to the room in which the mezzanine is located if at least one of the means of egress provides direct access to an exit from the mezzanine level.
3. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the aggregate floor area of the enclosed space does not exceed 10 percent of the mezzanine area.
4. In industrial facilities, mezzanines used for control equipment are permitted to be glazed on all sides.
5. In other than Groups H and I occupancies no more than two stories in height above grade plane and equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a mezzanine having two or more means of egress shall not be required to be open to the room in which the mezzanine is located.

505.5 (Supp) Equipment platforms. Equipment platforms in buildings shall not be considered as a portion of the floor below. Such equipment platforms shall not contribute to either the ~~building~~ fire compartment area or the number of stories as regulated by Section 503.1. The area of the equipment platform shall not be included in determining the fire area in accordance with Section 903. Equipment platforms shall not be a part of any mezzanine and such platforms and the walkways, stairs and ladders providing access to an equipment platform shall not serve as a part of the means of egress from the building.

505.5.1 Area limitations. The aggregate area of all equipment platforms within a room shall not exceed two-thirds of the area of the room in which they are located. Where an equipment platform is located in the same room as a mezzanine, the area of the mezzanine shall be determined by Section 505.2 and the combined aggregate area of the equipment platforms and mezzanines shall not exceed two-thirds of the room in which they are located.

[F] 505.5.2 Fire suppression. Where located in a building that is required to be protected by an automatic sprinkler system, equipment platforms shall be fully protected by sprinklers above and below the platform, where required by the standards referenced in Section 903.3.

505.5.3 Guards. Equipment platforms shall have guards where required by Section 1013.1.

SECTION 506
FIRE COMPARTMENTS PERMITTED TO BE UNLIMITED IN AREA

506.1 General. The area of a fire compartment shall not be limited and only one fire compartment is required in buildings meeting the requirements of 506.2 through 506.11.

506.2 (Supp) Nonsprinklered, one story. The area of the fire compartment in a one-story Group F-2 or S-2 occupancy shall not be limited when the building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

506.3 (Supp) Sprinklered, one story. The area of the fire compartment in a Group B, F, M or S occupancy no more than one story above grade plane, or the fire compartment in a one-story Group A-4 occupancy no more than one story above grade plane, of other than Type V construction, shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

Exceptions:

1. The fire compartment in structures of Type I and II construction for rack storage facilities that do not have access by the public shall not be limited in height, provided that such fire compartment conforms to the requirements of Sections 506.2 and 903.3.1.1 and NFPA 230.
2. The automatic sprinkler system shall not be required in ~~parts~~ portions of fire compartments that are occupied for indoor participant sports, such as tennis, skating, swimming and equestrian activities in occupancies in Group A-4, provided that:
   2.1. Exit doors directly to the outside are provided for occupants of the participant sports areas; and
   2.2. The fire compartment is equipped with a fire alarm system with manual fire alarm boxes installed in accordance with Section 907.
3. Group A-1 and A-2 occupancies of other than Type V construction shall be permitted, provided:
   3.1. All assembly occupancies are separated from other spaces as required for separated uses in Section 508.3.3.4 with no reduction allowed in the fire-resistance rating of the separation based upon the installation of an automatic sprinkler system;

3.2. Each Group A occupancy shall not exceed the maximum allowable area permitted in Section 503.1; and
3.3. All required exits shall discharge directly to the exterior.

506.4 (Supp) Two story. The area of the fire compartment in a Group B, F, M or S occupancy no more than two stories above grade plane shall not be limited when the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

506.5 Reduced open space. The permanent open space of 60 feet (18 288 mm) required in Sections ~~507.2, 507.3, 507.4, 507.6 and 507.10~~ 506.2, 506.3, 506.4, 506.6, and 506.10 shall be permitted to be reduced to not less than 40 feet (12 192 mm), provided the following requirements are met:

1. The reduced open space shall not be allowed for more than 75 percent of the perimeter of the building.
2. The exterior wall facing the reduced open space shall have a minimum fire-resistance rating of 3 hours.
3. Openings in the exterior wall facing the reduced open space shall have opening protectives with a minimum fire protection rating of 3 hours.

506.6 (Supp) Group A-3 buildings. The area of the fire compartment in a Group A-3 occupancy no more than one-story above grade plane, used as a place of religious worship, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor swimming pool or tennis court of Type II construction shall not be limited when all of the following criteria are met:

1. The fire compartment shall not have a stage other than a platform.
2. The fire compartment shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
3. The assembly floor shall be located at or within 21 inches (533 mm) of street or grade level and all exits are provided with ramps complying with Section 1010.1 to the street or grade level.
4. The building shall be surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

506.7 (Supp) Group H occupancies. Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited area fire compartments containing Group F and S occupancies, in accordance with Sections ~~507.3 and 507.4~~ 506.3 and 506.4 and the limitations of this section. The aggregate floor area of the Group H occupancies located at the perimeter of the unlimited area fire compartment shall not exceed 10 percent of the area of the ~~building~~ fire compartment nor the area limitations for the Group H occupancies as specified in Tables 503.1(2) and 503.1(3)~~, based upon the percentage of the perimeter of each Group H fire area that fronts on a street or other unoccupied space~~. The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the fire compartment area limitations for the Group H occupancies as specified in Tables 503.1(2) and 503.1(3). Group H occupancies shall be separated from the rest of the unlimited area ~~building~~ fire compartment and from each other in accordance with Table 508.4. For two-story unlimited area fire compartments, the Group H occupancies shall not be located more than one story above grade plane unless permitted by the allowable height in stories and feet as set forth in Table 503.1(1) based on the type of construction of the unlimited area ~~building~~ fire compartment.

506.8 (Supp) Aircraft paint hangar. The area of the fire compartment for a Group H-2 aircraft paint hangar no more than one story above grade plane shall not be limited where such aircraft paint hangar complies with the provisions of Section 412.4 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

506.9 (Supp) Group E buildings. The area of the fire compartment for a Group E occupancy no more than one story above grade plane, of Type II, IIIA or IV construction shall not be limited when the following criteria are met:

1. Each classroom shall have not less than two means of egress, with one of the means of egress being a direct exit to the outside of the building complying with Section 1018.
2. The fire compartment is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
3. The fire compartment is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

506.10 (Supp) Motion picture theaters. ~~In fire compartments of Type II construction, the area of the fire compartment for a motion picture theater located on the first story above grade plane~~ The area of the fire compartment for a Group A-1 motion picture theater no more than one story above grade plane of Type II construction shall not be limited when the ~~building~~ fire compartment is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

506.11 Covered mall buildings and anchor stores. The area of the fire compartment for ~~a~~ covered mall buildings and anchor stores not exceeding three stories above grade plane ~~in height~~ that comply with Section 402.6 shall not be limited.

SECTION 507
MIXED USE AND OCCUPANCY

507.1 (Supp) General. Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section ~~508.2, 508.3 or 508.4~~ 507.2, 507.3, or 507.4, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section ~~509~~ 508.
2. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a separate and detached building or structure.
3. Live/Work Units in accordance with Section 419 are not considered separate occupancies.

507. 2 (Supp) Accessory occupancies Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections ~~508.2.1~~ 507.2.1 through ~~508.2.5.3~~ 507.2.5.3.

507.2.1 (Supp) Area limitations. Aggregate accessory occupancies shall not occupy more than 10 percent of the area of the story of the building in which they are located and shall not exceed the tabular values in Tables 503.1(2) and 503.1(3).

507.2.2 (Supp) Occupancy classification. Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

507.2.3 (Supp) Allowable area and height. The allowable area of the fire compartment and height of the building shall be based on the allowable area and height for the main occupancy in accordance with Section 503.1. The height of each accessory occupancy shall not exceed the tabular values in Table 503.1(1), without increases in accordance with Section 504 for such accessory occupancies. The area of the accessory occupancies shall be in accordance with Section ~~508.2.1~~ 507.2.1.

507.2.4 (Supp) Separation of occupancies. No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section ~~508.4~~ 507.4.
2. Incidental accessory occupancies required to be separated or protected by Section ~~508.2.5~~ 507.2.5.
3. Group R occupancies shall be separated from other accessory occupancies in accordance with Section ~~508.4.4~~ 507.4.4.

507.2.5 (Supp) Separation of incidental accessory occupancies. The incidental accessory occupancies listed in Table ~~508.2.5~~ 507.2.5 shall be separated from the remainder of the building or equipped with an automatic fire extinguishing system, or both, in accordance with Table ~~508.2.5~~ 507.2.5.

Exception: Incidental accessory occupancies within and serving a dwelling unit are not required to comply with this section.

TABLE 507.2.5 (Supp)
INCIDENTAL USE AREAS
(No Changes)

507.2.5.1 (Supp) Fire resistance rated separation. Where Table ~~508.2.5~~ 507.2.5 specifies a fire-resistance rated separation, the incidental accessory occupancies shall be separated from the remainder of the building by a fire barrier constructed in accordance with Section 706 or a horizontal assembly constructed in accordance with Section 711, or both.

507.2.5.2 (Supp) Nonfire-resistance rated separation and protection. Where Table ~~508.2.5~~ 507.2.5 permits an automatic fire extinguishing system without a fire barrier, the incidental accessory occupancies shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the fire-resistance-rated floor/ceiling assembly above or fire-resistance-rated roof/ceiling assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic closing upon detection of smoke in accordance with Section 715.4.7.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80.

507.2.5.3 (Supp) Protection. Where an automatic fire-extinguishing system or an automatic sprinkler system is provided in accordance with Table ~~508.2.5~~ 507.2.5, only the space occupied by the incidental accessory occupancy need be equipped with such a system.

507.3 (Supp) Nonseparated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

507.3.1 (Supp) Occupancy classification. Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space except that the most restrictive applicable provisions of Section 403 and Chapter 9 shall apply to the building or portion thereof in which the nonseparated occupancies are located.

507.3.2 (Supp) Allowable fire compartment area and height. The allowable fire compartment area and the height of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1.

507.3.3 (Supp) Separation. No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section ~~508.3.3~~ 507.4.
2. All Group R occupancies shall be separated from other occupancies in accordance with Section ~~508.4.4~~ 507.4.4.

507.4 (Supp) Separated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

TABLE 507.4 (Supp)
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)
(No Changes)

507.4.1 (Supp) Occupancy classification. Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building.

507.4.2 (Supp) Allowable fire compartment area. ~~In each story, the fire compartment, area shall be such that the sum of the ratios of the actual building area of each separated occupancy divided by the allowable area of each separated occupancy fire compartment shall not exceed one.~~ In each fire compartment, the sum of the ratios of the actual floor area of each separated occupancy divided by the allowable floor area of each separated occupancy shall not exceed one.

507.4.3 (Supp) Allowable height. Each separated occupancy shall comply with the height limitations based on the type of construction of the building in accordance with Section 503.1.

Exception: Special provisions permitted by Section ~~509~~ 508.

507.4.4 (Supp) Separation. Individual occupancies shall be separated from adjacent occupancies in accordance with Table ~~508.4~~ 507.4.

507.4.4.1 (Supp) Construction. Required separations between adjacent occupancies shall be fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies.

SECTION 508
SPECIAL PROVISIONS

508.1 (Supp) General. The provisions in this section shall permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable heights and areas of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in this section for such condition and other applicable requirements of this code. The provisions of Sections 509.2 through 509.8 are to be considered independent and separate from each other.

508.2 (Supp) Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining fire compartment area limitations, continuity of fire walls, limitation of number of stories and type of construction where all of the following conditions are met:

1. The buildings are separated with a horizontal assembly having a minimum 3-hour fire-resistance rating.
2. The building below the horizontal assembly is no more than one story above grade plane
3. The building below the horizontal assembly is of Type IA construction.
4. Shaft, stairway, ramp and escalator enclosures through the horizontal assembly shall have not less than a 2-hour fire-resistance rating with opening protectives in accordance with Table 715.4.

   Exception: Where the enclosure walls below the horizontal assembly have not less than a 3-hour fire resistance rating with opening protectives in accordance with Table 715.4, the enclosure walls extending above the horizontal assembly shall be permitted to have a 1-hour fire-resistance rating, provided:

   1. The building above the horizontal assembly is not required to be of Type I construction;
   2. The enclosure connects less than four stories; and
   3. The enclosure opening protectives above the horizontal assembly have a minimum 1-hour fire protection rating.

5. The building or buildings above the horizontal assembly shall be permitted to have multiple Group A uses, each with an occupant load of less than 300, or Group B, M, R or S uses.
6. The building below the horizontal assembly shall be protected throughout by an approved automatic sprinkler system in accordance with Section 903.3.1.1, and shall be permitted to be any of the following occupancies:

   1. Group S-2 parking garage used for the parking and storage of private motor vehicles;
   2. Multiple Group A, each with an occupant load of less than 300;
   3. Group B;
   4. Group M;
   5. Group R; and
   6. Uses incidental to the operation of the building (including entry lobbies, mechanical rooms, storage areas and similar uses).

7. The maximum building height in feet shall not exceed the limits set forth in Section 503 for the building having the smaller allowable height as measured from the grade plane.

508.3 (Supp) Group S-2 enclosed parking garage with Group S-2 open parking garage above. A Group S-2 enclosed parking garage with no more than one story above grade plane and located below a Group S-2 open parking garage shall be classified as a separate and distinct building for the purpose of determining the type of construction where the following conditions are met:

1. The allowable area of the building shall be such that the sum of the ratios of the actual area divided by the allowable area for each separate occupancy shall not exceed 1.0.
2. The Group S-2 enclosed parking garage is of Type I or II construction and is at least equal to the fire resistance requirements of the Group S-2 open parking garage.
3. The height and the number of tiers of the Group S-2 open parking garage shall be limited as specified in Table 406.3.5.
4. The floor assembly separating the Group S-2 enclosed parking garage and Group S-2 open parking garage shall be protected as required for the floor assembly of the Group S-2 enclosed parking garage. Openings between the Group S-2 enclosed parking garage and Group S-2 open parking garage, except exit openings, shall not be required to be protected.
5. The Group S-2 enclosed parking garage is used exclusively for the parking or storage of private motor vehicles, but shall be permitted to contain an office, waiting room and toilet room having a total area of not more than 1,000 square feet (93 m2), and mechanical equipment rooms incidental to the operation of the building.

508.4 Parking beneath Group R. Where a maximum one-story above grade plane Group S-2 parking garage, enclosed or open, or combination thereof, of Type I construction or open of Type IV construction, with grade entrance, is provided under a building of Group R, the number of stories to be used in determining the minimum type of construction shall be measured from the floor above such a parking area. The floor assembly between the parking garage and the Group R above shall comply with the type of construction required for the parking garage and shall also provide a fire-resistance rating not less than the mixed occupancy separation required in Section ~~508.3.3~~ 507.4.

508.5 (Supp) Group R-1 and R-2 buildings of Type IIIA construction. The height limitation for buildings of Type IIIA construction in Groups R-1 and R-2 shall be increased to six stories and 75 feet (22 860 mm) where the first floor construction above the basement has a fire-resistance rating of not less than 3 hours and the floor area is subdivided by 2-hour fire-resistance-rated fire walls into areas of not more than 3,000 square feet (279 m^2).

508.6 (Supp) Group R-1 and R-2 buildings of Type IIA construction. The height limitation for buildings of Type IIA construction in Groups R-1 and R-2 shall be increased to nine stories and 100 feet (30 480 mm) where the building is separated by not less than 50 feet (15 240 mm) from any other building on the lot and from lot lines, the exits are segregated in an area enclosed by a 2-hour fire-resistance-rated fire wall and the first-floor construction has a fire-resistance rating of not less than 11/2 hours.

508.7 Open parking garage beneath Groups A, I, B, M and R. Open parking garages constructed under Groups A, I, B, M and R shall not exceed the height and area limitations permitted under Section 406.3. The height and fire compartment area of the portion of the building above the open parking garage shall not exceed the limitations in Section 503 for the upper occupancy. The height, in both feet and stories, of the portion of the building above the open parking garage shall be measured from grade plane and shall include both the open parking garage and the portion of the building above the parking garage.

508.7.1 Fire separation. Fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711 between the parking occupancy and the upper occupancy shall correspond to the required fire-resistance rating prescribed in Table 508.3.3 for the uses involved. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking structure, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. Means of egress for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by fire barriers having at least a 2-hour fire-resistance rating as required by Section 706 with self-closing doors complying with Section 715 or horizontal assemblies having at least a 2-hour fire-resistance rating as required by Section 711, with self closing doors complying with Section 715. Means of egress from the open parking garage shall comply with Section 406.3.

508.8 (Supp) Group B or M with Group S-2 open parking garage below. Group B or M occupancies located no higher than the first story above grade plane shall be considered as a separate and distinct building for the purpose of determining the type of construction where all of the following conditions are met:

1. The buildings are separated with a horizontal assembly having a minimum 2-hour fire-resistance rating.
2. The occupancies in the building below the horizontal assembly are limited to Groups B and M.
3. The occupancy above the horizontal assembly is limited to a Group S-2 open parking garage.
4. The building below the horizontal assembly is of Type I or II construction but not less than the type of construction required for the Group S-2 open parking garage above.
5. The height and area of the building below the horizontal assembly does not exceed the limits set forth in Section 503.
6. The height and area of the Group S-2 open parking garage does not exceed the limits set forth in Section 406.3. The height, in both feet and stories, of the Group S-2 open parking garage shall be measured from grade plane and shall include the building below the horizontal assembly.
7. Exits serving the Group S-2 open parking garage discharge directly to a street or public way and are separated from the building below the horizontal assembly by 2-hour fire barriers constructed in accordance with Section 706 or 2-hour horizontal assemblies constructed in accordance with Section 711, or both.

508.9 (Supp) Multiple buildings above an enclosed or open Group S-2 parking garage. Where two or more buildings are provided above the horizontal assembly separating a Group S-2 open or closed parking garage from the buildings above in accordance with the special provisions in Sections ~~509.2 and 509.3~~ 508.2 and 508.3, the buildings above the horizontal assembly shall be regarded as separate and distinct buildings and shall comply with all other provisions of this code as applicable to each separate and distinct building.

Commenter's Reason: This public comment was developed in response to Committee comments and others' testimony in Palm Springs, essentially saying this proposed code change, in its submitted form, was unclear as to its use of terms, and how "fire compartments" related to fire areas. This public comment is mostly editorial changes for internal consistency.

- A definition for "fire compartment barrier" has been inserted (the walls and floors at the boundaries of a fire compartment)
- The terms related to fire compartment barriers have been made consistent throughout the proposal. For components of the fire compartment barrier, the terms "vertical fire compartment barriers" and "horizontal fire compartment barriers" has been substituted for "fire barriers" or "fire compartment walls" and "horizontal assemblies", to differentiate between this application and fire barriers used in other applications (e.g., shaft or corridor walls).
- "Fire compartment" has been substituted for "building" where necessary for consistency with the concept of these fire compartments.
- References to "fire rated" have been replaced by the more-correct terminology, "fire-resistance rated".
- Section references have been updated to reflect the section numbering changes made in the proposal.

A more detailed explanation of the other changes follows:

Sec. 502.1, "AREA, FIRE COMPARTMENT". Definition revised to clarify the floor area of concern is within a box comprised of exterior walls or fire compartment barriers. The latter term could be vertical or horizontal, and is defined later. Given the revised definition of "fire compartment" and the new "fire compartment barrier" definition, this term is really self-explanatory.

Sec. 502.1, "FIRE COMPARTMENT". Definition revised to clarify what constitutes a fire compartment, namely, an area or space within a building surrounded by fire compartment barriers (defined later) or exterior walls.

Sec. 502.1, "FIRE COMPARTMENT BARRIER". New definition to clarify these assemblies are designed to restrict (not prevent) migration of smoke and fire between fire compartments.

Table 503.1(1). Revised to put the table in the same format as current IBC. No changes to the numbers is proposed in this public comment.

Tables 503.1(2) and 503.1(3). In the development of these tables for presentation in G110, the Balanced Fire Protection Features Study Group made a conscious decision to publish the submitted code change with the "exact" calculated numbers, in order to provide traceability of the genesis of the tabular values. However, there was always an intent to label any tabular area over 250,000 square feet as "unlimited". There was also recognition that this is not an exact science, so the intent was to round off the numbers to make the table values more usuable. Those two changes have been made in this public comment. In addition, the A-5 occupancy allowance for unlimited area was taken out of a footnote and added to the table. The table has also been rearranged into a more familiar format from the original submittal, based on current Table 503 format.

Table 503.1(4). Revised to clarify how to handle buildings that are more than 3 stories in height, or are permitted to have more than 9 stories.

Sec. 503.2. Provides direct reference to the term used in Table 503.1(4) ("gross area factor"), and references the specific, applicable section numbers as opposed to the ambiguous "this section".

Table 503.2.2. Table is compressed into a more familiar format, similar to IBC Table 706.3.9 for fire barriers between fire areas. Based upon feedback from the Palm Springs Code Development Hearings, the following additional information is provided to support the ratings in the table.

The general concept is to contain fire to the compartment—a similar concept to fire areas, where fire barriers separate non-sprinklered areas. Therefore, unsprinklered values are same as for separations between fire areas (see Table 706.3.9). Sprinklers can then reduce the ratings because the demand on the separations is less with a sprinklered fire. Conceptually, we are defining what the largest sprinklered fire area can be, although the basis for calculating the fire area is different. The original fire area separation values were taken from one of the legacy codes, which were in turn based on previous studies that related fire load to required separation ratings.

Sec. 503.2.2.1. A new exception is inserted to correlate with the revised exception in Section 503.2.2.2.2, and to avoid a conflict with Sections 711.3 and 711.4.

Sec. 503.2.2.2.1. In this context, "walls" are vertical fire compartment barriers. In exception 1.3, since this separation is between fire compartments, the rating of the roofing should be related to the fire compartments, not the building. The changes in Exception 4 reflect the intent to allow vertical fire compartment barriers to stop at the top of the 3-hour separation in podium buildings, instead of continuing to the foundation.

Sec. 503.2.2.2.2. The first exception was deleted because it was determined that the actual application was extremely limited (U occupancies), and therefore, the proposed exception was an unnecessary complication. The reference to IBC Sec. 903.3.1.2/NFPA 13-R sprinklers in the second exception was deleted to be consistent with other sections of the code, which require IBC Sec. 903.3.1.1/NFPA 13 sprinkler systems to reduce fire resistance ratings.

Table 503.2.2.4. Table title and column headings clarified.

Sec. 503.2.2.5. Clarified to refer to ducts and air transfer openings.

Sec. 503.2.2.6, 503.2.2.7. Text added to refer to appropriate sections in Chapter 7 for penetration and joint protection.

Sec. 503.3. Deleted commentary language. Addition to Item 1 clarifies that 13-R sprinklers are permitted to be used to mitigate the need for smoke management.

Sec. 503.4. Deleted ambiguous and unnecessary "as applicable". Additions to Item 4 clarify that both 13 and 13-R sprinkler systems are allowed.

Sec. 503.6. Deleted unnecessary "maximum". Clarified that the areas to be aggregated are those for all the buildings being considered as one building.

Sec. 506.7. The text referring to the percentage of the perimeter is no longer needed, since this code change proposal eliminates the 2006 IBC increase for frontage.

Sec. 506.10. Reworded for clarity.

Sec. 507.4.2. In this compartmentalization concept, the area of any individual story within the fire compartment is not of concern—the concern is the overall area of the fire compartment. Thus, the sum of the ratios calculation in a mixed occupancy building only needs to be performed for the fire compartment, not for stories within the fire compartment.

Sec. 507.4.4.1. Clarifies that the separations of concern in this section are those between adjacent occupancies, not those between fire compartments.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. This public comment is a result of the CTC's investigation of the area of study entitled "Balanced Fire Protection". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html. As part of the CTC process, Study Groups are often formed to address specific issues related to CTC areas of study. The CTC BFP Features Study group is one such study group. This study group was formed subsequent to the 2006 Orlando Code Development Hearings, with the focus being a review of the height and area provisions in the IBC. Since its inception, the study group has held ten meetings - all open to the public.

Public Comment 2:

Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group, request Approval as Modified by this public comment.

Modify proposal as follows:

TABLE 503.1(2)
MAXIMUM AREA PER FIRE COMPARTMENT, A_C (sf) - WITHOUT SPRINKLERS[a, b]

OCCUPANCY	TYPE IA AND IB	TYPE IIA	TYPE IIB AND IIIB	TYPE IIIA	TYPE IV AND VA	TYPE VB
S-2, F-2	30,267	16,933	7,867	16,933	10,933	4,800
A-3, A-4, B, H-4, I, R, E	26,706	14,941	6,941	14,941	9,647	4,235
A-1, A-2, M	22,700	12,700	5,900	12,700	8,200	3,600
F-1, S-1, H-5	19,739	11,043	5,130	11,043	7,130	3,130
H–1, H-2, H-3	NP	NP	NP	NP	NP	NP

a. One or more fire compartment in the building does not have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2

b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.

NP = not permitted

TABLE 503.1(3)
MAXIMUM AREA PER FIRE COMPARTMENT, A_C (sf) - WITH SPRINKLERS[a, b]

OCCUPANCY	TYPE IA AND IB	TYPE IIA	TYPE IIB AND IIIB	TYPE IIIA	TYPE IV AND VA	TYPE VB
S-2, F-2	722,400	290,667	130,667	290,667	172,000	82,667
A-3, A-4, B, H-4, I, R, E	637,412	256,471	115,294	256,471	151,765	72,941
A-1, A-2, M	387,000	109,000	49,000	109,000	64,500	31,000
F-1, S-1, H-5	168,261	70,139	31,530	70,139	41,504	19,948
H–1, H-2, H-3	30,960	17,440	7,840	17,440	10,320	4,960

a. All fire compartments in the building have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
b. A-5 Assembly uses intended for participation in or viewing outdoor activities are permitted to be unlimited in area.

TABLE 503.1(4)
GROSS AREA FACTOR, F_G

ACTUAL BUILDING HEIGHT, STORIES	NUMBER OF STORIES PERMITTED								
	1	2	3	4	5	6	7	8	9
1	4	8	12	16	20	24	28	32	36
2	-	6	9	12	15	18	21	24	27
3	-	-	6	8	10	12	14	16	18

503.2 Building area. The maximum allowable building area shall ~~not exceed the maximum area of fire compartments~~ be calculated in accordance with Equation 5-1 ~~Tables 503.1(2) or 503.1(3) multiplied by the number in Table 503.1(4)~~. A building shall be considered one fire compartment except where subdivided by fire compartment ~~fire~~ barriers conforming with ~~this section~~ Sections 503.2 through 503.4.

$A_B = A_C \times F_G$ (Equation 5-1)

where:

A_B = Maximum allowable building area (square feet)
A_C = Maximum area of fire compartment in accordance with Table 503.1(2) or 503.1(3) (square feet)
F_G = Gross area factor in accordance with Table 503.1(4)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The main change being proposed is somewhat editorial, but is essentially to change the text that states how to calculate the maximum allowable building area into an equation, for clarity. The addition of the rows for A-5 occupancies in Tables 503.1(2) and (3) is editorial, but necessary to avoid confusion, given all the other tables in G110 that list occupancies show A-5's. The changes to the 2nd sentence in Section 503.2 are editorial, and are just being carried over to this proposal from the larger editorial change proposal for the whole of G110.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. This public comment is a result of the CTC's investigation of the area of study entitled "Balanced Fire Protection". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html. As part of the CTC process, Study Groups are often formed to address specific issues related to CTC areas of study. The CTC BFP Features Study group is one such study group. This study group was formed subsequent to the 2006 Orlando Code Development Hearings, with the focus being a review of the height and area provisions in the IBC. Since its inception, the study group has held ten meetings - all open to the public.

Public Comment 3:

Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group, requests Approval as Modified by this public comment.

Modify proposal as follows:

503.2.2.2.1 Vertical continuity. Fire compartment barriers shall extend from the foundation ~~to the underside of the roof deck~~ to a termination point at least 30 inches above both adjacent roofs.

Exceptions: (No change)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The purpose of this public comment is to provide criteria for the termination of compartment fire barriers at the roof and to clarify how such measurement is made. The provisions are based on Section 705.6 for fire wall vertical termination which requires a 30 inch extension above both roofs and then the exceptions allow for the barrier to terminate at the roof.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. This public comment is a result of the CTC's investigation of the area of study entitled "Balanced Fire Protection". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html. As part of the CTC process, Study Groups are often formed to address specific issues related to CTC areas of study. The CTC BFP Features Study group is one such study group. This study group was formed subsequent to the 2006 Orlando Code Development Hearings, with the focus being a review of the height and area provisions in the IBC. Since its inception, the study group has held ten meetings - all open to the public.

Public Comment 4:

Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group, requests Approval as Modified by this public comment.

Modify proposal as follows:

SECTION 507
MIXED USE AND OCCUPANCY

507.1 (Supp) General. Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section 509.
2. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a separate and detached building or structure.
3. Live/Work Units in accordance with Section 419 are not considered separate occupancies.

507.1.1 Fire compartment barriers. In mixed occupancy buildings, fire compartment barriers shall comply with the most restrictive fire resistance rating for the occupancies in the fire compartments being separated, in accordance with Table 503.2.2.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: As submitted, G110 does not address the ratings of fire compartment barriers where there is more than one occupancy within the fire compartment. This proposal will fill the gap, and is similar in concept to non-separated uses, where everything is gauged to the most restrictive occupancy.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. This public comment is a result of the CTC's investigation of the area of study entitled "Balanced Fire Protection". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html. As part of the CTC process, Study Groups are often formed to address specific issues related to CTC areas of study. The CTC BFP Features Study group is one such study group. This study group was formed subsequent to the 2006 Orlando Code Development Hearings, with the focus being a review of the height and area provisions in the IBC. Since its inception, the study group has held ten meetings - all open to the public.

Public Comment 5:

Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group, requests Approval as Modified by this public comment.

Modify proposal as follows:

~~**TABLE 503.1(2)**~~
~~**MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITHOUT SPRINKLERS [a, b]**~~

~~OCCUPANCY~~	~~TYPE IA/IB~~	~~TYPE IIA~~	~~TYPE IIIA~~	~~TYPE IV AND VA~~	~~TYPE IIB AND IIIB~~	~~TYPE VB~~
~~S-2, F-2~~	~~30,267~~	~~16,933~~	~~16,933~~	~~10,933~~	~~7,867~~	~~4,800~~
~~A-3, A-4, B, H-4, I, R, E~~	~~26,706~~	~~14,941~~	~~14,941~~	~~9,647~~	~~6,941~~	~~4,235~~
~~A-1, A-2, M~~	~~22,700~~	~~12,700~~	~~12,700~~	~~8,200~~	~~5,900~~	~~3,600~~
~~F-1, S-1, H-5~~	~~19,739~~	~~11,043~~	~~11,043~~	~~7,130~~	~~5,130~~	~~3,130~~
~~H-1, H-2, H-3~~	~~NP~~	~~NP~~	~~NP~~	~~NP~~	~~NP~~	~~NP~~

~~a. One or more fire compartment in the building does not have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

~~b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.~~

~~NP = Not Permitted~~

TABLE 503.1(2)

MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITHOUT SPRINKLERS[a, ~~b~~]

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE IIIB	TYPE IV	TYPE VA	TYPE VB
A-1, A-2, M	11,000	11,000	11,000	2,000	11,000	2,000	4,000	4,000	2,000
A-3, A-4, B, E, H-4,	13,000	13,000	13,000	3,000	13,000	3,000	5,000	5,000	2,000
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL
F-1, S-1	9,000	9,000	9,000	2,000	9,000	2,000	3,000	3,000	2,000
F-2, S-2, U	15,000	15,000	15,000	3,000	15,000	3,000	5,000	5,000	2,000
H–1, H-2, H-3,H-5, I, R	NP	NP	NP	NP	NP	NP	NP	NP	NP

a. One or more fire compartment in the building does not have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2

NP = not permitted

UL = unlimited

~~TABLE 503.1(3)~~

~~MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITH SPRINKLERS[a, b]~~

~~OCCUPANCY~~	~~TYPE IA/IB~~	~~TYPE IIA~~	~~TYPE IIIA~~	~~TYPE IV AND VA~~	~~TYPE IIB AND IIIB~~	~~TYPE VB~~
~~S-2, F-2~~	~~722,400~~	~~290,667~~	~~290,667~~	~~172,000~~	~~130,667~~	~~82,667~~
~~A-3, A-4, B, H-4, I, R, E~~	~~637,412~~	~~256,471~~	~~256,471~~	~~151,765~~	~~115,294~~	~~72,941~~
~~A-1, A-2, M~~	~~387,000~~	~~109,000~~	~~109,000~~	~~64,500~~	~~49,000~~	~~31,000~~
~~F-1, S-1, H-5~~	~~168,261~~	~~70,139~~	~~70,139~~	~~41,504~~	~~31,530~~	~~19,948~~
~~H-1, H-2, H-3~~	~~30,960~~	~~17,440~~	~~17,440~~	~~10,320~~	~~7,840~~	~~4,960~~

~~a. All fire compartments in the building have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

~~b. A-5 Assembly uses intended for participation in or viewing outdoor activities shall be permitted to be unlimited in area.~~

TABLE 503.1(3)

MAXIMUM AREA PER FIRE COMPARTMENT (sf) - WITH SPRINKLERS[a, ~~b~~]

OCCUPANCY	TYPE IA	TYPE IB	TYPE IIA	TYPE IIB	TYPE IIIA	TYPE IIIB	TYPE IV	TYPE VA	TYPE VB
A-1, A-2, M	227,000	227,000	64,000	30,000	64,000	30,000	41,000	41,000	18,000
A-3, A-4, B, E, H-4, I, R	UL	UL	149,000	69,000	149,000	69,000	96,000	96,000	42,000
A-5	UL	UL	UL	UL	UL	UL	UL	UL	UL
F-1, H-5, S-1	99,000	99,000	41,000	19,000	41,000	19,000	26,000	26,000	12,000
F-2, S-2, U	UL	UL	169,000	79,000	169,000	79,000	109,000	109,000	48,000
H–1, H-2, H-3	18,000	18,000	10,000	5,000	10,000	5,000	7,000	7,000	3,000

a. All fire compartments in the building have an automatic fire suppression system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

UL = Unlimited

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The compartment area tables originally submitted in G110 were based on the building area limitations reflected in Table B105.1 of the International Fire Code with modifications for relative occupancy hazards and, for buildings protected by fire sprinklers, increases in compartment area comparable to reductions in fire flow allowed by IFC Appendix B. The fire flows originally chosen to be the basis for the tables in G110 were 1500gpm for buildings without sprinklers and 2000gpm for buildings protected by sprinklers. The choice of 1500gpm was based on the minimum fire flow currently recognized in IFC Table B105.1 and the 2000gpm was chosen to give added incentive for installing fire sprinklers.

During the hearings in Palm Springs, it was noted numerous times that the resultant areas were too large and that many small town and rural fire departments cannot deliver 1500gpm either because the infrastructure does not support that flow or because the departments do not have the equipment and/or staffing to reliably deliver that flow. Another comment was that 1000gpm is likely a better initial fire flow for single alarm responses based on the work done to develop the Iowa Fire Flow Calculation and other empirical data.

The Features Study Group has tried to address the concerns expressed in comments received and in discussions with attendees in Palm Springs by reducing the fire flow basis for a compartment to 1000gpm for buildings that are not protected by fire sprinklers. The area limits for the lower flow were generally based on proportional reductions. It needs to be noted that, based on the comments received, the same area was assigned to all non-combustible and limited combustible construction types with passive fire protection (IA, IB, IIA, and IIIA) since there was a level of comfort with the assumption that fires in these construction types can be limited to the compartment of origin. The Type IV and V construction types were limited by strict application of the fire flow calculations for these types of buildings since there was less comfort with an assumption that fires in these construction types can be routinely contained in a single compartment. This comment will also change R, I and H-5 occupancies in Table 503.1(2) to "NP" or not permitted since these occupancies are always required to be protected by fire sprinklers in the IBC. Utility group "U" is added to both tables with allowable areas which are of a similar hazard as the F-2 and S-2 occupancies. All values have been rounded to the nearest 1000 square feet.

For buildings protected by fire sprinklers, the fire flow basis was also reduced but to 1500gpm rather than 1000gpm. This reduction is significant relative to the original compartment areas in G110 but still recognizes the major increase in fire safety afforded by these systems and therefore gives added incentive for the installation of fire sprinklers. The Study Group acknowledges that, in the unlikely event of sprinkler system failure, this code change would present challenges to the fire service and may require responses in excess of a single alarm complement. Indeed buildings built under this approach may require the fire service to consider a defensive posture rather than aggressive suppression tactics if required sprinklers do not work. The Study Group supports efforts to ensure the maintenance of required fire protection features in order to further decrease the potential for such catastrophic fires. Regardless of the outcome of G110 and the other work of the Study Group and the CTC, better funding and additional support for fire and emergency prevention activities will help in further reducing the loss of life (civilian and fire service) and property in our communities.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. This public comment is a result of the CTC's investigation of the area of study entitled "Balanced Fire Protection". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html. As part of the CTC process, Study Groups are often formed to address specific issues related to CTC areas of study. The CTC BFP Features Study group is one such study group. This study group was formed subsequent to the 2006 Orlando Code Development Hearings, with the focus being a review of the height and area provisions in the IBC. Since its inception, the study group has held ten meetings - all open to the public.

Public Comment 6:

John Woestman, The Kellen Group, representing The Window and Door Manufacturers Association (WDMA), requests Approval as Modified by this public comment.

Modify proposal as follows:

503.2.2.3 Glazed openings. Glazed openings in fire compartment barriers shall be limited to those in fire doors complying with 715.4 or fire-resistance-rated glazing complying with 715.2.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: WDMA recommends further modification of G110 to allow glazed openings that have been tested to perform equivalently to a wall, as required in Section 715.2.

Final Action: AS AM AMPC____ D

G115-07/08
Table 503

Proposed Change as Submitted:

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(feet) HGT(S)	UL	160	65	55	65	55	65	50	40
B	S	UL	11	5	~~4~~ 3	5	~~4~~ 3	5	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000

(Portions of table and footnotes not shown remain unchanged)

Reason: One area of concern identified for study by the Height and Area Task Group was 4 and 5 story buildings of unrated construction. The table below shows the occupancies in the IBC where that condition exists for sprinklered construction. In addition, the table shows the sprinklered height allowances for these occupancies in the legacy codes.

Type IIB, Type IIIB (Unprotected Construction)
Story Comparison (w/ NFPA 13 Sprinklers)

NA- Not Applicable NP- Not Permitted

	SBC	NBC	UBC	2006 IBC
B	5	4	2	**5**
F-2	4	4	2	**4**
M	5	3	2	**5**
S-1	4	3	2	**4**
S-2	4	4	2	**5**
R* (13)	5	4	4	**5**
R*(13R)	4	4	3	**4**

* - Applies for R-1, R-2 and R-3 Use Groups

The study group noted that for Use Group B, M, S-1, and R buildings of Type IIB or Type IIIB construction, the allowance for 4 or 5 stories in the IBC was premised on the story heights allowed in the SBC. In all these instances, the SBC sprinklered height allowance for these Use Groups relied on a multiple story sprinkler increase. For example, for Use Group B, the SBC allowed 2 stories for unsprinklered construction and 5 stories for sprinklered construction. This exceeds the consistent one story sprinkler height increase incorporated in the IBC height and area provisions. Based on this review, the study group identified two anomalies from what was permitted by the legacy codes. First, the story height allowance for S-2 use groups is not based on any of the legacy code allowances. Second, for Use Group B, M, S-1, and R (Type IIB and IIIB construction), the IBC story height allowance for unsprinklered construction exceeds what was allowed by any of the legacy codes. For example, the maximum height for an unsprinklered Type IIB office building in any of the legacy codes was the NBC allowance for 3 stories. Currently, the IBC allows 4 stories for this condition. Rather than modify the sprinkler increase in the IBC, the study group suggested the following recommended story height changes:

Unsprinklered IBC Table 503 Values

Use Group	IIB	IIIB
B	3	3
M	2	2
S-1	2	2
S-2	3	3
R* (13)	3	3

* - Applies for R-1, R-2 and R-3 Use Groups

In essence, these reductions would eliminate the anomalies created by the multi-story SBC sprinkler increase and drop the IBC value back to the next least restrictive legacy code (in these cases, the NBC).

The study group noted that the motivation for these recommendations was to address anomalies associated with unsprinklered 4 and 5 story buildings of nonrated construction. No evidence was submitted to suggest that the existing sprinklered height allowances for these buildings in either the IBC or the legacy codes had created an unsafe condition that requires correction.

Cost Impact: The code change proposal will not increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: Large losses in B occupancies are not seen in any of the 3 legacy code areas, thus taking the least restrictive approach is justified. The focus should be on the IBC not on the legacy codes at this point in time.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group, requests Approval as Submitted.

Commenter's Reason: Although the proposal will reduce the allowable height of Group B buildings of Types IIB and IIIB construction by one story, the maximum area (total of all stories) of the tallest building that will then be permitted is generally considerably greater than that permitted by any of the legacy codes (see table below). For example, consider an unsprinklered Type IIB business building with a height of 3 stories; the tallest permitted by any of the legacy codes. If less than 20 feet of open space is provided around the building, the IBC permits the aggregate area of all three stories to be 100% greater than the largest total area permitted by the legacy codes. If the width of the open space is increased to 40 feet, the IBC's total area is still 22% greater than that permitted by the largest legacy code. Although allowable heights are proposed to be reduced, the foregoing illustrates that buildings will still be able to have total areas that are comparable to or greater than permitted by the legacy codes.

Occupancy Group	Type of Construction	NFPA 13 Sprinklers – Yes/No	Width of Open Space (ft.)[a, b]	Ratio of IBC Maximum Building Area to the Largest Maximum Building Area Permitted by Legacy Codes				
				Number of Stories				
				1	2	3	4	5
B	IIB	No	< 20	1.35	1.35	2.00	NPLC	NP
			40	1.12	1.12	1.22	NPLC	NP
		Yes	< 20	1.80	1.60	2.03	1.52	1.22
			40	1.52	1.33	1.69	1.27	1.01
	IIIB	No	< 20	1.32	1.32	1.65	NPLC	NP
			40	0.92	0.92	1.00	NPLC	NP
		Yes	< 20	1.76	1.32	2.04	1.53	1.22
			40	1.25	1.10	1.50	1.12	1.02

NPLC means not permitted by any of the legacy codes, but permitted by IBC.
NP means not permitted by any of the legacy codes or IBC.
If G115 is approved, building heights represented by shaded cells will not be permitted by the IBC.
a. Width of open space around 100% of building perimeter.
b. 40 feet was used because the UBC required a minimum of 40 feet of open space on all sides in order to qualify for 100% area increase; the maximum permitted by that code. The NBC and SBC permitted maximum open space increases of 150% and 100%, respectively, at 30 feet.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. This public comment is a result of the CTC's investigation of the area of study entitled "Balanced Fire Protection". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html. As part of the CTC process, Study Groups are often formed to address specific issues related to CTC areas of study. The CTC BFP Features Study group is one such study group. This study group was formed subsequent to the 2006 Orlando Code Development Hearings, with the focus being a review of the height and area provisions in the IBC. Since its inception, the study group has held ten meetings - all open to the public.

Final Action: AS AM AMPC____ D

G116-07/08
Table 503

Proposed Change as Submitted:

Proponent: Jason Thompson, PE, National Concrete Masonry Association NCMA, representing the Masonry Alliance for Codes and Standards (MACS)

Revise table as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(ft) HGT(S)	UL	160	65	55	65	55	65	50	40
I-1	S	UL	~~9~~ 4	~~4~~ 2	~~3~~ 1	~~4~~ 1	~~3~~ 0	~~4~~ 1	~~3~~ 1	~~2~~ 0
	A	UL	55,000	19,000	10,000	16,500	10,000	18,000	10,500	4,500

(Portions of table and footnotes not shown remain unchanged)

Reason: This code change proposal basically reduces the allowable number of stories in height for Group I-1 occupancies which house more than 16 persons on a 24 hour basis who because of age, mental disability, or other reasons live in a supervised residential environment that provides personal care services. Typical Group I-1 occupancies include residential board and care facilities, assisted living facilities, half-way houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug centers, and convalescent facilities. Furthermore, the occupants of Group I-1 occupancies are supposed to be capable of responding to an emergency situation without physical assistance from staff. However, that may not always be the case and, in fact, there could be as many as five occupants who are not capable of self-preservation legally occupying the building since that is the occupant threshold beyond which the occupancy would be classified as a Group I-2, I-3, or I-4 occupancy. Even so, during the life of these types of Group I-1 occupancies it is very likely that there will be more such occupants at any given time just because of the nature of such facilities.

In our opinion, when it comes to determining the allowable construction types for this occupancy, it would be more realistic to generally reduce the allowable number of stories to not more than those allowed for a Group I-4 occupancy but not to less than that allowed for a Group I-2 occupancy. In fact, the number of stories limitations we've proposed in this code change reflect those specified in the NFPA 101-2006 Life Safety Code except for Type IB construction. The comparable occupancy in the Life Safety Code is called a large board and care facility. We believe the Life Safety Code story height limits make sense and are reasonable. Furthermore, approximately 40 states adopt NFPA 101 at the state level. Therefore, it is very likely that in those states Group I-1 occupancy buildings have been constructed to the height limits specified in NFPA 101 for the number of allowable stories. That is because the more restrictive provision of the applicable codes would apply and the lower story limits for NFPA 101 would supersede those allowed by any of the previous legacy codes or the current IBC.

For Type IB construction we used the number of stories allowed for the I-2 occupancy (4) in the current IBC which is also one story less than that allowed for the I-4 occupancy (5). That is because the Life Safety Code allowed a greater number of stories in height (11) than even the IBC for the I-1 occupancy (9).

It is also interesting to compare the number of stories height limits proposed for the Group I-1 occupancy to those currently specified in the IBC for the I-2 and I-4 occupancies. Please refer to the following table:

Comparison of Allowable Stories in Height
Proposed for Group I-1 Occupancies
vs.
Groups I-2 and I-4 Occupancies

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(ft) HGT(S)	UL	160	65	55	65	55	65	50	40
I-1	S	UL	4	2	1	1	0	1	1	0
I-2	S	UL	4	2	1	1	NP	1	1	NP
I-4	S	UL	5	3	2	3	2	3	1	1

In terms of providing relative levels of safety for these different Group I occupancies, in the Group I-1 occupancy the occupants are spending the night, as is the case in a Group I-2 occupancy. However, in a Group I-4 occupancy, which is a day care type occupancy, the occupants do not stay over night. Thus, even though they may need assistance from staff to evacuate, they are at least awake and aware, allowing for more effective and efficient evacuation in a fire emergency than if a fire were to occur while the occupants were sleeping as in the I-1 occupancy, for example. Furthermore, in the I-1 occupancy staffing levels are very minimal, if any, so the occupants are basically left on their own to respond to a fire emergency.

For all the above reasons, we believe it is more appropriate to revise the allowable number of stories in height for the Group I-1 occupancy as proposed by this code change to reflect the relative fire and life safety risk compared to the other Group I occupancies in Table 503.

Cost Impact: This code change will increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The Group I-1 heights and area requirements do not need to match Group I-2 as they have a completely different package of requirements based upon the difference in the ability of the occupants. Additionally the use of "0" stories is confusing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jason Thompson, PE, National Concrete Masonry Association, representing the Masonry Alliance for Codes and Standards (MACS), requests Approval as Modified by this public comment.

Modify proposal as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per story

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(ft) HGT(S)	UL	160	65	55	65	55	65	50	40
I-1	S	UL	4	2	1	1	~~0~~ NP[e]	1	1	~~0~~ NP[e]
	A	UL	55,000	19,000	10,000	16,500	10,000	18,000	10,500	4,500

e. The allowable number of stories shall be permitted to be 1 where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

(Portions of table and footnotes not shown remain unchanged)

Commenter's Reason: We have revised our original code change proposal to respond to one of the Committee's comments about the use of the "0" within the table which seemed to confuse the Committee members as to how it would apply. The intent was that there would be no story height allowed for a building of a Group I-1 occupancy that was not provided with an automatic sprinkler system designed in accordance with NFPA 13. Since Section 504.2 Automatic Sprinkler System Increase allows a 1-story increase in height for a building protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 (NFPA 13), it would have allowed a 1-story building when so sprinklered. To eliminate the potential confusion, we substituted "NP" for the "0" in the table in two locations for Types IIIB and VB construction with the addition of a new Footnote e which indicates that the allowable number of stories is permitted to be 1 where the building is protected with an NFPA 13 sprinkler system.

The Committee also indicated that there was no need for the number of stories allowed for the Group I-1 occupancy to match those allowed for a Group I-2 occupancy. However, that was not the intent of making the proposed reductions in the allowable number of stories for the Group I-1 occupancies as indicated in our Reason statement for the original code change proposal. The key point was that these story heights, for the most part, were based on those allowed by NFPA 101 for their similar occupancy classification which is designated as "a large board and care facility." We further based our substantiation on the fact that because of the nature of an I-1 occupancy, which eventually could have several bed-ridden patients occupying such occupancies, they should be allowed to have story heights no less than those allowed for a Group I-2 occupancy but no greater than those allowed for a Group I-4 occupancy. Group I-4 occupancies contain both adult care and child care daycare facilities where occupants do not spend the night, unlike Group I-1 occupancies where they will spend the night. Please refer to the Comparison Table of Allowable Stories in Height in the original Reason statement for this code change proposal to see how the allowable story heights compare for the Group I-1s as proposed in this code change proposal compared to the Group I-2s and the Group I-4s currently allowed in the International Building Code (IBC).

We have also provided an additional comparison table which shows what the IBC would allow based on the fact that these buildings will be sprinklered. The sprinkler allowance for an increase in the number of stories is given wherever appropriate except for Group I-2 occupancies of Types IIB, III, IV, and V construction. These are also compared with the story heights allowed by NFPA 101 for large board and care facilities which also are also required to be sprinklered.

Comparison of Allowable Stories in Height

Proposed for Group I-1 Occupancies
vs.
Groups I-2 and I-4 Occupancies
With an NFPA 13 Automatic Sprinkler System

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(ft) HGT(S)	UL	160	65	55	65	55	65	50	40
I-1	S	UL	5	3	2	2	1	2	2	1
I-2	S	UL	5	3	1	1	NP	1	1	NP
I-4	S	UL	6	4	3	4	3	4	2	2
NFPA 101	S	UL	12	3	2	2	1	2	2	1

In conclusion, we believe that the proposed story heights contained in our code change proposal modified by this Public Comment are more appropriate from a life safety perspective for Group I-1 occupancies than that currently allowed based on the relative hazard compared to other Group I occupancies, as well as to the NFPA 101 Life Safety Code which is adopted by approximately forty states throughout the country. Therefore, we urge the ICC voting membership to approve this code change proposal as modified by this Public Comment.

Final Action: AS AM AMPC____ D

G117-07/08
Table 503

Proposed Change as Submitted:

Proponent: Kate Dargan and David Collins, Co-Chairs, Code Technology Committee (CTC) Balanced Fire Protection Features Study Group

Revise as follows:

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS[a]
Height limitations shown as stories and feet above grade plane.
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		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HGT(feet) HGT(S)	UL	160	65	55	65	55	65	50	40
M	S	UL	11	4	~~4~~ 2	4	~~4~~ 2	4	3	1
	A	UL	UL	21,500	12,500	18,500	12,500	20,500	14,000	9,000

(Portions of table and footnotes not shown remain unchanged)

Reason: One area of concern identified for study by the Height and Area Task Group was 4 and 5 story buildings of unrated construction. The table below shows the occupancies in the IBC where that condition exists for sprinklered construction. In addition, the table shows the sprinklered height allowances for these occupancies in the legacy codes.