ICC Code Technology Committee

Balanced Fire Protection

ICC Code Change History
2000-2004/2005
Sampling of Code Changes

This listing is not intended to be all inclusive. Includes code changes submitted to the following codes: IBC- General (G), IBC-Egress (E), IBC-Fire Safety (FS), and IFC (F). Action indicated next to code change number is the Final Action for 2001-2003/2004 Cycles and Committee Action for 2004/2005 Cycle.

2000 CYCLE

G7-00 AS
Table 302.1.1

Proposed Change as Submitted:

Proponent: Ronald Estepp, C.B.O., Hillsborough Township Construction Department, representing BOCA General/Occupancy Review Committee

1. Revise as follows:

TABLE 302.1.1
INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION[a]
Furnace room where largest piece of equipment is over 400,000 BTU per hour input	1 hour or provide automatic fire-extinguishing system
Boilers over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery rooms .	1 hour or provide automatic fire-extinguishing system
Automotive parking garage in other than Group R-3	2 hours; or 1 hour and provide automatic fire extinguishing system
Incinerator rooms	2 hours and automatic sprinkler system
Paint Shops, not classified as a Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing systems
Laboratories and vocational shops, not classified as Group H, located in Group E and 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
Storage rooms over 100 square feet	1 hour or provide automatic fire extinguishing system
Group I-3 padded cells	1 hour
Waste and linen collection room over 100 square feet	1 hour or provide automatic fire extinguishing system
Stationary lead-acid battery systems having a liquid capacity of more than 100 gallons (380 L) used for facility standby power, emergency power or uninterrupted power supplies	1-hour fire barriers and floor-ceiling assemblies in Group B, F, H, M, S and U occupancies. two-hour fire barriers and floor-ceiling assemblies in Group A, E, I and R occupancies.

2. Revise as follows:

302.1.1 Incidental use areas. ~~Areas~~ Spaces which are incidental to the main occupancy shall be separated ~~and~~ or protected, or both, in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use area is located.

Reason: 1. Provides reasonable protection alternatives consistent with the application of fire suppression elsewhere in the code for

the identified uses.

2. Editorial correction to make the application of the table more clear.

Committee Action: **Approved as Submitted**

Committee Reason: The proposed change provides for design options which are currently lacking in the code.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment

Rick Thornberry, P.E., The Code Consortium, representing Masonry Alliance for Codes and Standards, requests Disapproval.

Commenter's Reason: We are requesting Disapproval of this code change mainly because of the sprinkler trade-off allowed for automotive parking garages which reduces the fire resistance rating of the required fire separation from two hours to one hour when an automatic fire extinguishing system is provided. A similar Code Change O9-99 was approved by the Occupancies Subcommittee last year and subsequently overturned and recommended for disapproval by the voting membership based on a Public Comment submitted for consideration at the St. Louis Code Hearings. We believe the membership should once again overturn the Committee's recommendation and vote for disapproval of this code change.

This code change compounds the already identified problem with the excessive number of automatic sprinkler system trade-offs. Garages can be very large and very tall and contain significant combustible loading, not only in the form of cars, but also with incidental storage areas and ancillary facilities that may be found in conjunction with garages, especially those related to Group R-1 and R-2 occupancies. In the 1999 BOCA National Building Code garages, including open parking garages, are required to be separated from other occupancies by at least a two-hour fire resistive separation. Similarly, the 1997 UBC requires a three-hour separation between an R-1 occupancy and a parking garage, but that is allowed to be reduced to two hours. In fact, that separation may be reduced to one hour if the garage does not exceed 3,000 sq. ft. However, no such limitations are proposed in this code change.

It should also be noted that the source document for these incidental use area separations, the 1996 BOCA National Building Code, requires laundry rooms greater than 100 sq. ft. to have both a one-hour fire resistive separation and automatic sprinkler protection, as well as waste and soiled linen collection rooms greater than 100 sq. ft. in area. However, this code change reduces those requirements by allowing either a one-hour separation or an automatic fire extinguishing system. This is a significant departure from the source document and from the present requirements in the IBC which apparently were the result of a compromise between the source document and the other model codes.

In conclusion, this code change should be Disapproved as being too permissive since it allows unjustified automatic sprinkler system trade-offs. A thorough and comprehensive analysis should be performed to determine if these proposed trade-offs are justifiable.

G10-00 D

Table 302.1.1

Proponent: Joe Garcia/Wayne Maynard, Fire Prevention Officers Section, representing California Fire Chiefs Association

Revise as follows:

TABLE 302.1.1

INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION[a]
Laboratories and vocational shops, not classified as Group H, located in Group E and I-2 occupancies	1 hour ~~or provide automatic fire-extinguishing system~~

(Portions of Table not shown remain unchanged)

Reason: These ancillary laboratories will often have diverse and constantly changing chemical inventories. In areas where natural disasters are probable and frequently occur, sprinkler systems may be affected or negated. Other means of protection such as passive one-hour fire resistive construction is important in order for the original function of the buildings to continue with little or no interruptions.

G10-00

Committee Action: **Disapproval**

Committee Reason: The proposed change is not substantiated, since natural disasters can affect passive fire resistance as well as active fire protection systems.

Assembly Action: **No Motion**

G11-00 D

Table 302.1.1

Proponent: Dave W. Frable, General Services Administration

Revise as follows:

Table 302.1.1
INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION[a]
Storage rooms more than 100 square feet in area in Use Group B.	1 hour; or automatic fire extinguishing system with smoke partitions.
Storage rooms ~~over~~ more than 100 square feet in all other use groups.	1 hour

(Portions of table not shown remain unchanged)

Reason: The intent of this code change is to permit an alternative regarding the separation requirements around storage rooms more than 100 square feet in size in Use Group B occupancies. Currently the IBC requires a fire barrier with a 1-hour fire resistance separation with no alternatives for sprinkler system protection in Use Group B occupancies. This change recognizes the benefits of smoke partitions when used in conjunction with automatic sprinklers in Use Group B occupancies. The purpose of a smoke partition is not to create a fire barrier, but rather to create an enclosure that will allow heat from a fire to build up within the enclosure to activate the automatic sprinkler system (i.e., fuse the sprinklers). Respective to the application of certain specific occupancy requirements; storage rooms are considered rooms with a high fuel load (boxes of paper, plastics, etc.) and low supervision, having the potential for a concealed fire. The change recognizes that the installation of an automatic sprinkler system minimizes this concern. In addition, this change will provide the building owner more flexibility in designing their buildings without compromising safety.

G11-00

Committee Action: **Disapproval**

Committee Reason: The proposed change is unnecessary since it is covered in G7-00.

Assembly Action: **No Motion**

G19-00 D

Table 302.3.3

Proponent: Rick Thornberry, P.E., The Code Consortium, Inc., representing Masonry Alliance for Codes and Standards

Revise as follows:

TABLE 302.3.3[a]
REQUIRED SEPARATION OF OCCUPANCIES (HOURS

USE	A-1	A-2	A-3	A-4	A-5	B[b]	E[e]	F-1	F-2	H-1	H-2	H-3	H-4	H-5	I-1	I-2	I-3	I-4	M[b]	R-1	R-2	R-3, R-4	S-1	S-2[c]	U
I-1															2	2	2	2	2	2	2	2	4	3	2
I-2																~~2~~ 3	2	2	2	2	2	2	3	2	1
I-3																	~~2~~ 3	2	2	2	2	2	3	2	1
I-4																		2	2	2	2	2	3	2	1
M[b]																			~~2~~ 3	2	2	2	3	2	1

(Portions of Table not shown remain unchanged)

Reason: These changes help to clarify the application of Table 302.3.3 by making the hourly ratings required for the separation of fire areas of the same occupancy group more consistent with the source document for the fire area concept which is Table 313.1.2 of the 1999 BOCA National Building Code. The only difference between the BOCA National Building Code and these proposed revisions would be the increase in the hourly fire resistance rating for the Group M occupancy from 2 hours to 3 hours. That is based on the hourly ratings contained in Table 705.4 for fire walls for the comparable occupancy Groups F-1, H-3, and S-1 which are also required to have 3-hour fire resistance ratings. The 3-hour rating is also consistent with the fire ratings shown in Table 302.3.3 for those comparable occupancy groups.

Furthermore, the fire loading generally found in Group M occupancies is more comparable to that found in Groups F-1, H-3, and S-1 occupancies as well. This generally ranges in the area of 20 to 30 lbs. per sq. ft. or more depending upon the type of storage arrangement and the arrangement of the sales merchandise in the building. For example, a back of house storage area would have a significantly higher fire loading as compared to a sales floor area. However, a "big box" store where the merchandise is actually stored in racks on the sales floor would also have the higher fire loadings associated more closely with a 3-hour fire resistance rating.

Since the fire ratings indicated along the diagonal of the table are intended to separate the same use group for establishing fire areas mainly for the purpose of determining when automatic sprinklers are required in accordance with Chapter 9 based on the area of the fire area, it is essential that the fire barriers be able to contain a fire within the occupancy classification in order to prevent the spread of fire to the adjacent fire area. In other words, the fire area concept allows for a building to be compartmented by fire barriers such that the installation of an automatic sprinkler system can be avoided by keeping the fire areas small enough. This concept is compatible with an acceptable level of risk which the code assumes when it establishes threshold limits for requiring automatic sprinkler protection as well as, for example, when it sets height and area limits on buildings based on their type of construction.

G19-00

Committee Action: **Disapproval**

Committee Reason: The higher ratings proposed are not justified in most Group M occupancies; increased fire load in the "big box" stores should be addressed by a more specific fix than an increase in ratings for separations in all Group M occupancies. The increased rating for separation of Group M fire areas is not justified. (Editor's note: the proponent had requested that the committee consider a suggested modification to leave the ratings for I-2 and I-3 unchanged, and therefore the discussion was limited to Group M occupancies in anticipation of a motion for modification.)

Assembly Action: **No Motion**

G58-00 D

403.3.1

Proponent: Lee G. Jones and Karl D. Houser, Association of the Wall and Ceiling Industries, Intl., representing AWCI Fire Safety Task Group

Revise as follows:

403.3.1 Type of Construction. In other than Group A-2 having an occupant load of 300 or more, the following reductions in the minimum construction type allowed in Table 601 shall be ~~allowed~~ permitted as provided for in Section 403.3:

1. Type IA construction shall be ~~allowed~~ permitted to be reduced to Type IB.
2. In other than Use Groups F-1, M, and S-1, Type IB construction shall be ~~allowed~~ permitted to be reduced to Type IIA.

Reason: This change proposes to delete certain Use Group A-2 (Restaurants and Night Clubs) occupancies from the reduction in fire resistance ratings for high-rise buildings. This proposal is similar to one proposed in the final round of changes to the 2000 IBC, but is unique in that it only addresses certain types of Group A-2 occupancies. It also has an exception permitting the reduction of fire ratings when the Group A-2 occupancies have an occupant load of less than 300 people. The 300 occupant "trigger" appears elsewhere in the IBC and the *Life Safety Code* for additional limits or requirements for Group A-2 uses. High-rise assembly occupancies present challenges to life safety because of the potential number of occupants, their unfamiliarity with the building, extended egress times, and intoxication beyond that contemplated in the traditional high rise packages in two out of the three model codes (1997 ICBO *Uniform Building Code* and 1997 SBCCI *Standard Building Code*). Minimum fire resistance ratings help assure adequate time for evacuation and rescue from high-rise structures. Although 300 occupants in a Group A-2 occupancy is a substantial fire risk, it was felt that this 300 person limit, historically found elsewhere in codes, would not unnecessarily penalize a building with small restaurants, night clubs, or banquet facilities from using this sprinkler trade-off.

G58-00

Committee Action: **Disapproval**

Committee Reason: In regard to proposed code changes G58-00, G59-00, and G60-00, there is a lack of technical substantiation for the proposed increased restriction on Groups A-2, E, and I, which have comparatively low fuel loads among the occupancy groups. Also, the proposed change does not distinguish between buildings which are primarily Groups A-2, E, and I and those that contain, for example, a Group A-2 on the first floor of a high rise building. The need for redundancy of systems in high seismic areas is not good justification, since these proposed changes are not tied to seismic risks.

Assembly Action: **No Motion**

G64-00 D

404.4 (IFC 907.2.13.1, IFC 909.8)

Proponent: Kermit C. Robinson, City of Portland, representing Oregon Building Official Association

1. Delete without substitution:

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

~~**Exceptions:**~~
~~1. Smoke control is not required for a floor opening connecting only 2 floors meeting the requirements of Section 707.2, Exception 7.~~
~~2. Smoke control is not required for floor openings meeting the requirements of Section 707.2, Exceptions 2, 8 or 9.~~

~~**907.2.13.1 System response.** The activation of two spot-type detectors or a single beam-type detector shall activate the atrium smoke removal system. The activation of any one detector shall cause an alarm to be sounded at a constantly attended location. All smoke detectors shall be accessible for maintenance and testing.~~

2. Revise as follows:

909.8 Exhaust method. When approved by the code official, mechanical smoke control for large enclosed volumes, such as in ~~atriums or~~ malls, shall be permitted to utilize the exhaust method. The design exhaust volumes shall be in accordance with this section.

Reason: The membership has repeatedly rejected the need for smoke control for highrise buildings. We do not expect occupants to exit a highrise building, but we are defending them in place. In atria we expect them to leave the building, so why require smoke control? Like all highrises, all atria must be fully sprinklered. Many atria are associated with a highrise building. It seems inconsistent to require smoke control in a highrise that contains an atrium and to not require smoke control in another highrise of the same size because it doesn't contain an atrium. Additionally the high volume typically found in an atrium can serve as a smoke reservoir to increase the time available for occupants and the fire service to respond appropriately. The low floor to floor heights in a typical highrise do not afford this additional safety factor. This proposed change will result in a cost savings for building construction.

G64-00

Committee Action: **Disapproval**

Committee Reason: Disapproval is consistent with the action taken on G50-00. It is not inconsistent to require smoke control in atriums in high rise buildings as stated in the proponent's reason statement, since it is the presence of the atrium that triggers the requirement, not the fact that it is in a high rise building.

Assembly Action: **No Motion**

G83-00 D

503.3

Proponent: Gene B. Endthoff, Director of National Codes, The National Fire Sprinkler Association

1. Revise as follows:

503.3 Area determination. The maximum area of a non-sprinklered building shall be determined by multiplying the allowable area per floor (A_a), as determined in Section 506.1 by the number of stories up to a maximum of ~~three~~ two stories.

The maximum area per floor of a sprinklered building (A_a) determined in Section 506.1 shall be reduced as specified in Table 503.3.

Exception: Unlimited area buildings in accordance with Section 507.

2. Add new table as follows:

TABLE 503.3
PERCENT REDUCTION OF AREA PER FLOOR FOR SPRINKLERED BUILDINGS

Construction Type	Stories										
	1	2	3	4	5	6	7	8	9	10	> 10
1-A, 1-B	None	None	None	None	None	None	None	None	None	None	None
2-A	None	None	5%	10%	15%	18%	25%	30%	35%	40%	40%
Other	None	None	20%	20%	30%	40%	50%	60%	70%	80%	80%

3. Revise as follows:

506.3 Automatic sprinkler system increase. Where a building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 and 903.3.1.2, the area limitation in Table 503 is permitted to be increased by 200 percent (I_s = 200 percent) for multi story buildings and 300 percent (I_s = 300%) for single story buildings.

Exception: Group H-1, H-2 or H-3.

Reason: The aggregate floor area reductions that were approved during the final hearings are too restrictive. They were passed because it was the only game in town, since no modifications were permitted from the floor. I think many agreed that some restriction was needed to prevent oversized non-sprinklered buildings. The change proposed is from the 1999 Edition of the BOCA National Building Code which I feel would be an acceptable alternative. The following table clearly identifies the differences in percentage of allowable areas per floor that are in the IBC and those permitted by BOCA for the various types of construction.

Code	Construction Type	Stories										
		1	2	3	4	5	6	7	8	9	10	>10
BOCA	1-A	100	100	100	100	100	100	100	100	100	100	100
	1-B	100	100	100	100	100	100	100	100	100	100	100
	2-A	100	100	95	90	85	80	75	70	65	60	60
	Other	100	100	80	80	70	60	50	40	30	20	20
IBC	Other	100	100	100	75	60	50	43	39	33	30	30

The addition of the reference to Section 903.3.1.2 is necessary to permit the increases for both a NFPA 13 and a NFPA 13R system. This was the intent of the committees and the membership.

G83-00

Committee Action: **Disapproval**

Committee Reason: Before this kind of change can be considered, the impact of the proposed table on the total allowable area of buildings should be presented, and some substantiation of the resulting effects.

Assembly Action: **No Motion**

G85-00 D

Table 503

Proposed Change as Submitted:

Proponent: Lee G. Jones and Karl D. Houser, Association of the Wall and Ceiling Industries, Intl., representing AWCI Fire Safety Task Group

Revise as follows:TABLE 503

ALLOWABLE HEIGHT AND BUILDING AREAS
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building", per floor.

		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) Area	UL	160	65	55	65	55	65	50	40
A-1	S	UL	5	3	2	3	2	3	2	1
	A	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
A-2	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-3	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-4	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-5	S	UL	UL	UL	UL	UL	UL	UL	UL	UL
	A	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	S	UL	~~11~~ 7	5	4	5	4	5	3	2
	A	UL	~~UL~~ 38,000	~~37,500~~ 27,000	~~23,000~~ 18,500	~~28,500~~ 23,500	~~19,000~~ 17,500	~~36,000~~ 25,000	~~18,000~~ 15,500	~~9,000~~ 8,000
E	S	UL	5	3	2	3	2	3	1	1
	A	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500

(Portions of Table not shown do not change)

Reason: Our national fire losses remain among the highest in the industrialized world. Although automatic fire sprinklers are an important part of building fire protection, we must also control the extent of the fire risk in a given fire area and increase the building's ability to resist the effects of a fire. This is accomplished with fire compartmentation or a proportional increase in the fire resistance of structural elements when a larger building is designed.

The existing 2000 IBC Table of Allowable Heights and Areas was somewhat of a compromise among the existing heights and areas of the three model building codes. It was recognized during the development of the 2000 IBC draft and related code hearings that some of the individual tabular entries allowed buildings of far too great a height and/or area than that found in any of the three model codes. Instead of accepting the recommendations of the 1988 Board for the Coordination of Model Codes Report on Heights and Areas, it was recommended that individual entries be analyzed and brought back for consideration.

This code change is one of a series that resulted from the attached analysis focusing on some of the extremes of select occupancies. The maximum potential area of a building was computed based on use group, construction type, base tabular area, maximum permitted open perimeter/street frontage increase, installation of automatic fire sprinklers, and number of stories. The resulting values were compared to the values in the existing model codes using the maximum area increase factors for open perimeter and automatic sprinklers. Where significant discrepancies were identified, more rationale values have been proposed. In addition to comparing the percent change between the 2000 IBC and the 2003 IBC, what is significant is the comparison to the values derived from the three model codes (attached). Generally, the proposed 2003 IBC values remain substantially above those found in the three model codes. In other cases, the proposed values fall in between the most restrictive and the least restrictive values available in today's model building codes. Examination of the percent change between the 2000 edition and the 2003 IBC illustrates just how extreme many values are in the 2000 IBC. Only one change to the allowable number of stories is proposed that being for Type IB construction which is proposed to be consistent with the *National Building Code*.

This proposal does not limit construction. It simply intends to do what has been done for decades - when one constructs a building of greater potential fire risk or fire area, those risks need to be offset by the use of more fire-resistant construction by moving "up" the table to another construction type and/or by providing a complete automatic fire sprinkler system.

	GROUP "B" - BUSINESS 1 STORY Type of Construction									
CODE	BOCA IA	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB

2000 IBC[1]	N/A	UL	UL	178,125	109,250	135,375	90,250	171,000	85,000	42,750
2003 IBC[1] (as proposed)	N/A	UL	180,500	128,250	87,875	111,625	83,125	118,750	73,625	38,000
1999 NBC[2]	N/A	UL	153,900	101,250	64,800	89,100	64,800	97,200	68,850	32,400
1997 UBC[3]	N/A	UL	239,400	108,000	72,000	108,000	72,000	108,000	84,000	48,000
1999 SBC[4]	N/A	UL	UL	102,000	68,000	84,000	56,000	102,000	54,000	36,000
% CHANGE (between 2000 IBC and as proposed)		0	YES	28	20	18	8	31	14	11

1-For the IBC, the maximum area multiplier from Sections 506.1, 506.2, and 506.3.

2-For the NBC, the maximum area multiplier from Sections 506.2 and 506.3.

3-For the UBC, the maximum area multiplier from Sections 504, 505.1.3, and 505.3

4-For the SBC, the maximum area multiplier from Table 500 and Sections 503.3.2 and 503.3.3.

	GROUP "B" - BUSINESS 2 STORY Type of Construction									
CODE	BOCA IA	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
2000 IBC[1]	N/A	UL	UL	140,625	86,250	106,875	71,250	135,000	67,500	33,750
2003 IBC[1] (as proposed)	N/A	UL	142,500	101,250	69,375	88,125	65,625	93,750	58,125	30,000
1999 NBC[2]	N/A	UL	153,900	101,250	64,800	89,100	64,800	97,200	68,850	32,400
1997 UBC[3]	N/A	UL	239,400	108,000	72,000	108,000	72,000	108,000	84,000	48,000
1999 SBC[4]	N/A	UL	UL	102,000	68,000	84,000	56,000	102,000	54,000	36,000
% CHANGE (between 2000 IBC and as proposed)		0	YES	28	20	18	8	31	14	11

1-For the IBC, the maximum area multiplier from Sections 506.1, 506.2, and 506.3.

2-For the NBC, the maximum area multiplier from Sections 506.2 and 506.3.

3-For the UBC, the maximum area multiplier from Sections 504, 505.1.3, and 505.3

4-For the SBC, the maximum area multiplier from Table 500 and Sections 503.3.2 and 503.3.3.

Committee Action: **Disapproval**

Committee Reason: The methods used by the proponent for calculation of the new area limitations for Groups B, E, I-2, and H-5 in proposed changes G85-00, G-86-00, G87-00, and G88-00 are not clearly explained. It has not been demonstrated that the new limitations in area and number of stories are reasonable by an objective standard. It has not been demonstrated that the rational method used to arrive at the new numbers was consistently applied, and there appears to be inconsistencies in the proposed new entries to

the table. Concentration on occupancy groups which have a good fire record, as opposed to others which do not, has not been explained. The method used for comparison of allowable areas is inconsistent with the method used by the code development committee in establishing the current limits.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment

Lee G. Jones/Karl D. Houser, Assn. of the Wall & Ceiling Industries-International, requests Approval as Submitted.

Commenter's Reason: The attached charts graphically depict the disparity in the allowable area of Group B buildings in the 2000 *International Building Code* as compared to the three model building codes. The square footages in the bar graphs and spreadsheets were derived by taking the "fully-loaded" values obtained by applying allowable factors for automatic sprinkler protection, open perimeter/street frontage, and number of stories. The values were then compared and adjusted to reflect more harmonized values that align themselves closer to the building areas now allowed under the *National Building Code*, the *Standard Building Code*, and the *Uniform Building Code*. *In almost every case the allowable areas are still greater than those derived from two or more of the model codes.*

It was recognized during the development of the 2000 IBC that some of the individual tabular entries allowed buildings of far too great a height and/or area than that found in any of the three model codes. Instead of accepting the recommendations of the 1988 Board for the Coordination of Model Codes' "Report on Heights and Areas," it was recommended that individual entries be analyzed and brought back for consideration. We have tried to do what the code development committees requested.

The existing 2000 IBC Table of Allowable Heights and Areas was somewhat of a compromise among the existing heights and areas of the three model building codes - it also struck out in a new direction. Unfortunately, that "new direction" liberalized values without necessarily considering the fire record and fire loss statistics our nation has under the existing model codes. Our national fire losses remain among the highest in the industrialized world. Although automatic fire sprinklers are an important part of building fire protection, we must also control the extent of the fire risk in a given fire area and increase the building's ability to resist the effects of a fire. This is accomplished with fire compartmentation or a proportional increase in the fire resistance of structural elements when a larger building is designed.

This proposal does not limit construction. It simply intends to do what has been done for decades - when one constructs a building of greater potential fire risk or fire area, those risks need to be offset by the use of more fire-resistant construction by moving "up" the table to another construction type and/or by providing a complete automatic fire sprinkler system.

G90-00 D
Table 503

Proposed Change as Submitted:

Proponent: Rick Thornberry, P.E., The Code Consortium, Inc., representing W.R. Grace & Company

Delete and substitute the contents to Table 503 as follows:

(Underline omitted for clarity in the table.)

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building", per floor are expressed in 1,000's of square feet.

		TYPE OF CONSTRUCTION								
HEIGHT (feet)		**TYPE I**		**TYPE II**		**TYPE III**		**TYPE IV**	**TYPE V**	
		A	**B**	**A**	**B**	**A**	**B**	**HT**	**A**	**B**
Group	**Hgt/Area**	**UL**	**60**	**65**	**55**	**65**	**55**	**65**	**50**	**40**
A-1	H	UL	5	3	1	2	1	1	2	NP

	A	UL	22.5	15.0	12.0	14.5	12.0	12.0	12.0	NP
A-2	H	UL	5	3	1	2	1	2	2	1
	A	UL	19.5	13.5	10.5	13.0	10.5	13.0	11.0	6.0
A-3	H	UL	5	3	1	2	1	2	2	1
	A	UL	15.0	11.0	7.5	10.5	7.0	11.0	7.5	4.5
A-4	H	UL	5	3	2	2	1	2	2	1
	A	UL	46.5	28.5	20.5	27.0	20.5	28.0	21.0	14.5
A-5	H	UL	UL	3	2	2	1	2	2	1
	A	UL	53.5	32.5	23.0	30.5	23.0	32.0	24.0	16.0
B	H	UL	7	4	3	4	2	4	3	
	A	UL	37.0	23.0	17.0	22.0	17.0	23.0	17.5	12.5
E	H	UL	5	3	2	2	1	2	2	1
	A	UL	33.5	21.0	16.0	20.5	15.5	21.5	16.0	11.5
F-1	H	UL	5	3	2	3	2	3	2	1
	A	UL	24.5	16.0	12.5	15.5	12.5	16.0	12.5	8.5
F-2	H	UL	UL	4	3	4	2	4	3	
	A	UL	43.0	26.5	19.5	25.0	19.0	26.0	19.5	13.5
H-1	H	3	2	1	1	NP	NP	NP	NP	NP
	A	15.0	12.5	5.5	3.5	NP	NP	NP	NP	NP
H-2	H	3	2	1	1	1	1	1	1	1
	A	15.0	12.5	5.5	3.5	5.5	3.5	5.5	4.5	2.5
H-3	H	UL	5	2	1	2	1	2	2	1
	A	UL	25.5	11.0	7.5	11.0	7.5	11.0	9.0	5.0
H-4	H	UL	6	3	2	3	2	3	3	1
	A	UL	40.0	18.0	12.0	18.0	12.0	18.0	14.0	8.0
H-5	H	3	3	3	3	3	2	3	3	2
	A	UL	37.0	23.0	17.0	22.0	17.0	23.0	17.5	12.5
I-1	H	UL	5	3	1	3	1	2	2	1
	A	UL	13.5	9.5	6.0	9.0	6.0	9.5	6.5	3.5
I-2	H	UL	4	2	1	1	NP	1	1	NP
	A	UL	18.5	1	3.0	10.5	12.5	NP	13.0	10.5
					NP					
I-3	H	UL	4	2	1	2	1	1	1	NP
	A	UL	12.5	8.5	5.5	8.0	5.5	8.5	5.5	NP
I-4	H	UL	5	3	2	2	1	2	2	1
	A	UL	33.5		21.0	16.0	20.5	15.5	21.5	16.0
					11.5					
M	H	UL	5	4	2	3	2	3	3	2
	A	UL	19.0	13.0	10.5	12.5	10.5	13.0	11.0	6.0
R-1	H	UL	12	4	2	4	2	4	3	2
	A	UL	18.5	12.5	10.5	12.5	10.0	12.5	10.5	6.0
R-2	H	UL	12	4	2	4	2	4	3	2
	A	UL	15.0	11.0	8.0	10.5	7.5	11.0	8.0	4.5
R-3	H	UL	11	4	4	4	4	4	3	3
	A	UL	UL	UL	UL	UL	UL	UL	UL	UL
R-4	H	UL	12	4	2	4	2	4	3	2
	A	UL	15.0	11.0	8.0	10.5	7.5	11.0	8.0	4.5
S-1	H	UL	5	3	2	3	2	3	2	1
	A	UL	32.5	21.0	15.0	19.5	15.5	20.5	16.0	11.5
S-2	H	UL	UL	4	3	4	2	4	3	2
	A	UL	61.5	37.0	26.0	34.5	25.5	36.5	26.5	17.5
U	H	UL	5	4	2	3	2	4	2	1
	A	UL	35.5	19.0	8.5	14.0	8.5	18.0	9.0	5.5

1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

Reason: The liberal approach taken by the IBC Occupancy Subcommittee during the drafting of the IBC by utilizing the greatest allowable area and height of any of the three model building codes appears to be very excessive and unwarranted. One of the main reasons expressed for utilizing this approach was that it would accommodate all existing buildings once the International Building Code was adopted by a local jurisdiction. However, Section 102.7 already allows the "grandfathering" of existing building construction types so that any modifications, alterations, or additions to existing buildings would not be adversely impacted by the height and area table.

Please refer to the attached set of graphs which are intended to represent the maximum allowable areas for multi-story buildings

for the various types of construction classifications presently contained in the International Building Code for Group B, Group F-1, and Group R-2 Occupancies. The groups of vertical bar graphs are read from left to right using the key to the far right of each set of graphs reading vertically downward so that the BOCA National Building Code (NBC) would be the first vertical bar on the left of each group of bar graphs identified by Type of Construction .

An evaluation of these graphs clearly indicates that the present allowable areas of the IBC are generally excessive for the higher types of construction. This is because of the methodology used by the IBC Occupancy Subcommittee which was based on taking the most liberal areas allowed by any of the three national model building codes. It is also readily obvious by these graphs that the BCMC approach using the height and area tables proposed in this code change are more in line with the present three model building code area limitations. We believe that this would be the preferable approach to take regarding the allowable heights and areas under the International Building Code.

The BCMC approach was based on an extensive study that was conducted over many years by the BCMC which resulted in the Building Heights and Areas Report dated February 9, 1988. The height and area table developed in that report was based on a rational evaluation of the three model building codes' existing height and area tables with various factors incorporated to develop a systematic approach to the comparative allowable areas for the various types of construction based on the Use Group Classifications. That report was developed through the consensus process of the BCMC which requires a super majority vote of the representatives of the three model code groups and the NFPA. So why ignore what the BCMC accomplished and "reinvent the wheel"?

Since each of the three model building codes will be significantly affected when the allowable height and areas are finally incorporated into the International Building Code, it would seem reasonable that the new table be based on something more rational than the present Table 503 in the IBC. It would appear to be more appropriate to utilize the BCMC approach since it was arrived at through consensus of the three model building code groups. It would also appear to be a reasonable compromise that would be more acceptable to the three model building code groups than to take the most liberal of the allowable heights and areas and apply them across the board.

Since the BCMC allowable building height and area table was developed before the Use Groups H-5, I-4, R-4, and U were created, we have inserted the numbers for these use groups based on a comparative analysis of these occupancies to the existing occupancies in the BCMC table. For example, the Use Group H-5 was equated to a Use Group B with the exception that the maximum story height was limited to 3 stories which was the premise of the original proposal that introduced the H-5 occupancy classification into each of the model codes. The Use Group I-4 limits match those of the BCMC Use Group E and the Use Group R-4 values match those of the BCMC Use Group R-2. However, the numbers used for Use Groups R-3 and U are identical to those shown in Table 503 of the IBC.

In conclusion, we have a significant concern that with the increased allowable areas for most buildings in the present Table 503, we will eventually begin to see an increase in the amount of fire losses in those jurisdictions that adopt the International Building Code. This is because with the greater areas there will be more use of combustible construction and less use of fire-resistive construction to help limit the size of fires and the damage they cause. This would also have an impact on the degree of life safety provided in the building which is much more difficult to quantify, but nevertheless very real.

Figure 1
Comparison of Aggregate Floor Areas
(Automatic Sprinklers + Full Open Space)

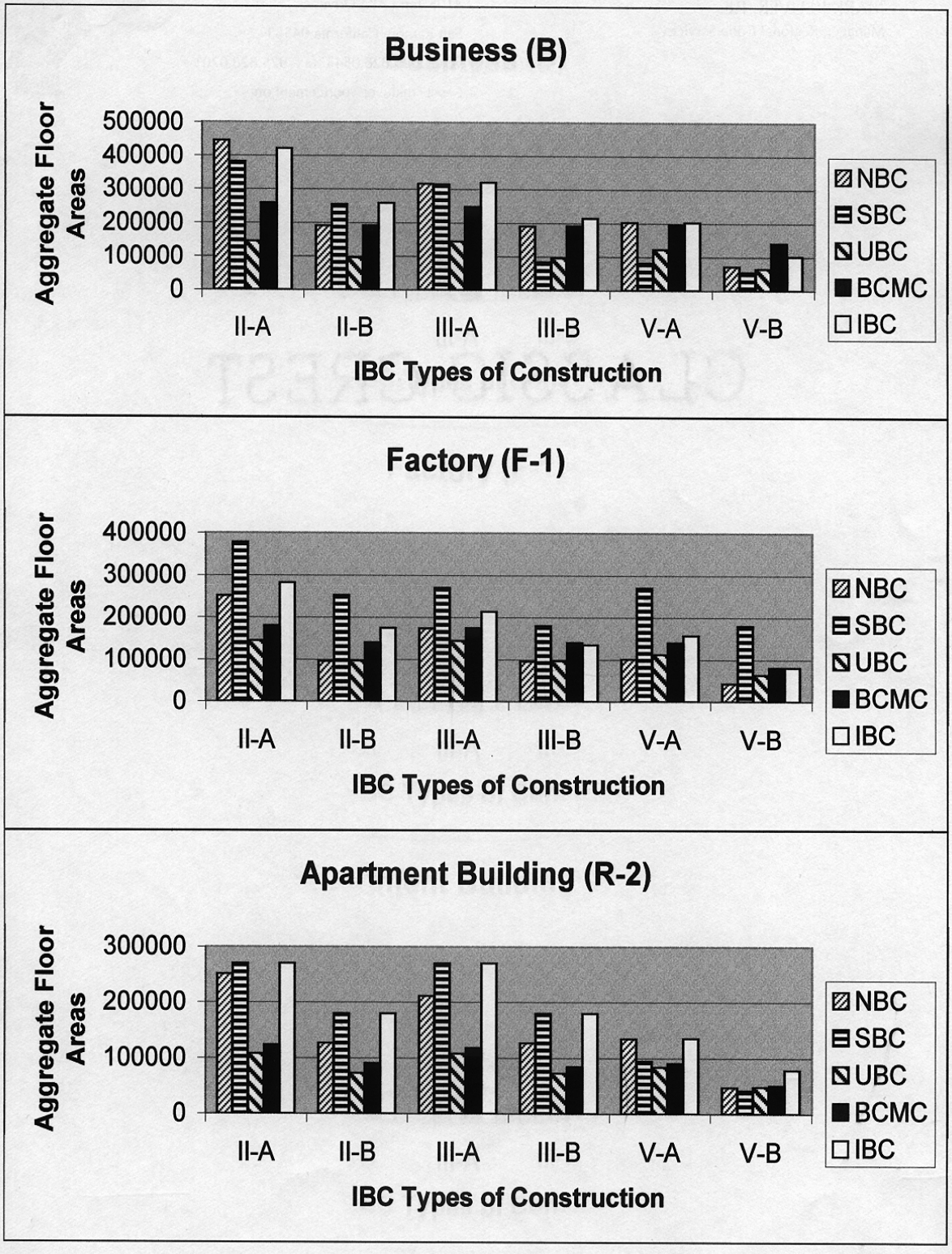
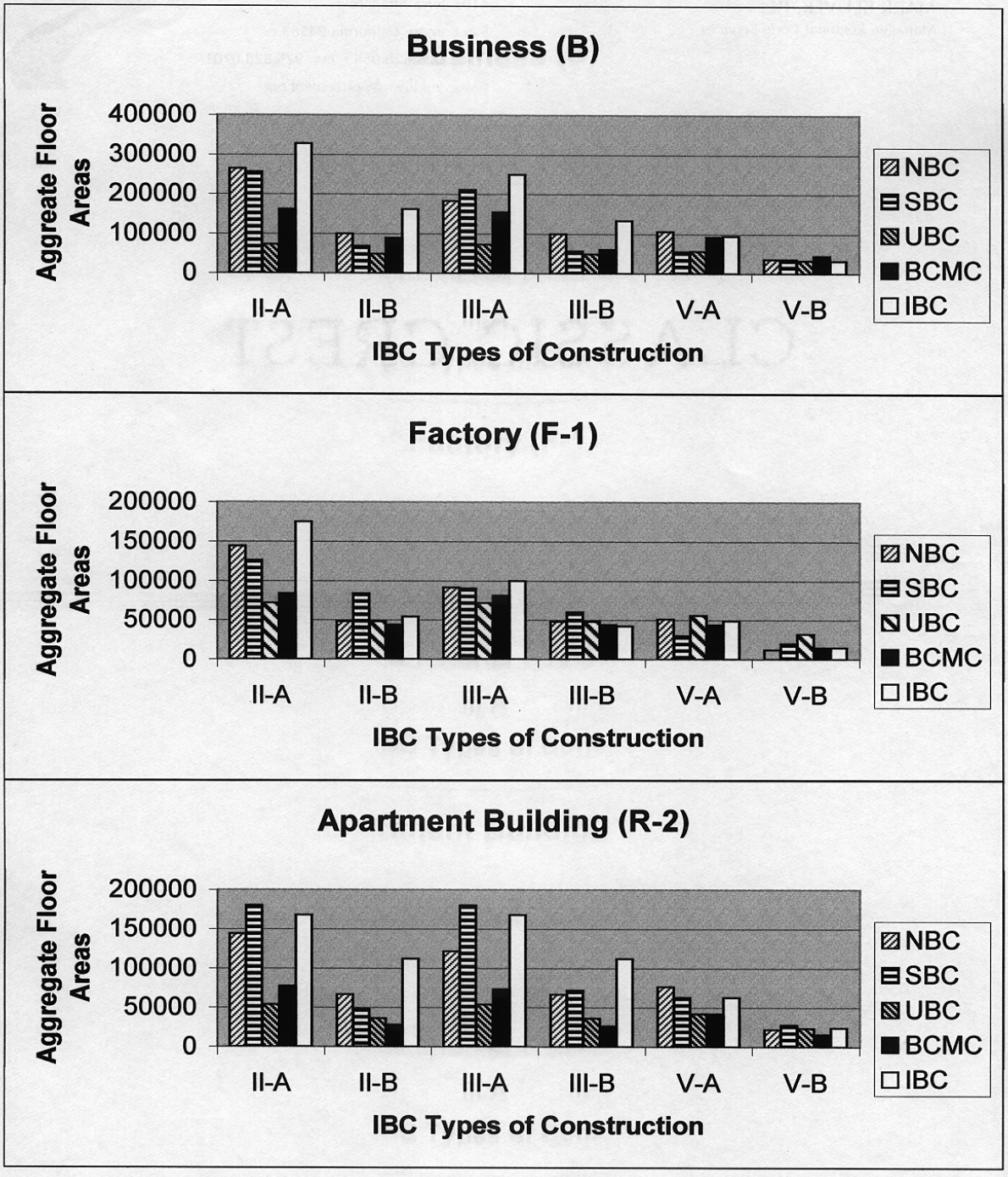


Figure 2
Comparison of Aggregate Floor Areas
(Full Open Space)



Committee Action: **Disapproval**

Committee Reason: Disapproval is consistent with action taken on preceding proposed changes which were similar. Proposed changes to the area limits of Table 503 should be the result of a unified effort by all the various proponents of similar changes and the results of the study made available to the committee.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment

Rick Thornberry, P.E., The Code Consortium, representing W. R. Grace, requests Approval as Submitted.

Commenter's Reason: We are submitting this Public Comment in order to raise the awareness of the building officials who will eventually be charged with enforcing the International Building Code (IBC) when it becomes adopted in their jurisdictions. We are seriously concerned about the significant reductions that have occurred in the built-in fire resistive protection and the requirements for noncombustible construction which have resulted from the incorporation of Table 503 which is based on the greatest allowable heights and areas of each of the three model codes from which the table was derived. Obviously, when such an approach is taken, the allowable areas and heights will be much greater for a given occupancy and type of construction which will vary by type of construction and occupancy. This allows buildings to be larger with less built-in fire resistance and less use of noncombustible construction materials which will obviously result in greater fire losses and, in particular, higher amounts of property damage.

Table 503 has been developed without any technical substantiation or analysis to determine how the overall level of fire protection will be impacted in the IBC. The table we propose in this code change took a number of years to be developed by the Board for Coordination of the Model Codes (BCMC) by using a systematic approach in an attempt to meld the three model codes. We truly believe that a task force should be established to evaluate the impact of the height and area table on the level of fire protection that will be provided by the IBC and then develop a rational basis for determining how that level of fire protection compares to the minimums specified by the three model codes. In fact, one of the key recommendations made by the Commission on America Burning, Recommissioned under the auspices of FEMA in its recently released report under Finding #6 -- Codes and Standards for Fire Loss Reduction in the Built Environment supports this approach. The Commission recommends "The development and promulgation of a set of performance standards for buildings, with respect to fire hazards and risks, against which model codes and standards can be measured for equivalency."

We have already begun an analysis of the height and area tables to determine how the overall fire resistance ratings are reduced for a specific building occupancy and allowable height and area for the building. As an example, please refer to the four tables included with this Public Comment that evaluate buildings containing Groups B, F-1, R-2, and E occupancies by comparing the required fire resistance ratings for the maximum allowable area calculated using the allowable increases for automatic sprinklers and open space in accordance with Table 503 and Chapter 5 of the IBC with the three model building codes which served as the source documents.

It should be noted that the height and area table must also be evaluated within the context of the overall package of building code requirements as well as within the context of Chapter 5 which specifies how the allowable heights and areas may be increased based on the provisions for automatic sprinkler protection and open space surrounding the building. Those allowances simply compound the already problematic numbers contained in Table 5. In many cases not only are the fire resistance ratings significantly reduced in the IBC, but combustible construction materials are allowed for buildings that would otherwise not be allowed for many of the cases evaluated under the three model building codes as evidenced in the four tables.

We urge building officials to do their own comparisons of the allowable heights and areas in the IBC in relationship to the allowable heights and areas of their specific code adopted in their jurisdiction. We believe you will be unpleasantly surprised and concerned about how significant the allowable areas and heights can be in the IBC.

FIRE RESISTANCE RATINGS
COMPARISON

BASED ON MAXIMUM ALLOWABLE AREA FOR IBC TYPE II-A CONSTRUCTION

Group B Occupancy

Maximum allowable area (AS + open space) = 421,875 SF

FIRE RESISTANCE RATINGS (Hours)

Code	Structural Frame[1]	Const. Floor	Type
NBC	1	1	2B
SBC	3 / 2	2	II
UBC	3	2	I-F.R.
IBC	1	1	II-A

Note:
[1] Where a slash (/) is shown between two numbers, the number to the left is for columns supporting floors and the number to the right is for columns supporting roofs and beams supporting floors.

FIRE RESISTANCE RATINGS
COMPARISON

BASED ON MAXIMUM ALLOWABLE AREA FOR IBC TYPE II-A CONSTRUCTION

Group F-1 Occupancy

Maximum allowable area (AS + open space) = 281,250 SF

FIRE RESISTANCE RATINGS (Hours)

Code	Structural Frame[1]	Floor	Const. Type
NBC	2 / 1½	1½	2A
SBC	1	1	IV-1 hr.
UBC	2	2	II-F.R.
IBC	1	1	II-A

Note:
[1] Where a slash (/) is shown between two numbers, the number to the left is for columns supporting floors and the number to the right is for columns supporting roofs and beams supporting floors.

FIRE RESISTANCE RATINGS
COMPARISON

BASED ON MAXIMUM ALLOWABLE AREA FOR IBC TYPE II-A CONSTRUCTION

Group R-2 Occupancy

Maximum allowable area (AS + open space) = 270,000 SF

FIRE RESISTANCE RATINGS (Hours)

Code	Structural Frame[1]	Const. Floor	Type
NBC	2 / 1½	1½	2A
SBC	1	1	IV-1 hr.
UBC	3	2	I-F.R.
IBC	1	1	II-A

Note:
[1] Where a slash (/) is shown between two numbers, the number to the left is for columns supporting floors and the number to the right is for columns supporting roofs and beams supporting floors.

FIRE RESISTANCE RATINGS
COMPARISON

BASED ON MAXIMUM ALLOWABLE AREA FOR IBC TYPE II-A CONSTRUCTION

Group E Occupancy

Maximum allowable area (AS + open space) = 298,125 SF

FIRE RESISTANCE RATINGS (Hours)

Code	Structural Frame[1]	Floor	Const. Type
NBC	2 / 1½	1½	2A
SBC	3 / 2	2	II
UBC	2	2	II-F.R.
IBC	1	1	II-A

Note:
[1] Where a slash (/) is shown between two numbers, the number to the left is for columns supporting floors and the number to the right is for columns supporting roofs and beams supporting floors.

G100-00 AS
507.2

Proposed Change as Submitted:

Proponent: Rick Thornberry, P.E., The Code Consortium, Inc., representing Masonry Alliance for Codes and Standards

Revise as follows:

507.2 Sprinklered One-Story: The area of a one-story Group ~~A-4,~~ B, F, M or S building or a one-story Group A-4 building 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 in width.

Exceptions: (no change)

Commenter's Reason: Requiring the Group A-4 occupancy of unlimited area to be in a building of a construction type other than Type V would be more in line with the 1997 ICBO Uniform Building Code (UBC) which does not allow any Group A occupancies in unlimited area buildings. It would also be more consistent with the 1999 SBCCI Standard Building Code (SBC) which would only allow such Group A occupancy in an unlimited area building under very limited circumstances with construction types limited to Types III, IV, and V 1-hour construction (IBC Types IV, IIB, and IIIA) provided the assembly floor is located within 21" of the street or grade level and all exits access the street by ramps having slopes not greater than 1:10 as specified in Section 503.4.3 of that code. This would also be more consistent with the 1999 BOCA National Building Code which allows the Group A-4 type occupancies (Group A-3 in BOCA) in unlimited area buildings of any type of construction except Type 5 (IBC Type V).

It is also interesting to note that during the last code cycle five code change proposals attempted to delete the Group A-4 occupancy. They were Code Changes O305, O307, O308, O309, and O313-99. Obviously, there was a significant concern that the Group A-4 occupancy should not be included as an unlimited area building. We are also concerned that Exception 2 to this section will allow the automatic sprinkler system to be omitted in these unlimited area buildings under certain conditions. Since these buildings can have very high occupant loads, they should not be permitted in unlimited area buildings constructed of Type V wood frame construction.

Due to very limiting conditions for which the SBC allows the unlimited area building of a Group A occupancy which is much more restrictive than the present requirements in Section 507.2 of the IBC and because the UBC does not allow Group A occupancies at all, it appears reasonable to limit the Group A-4 occupancy to unlimited area buildings of other than Type V construction which is what the BOCA NBC does. Furthermore, no technical justification was provided when the Group A-4 occupancy was originally incorporated into the IBC.

Committee Action: **Approved as Submitted**

Committee Reason: Approved in accordance with the proponent's reason statement.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment

Lawrence Brown, CBO , National Association of Home Builders, requests Disapproval.

Commenter's Reason: The proponent did not provide any data that supports limiting the area of a one story A-4 occupancy of Type V construction when a full NFPA 13 sprinkler system is installed. A sprinkler system works in conjunction with other requirements such as egress and fire separation to protect the occupants and prevent property loss. Just because the proponent believes this proposal "appears reasonable" is not grounds for acceptance. Changes to the IBC should be based on relevant data and fact, not insinuation or the use of one material over another. This proposal should be disapproved.

E48-00-WP
1004.3.2.1 (IFC 1004.3.2.1)

Proponent: Tom Allen, AIA, Smoke Guard Corporation, representing himself

Revise as follows:

1004.3.2.1 Construction. Corridors shall be fire-resistance rated in accordance with Table 1004.3.2.1. The corridor walls required to be fire-resistance-rated shall comply with Section 708 for fire partitions. Corridor walls not required to have a fire resistance rating in accordance with Table 1004.3.2.1 shall be constructed with partitions that form a barrier to limit the transfer of smoke. The partitions shall extend from the floor to the underside of the floor or roof deck above, or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke. All doors shall comply with Section 714.2.3 and are not required to be fire resistance rated. Ducts penetrating the corridor shall be protected by smoke dampers complying with Section 715.5.5 for smoke barriers.

(Remainder of Section unchanged)

Reason: This proposal defines the method of construction for a particular design option. When a design professional designs a corridor which confines the exit access to a single path of travel bounded by walls and ceilings, the occupants relying on the corridor must be protected against both fire and smoke. Fire rated construction addresses both fire and smoke. Sprinklers have good success in addressing the fire but are not designed to stop smoke migration. In a sprinklered building the corridor, when provided, does not need to be fire rated but needs to limit the migration of smoke.

Automatic fire sprinklers are effective for controlling the growth of fire but are not designed to limit smoke migration. NFIRS data shows that in a fire where sprinklers were present and activated, the smoke migrated beyond the room origin 30% of the time. The recent NFPA Research Foundation's work on positive pressure testing for doors illustrates that large quantities of smoke can escape through the door at temperatures likely in a sprinklered fire.

Sprinklered smoke is not as buoyant as hot smoke and fills the space between floor and ceiling completely. It is dense and impossible to crawl under.

Unlike open floor plans which permit smoke to be easily identified and avoided, a closed corridor which restricts the means of egress to a common path of travel may force building occupants to egress past the fire to find an exit.

E48-00

Withdrawn by Proponent

E51-00-D
Table 302.1.1, 1004.3.2.1 (IFC 1004.3.2.1)

Proponent: Tom Allen, AIA, Smoke Guard Corporation

Add new text as follows:

TABLE 302.1.1
INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION[a]
Corridor serving an occupant load greater than 30	1 hour or provide automatic fire extinguishing system
Elevator lobby enclosure	1 hour or provide automatic fire extinguishing system

(Remainder of table unchanged)

302.1.1.1 Separation. Where Table 302.1.1 requires a fire-resistance-rated separation, the incidental use area shall be separated from the remainder of the building with a fire barrier, except for corridors which shall be constructed in accordance with Section 1004.3.2.1. Where Table 302.1.1 permits an automatic fire-extinguishing system without a fire barrier, the incidental use area shall be separated by construction capable of resisting the passage of smoke. The partitions shall extend from the floor to the underside of the fire-resistance-rated floor/ceiling assembly or fire-resistance-rated roof/ceiling assembly or to the underside of the floor or roof deck above. Doors shall be self-closing or automatic-closing upon detection of smoke. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80.

Revise as follows:

1004.3.2.1 Construction. Corridors shall ~~be fire-resistance rated in accordance with Table 1004.3.2.1.~~ comply with Section 302.1.1. The corridor walls required to be fire resistance rated shall comply with Section 708 for fire protection.

Exceptions:
1. ~~A fire-resistance rating is not required for~~ Corridors in an occupancy in Group E where each room that is used for instruction has at least one door directly to the exterior and rooms for assembly purposes have at least one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. ~~A fire-resistance rating is not required for~~ Corridors contained within a dwelling unit or a guestroom in an occupancy in Group R.
3. ~~A fire-resistance rating is not required for~~ Corridors in open parking garages.
4. ~~A fire-resistance rating is not required for~~ Corridors in an occupancy in Group B which is a space requiring only a single means of egress complying with Section 1004.2.1.

~~**TABLE 1004.3.2.1**~~
~~**CORRIDOR FIRE-RESISTANCE RATING**~~

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system[c]
H-1, H-2, H-3	All	1	1
H-4, H-5	Greater than 30	1	1
A, B, E, F, M, S, U	Greater than 30	1	0
R	Greater than 10	1	1
I-2[a], I-4	All	Not Permitted	0
I-1, I-3	All	Not permitted	1[b]

a For requirements for occupancies in Group I-2, see Section 407.3.
b For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.7.
c Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Revise as follows:

707.14.1 Elevator lobby. Elevators opening into a fire-resistance-rated corridor as required by Section 1004.3.3 302 shall be provided with an elevator lobby at each floor containing such a corridor. The lobby shall completely separate the elevators from the corridor by fire barriers and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:
1. In office buildings, separations are not required from a street floor elevator lobby provided the entire street floor is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 707.2.
3. Where additional doors are provided in accordance with Section 3002.6.
4. In other than Groups I-2 and I-3, and buildings more than four stories above the lowest level of fire department vehicle access, lobby separation is not required where the building, including the lobby and corridors leading to the lobby, is protected by an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2.

Revise as follows:

407.3.1 Corridor doors. Corridor doors, other than those in a wall required to be rated by Section 302.1.1 Table 302.1.1 for incidental use area rooms such as storage rooms, or for the enclosure of a vertical opening or an exit, shall not have a required fire protection rating and shall not be required to be equipped with self-closing or automatic-closing devices, but shall provide an effective barrier to limit the transfer of smoke and shall be equipped with positive latching. Roller latches are not permitted. Other doors shall conform to Section 714.2.

Revise as follows:

708.3 Fire-resistance rating. The fire-resistance rating of the walls shall be 1 hour.

Exceptions:

~~1. Corridor walls as permitted by Table 1004.3.3.1.~~

2. Dwelling unit and guestroom separations in buildings of Types IIB, IIIB and VB construction shall have fire-resistance ratings of not less than ½ hour in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

Reason: Corridors and elevator lobby enclosures are areas incidental to the main occupancy of the floor. These use areas are intended to protect people during a building emergency. When building occupants are confined within a specific area during a fire, it is important to protect them against the effects of fire and smoke.

Under this proposal, all corridors serving an occupant load greater than 30 would provide smoke protection and not be required to have a fire rating when sprinklers are provided. This change standardizes corridor requirements for all use groups and simplifies the code, the design, and the enforcement.

E51-00

Committee Action: **Disapproval**

Committee Reason: The requirement for a 1 hour rated corridor would be deleted where only the corridor has a sprinkler system installed. Requirements for penetrations would be deleted. Elevator lobbies would not be required where a sprinkler system is installed only in the corridor since the corridor would not be required to have a fire resistance rating. These proposed revisions have not been justified. The corridor requirements should not be located in the incidental use table. The purpose of the incidental use Table 302.1.1 is to address hazards within a space. Corridors do not have hazards within them that the code is addressing.

Assembly Action: **No Motion**

FS5-00 AS
704.9

Proposed Change as Submitted:

Proponent: Ron Nickson, National Multi Housing Council

Revise as follows:

704.9 Vertical separation of openings. Openings in exterior walls in adjacent stories shall be separated vertically to protect against fire spread on the exterior of the buildings where the openings are within 5 feet (1524 mm) of each other horizontally and the opening in the lower story is not a protected opening in accordance with Section 714.3.7. Such openings shall be separated vertically at least 3 feet (914 mm) by spandrel girders, exterior walls or other similar assemblies that have a fire-resistance rating of at least 1 hour or by flame barriers that extend horizontally at least 30 inches (762 mm) beyond the exterior wall. Flame barriers shall also have a fire-resistance rating of at least 1 hour. The unexposed surface temperature limitations specified in ASTM E 119 shall not apply to the flame barriers or vertical separation unless otherwise required by the provisions of this code.

Exceptions:

1. This section shall not apply to buildings that are three stories or less in height.
2. This section shall not apply to buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 <u>or 903.3.1.2</u>.
3. Open parking garages.

Reason: The intent of Section 704.9 is to prevent a fire from extending vertically through a building via the exterior by passing out of an exterior window on one floor and re-entering the building on a floor above. A sprinklered building exception is already provided in Exception 2, which permits omission of external flame barriers when a building is protected by an NFPA 13 sprinkler system. The purpose of this proposal is to extend application of Exception 2 to include buildings not exceeding 4-stories in height that are protected by NFPA 13R systems.

Because the intended application of Section 704.9 involves preventing a fire in an occupied area from going out a window, any sprinkler system that is capable of protecting occupied spaces satisfies the intent of Exception 2. NFPA 13R protection should be

recognized under this exception because in occupied residential areas, the level of protection provided by an NFPA 13R system is identical to the level of protection provided by an NFPA 13 system. The required type of sprinkler (fast response-residential), discharge density, sprinkler spacing and water supply requirements will all be the same with either type of system.

Because an NFPA 13R system provides equivalent protection to an NFPA 13 system with respect to application of this section, NFPA 13R systems should be given equivalent recognition in Exception 2. It should be noted that approval of this proposal only impacts multifamily residential occupancies that are exactly 4 stories in height. One to three story buildings are already exempted from Section 704.9 based on Exception 1, and application of NFPA 13R is limited in the document's scope to buildings not exceeding 4-stories in height.

Analysis: This proposal is identical to FS29-99 which was disapproved due to a concern of the lack of sprinkler protection in concealed spaces with a 13R system. The proponent has expanded his reason in this proposal compared to FS29-99.

Committee Action: **Approval as Submitted**

Committee Reason: Based on proponent's published reason. NFPA 13R sprinkler systems are applicable to buildings up to 4 stories in height which is exactly the scope of Exception 2 since Exception 1 exempts buildings of 3 stories and less. In protected areas, a NFPA 13R system provides the same level of protection as a NFPA 13 system.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment

Rick Thornberry, P.E., The Code Consortium Inc., representing Masonry Alliance for Codes and Standards, requests Disapproval.

Commenter's Reason: We believe this code change should be disapproved since it allows the use of an NFPA 13R sprinkler system as a trade-off for the one-hour exterior wall or flame barriers required to separate exterior wall openings located above one another in buildings more than three stores in height.

Presently, this section requires that openings in exterior walls which are located above one another must be separated by a one-hour exterior wall construction for a minimum of 3 feet or a flame barrier having a horizontal projection of at least 30 inches beyond the exterior wall. And Exception 2 only allows the one-hour flame barrier or exterior wall construction to be eliminated if the building is protected throughout with an NFPA 13 sprinkler system in accordance with Section 903.3.1.1.

Since an NFPA 13R sprinkler system will allow a floor-ceiling assembly containing combustible concealed spaces not to have an automatic sprinkler system installed therein, yet still comply with the standard, there is a significant possibility that a fire originating within the concealed floor-ceiling assembly could break through the exterior wall and expose the window openings on the floor directly above, even if the rest of the building were protected as required for an NFPA 13R sprinkler system. We do not believe that is appropriate fire safety especially considering the fact that the NFPA 13R sprinkler system is already allowed by Section 504.2 to permit an additional one-story and 20 foot increase in the building height not to exceed 4 stories or 60 feet. In effect, this will allow a Type VA one-hour protected wood frame construction building containing a Group R occupancy to be 4 stories and 60 feet in height. As we interpret the code, this would allow such a building, when it has a minimum 30 foot fire separation distance fronting on its nonbearing exterior walls, to have such exterior walls without a fire resistance rating.

What is more troubling is that a Type IIIA construction building containing a Group R occupancy which is sprinklered in accordance with NFPA 13R would be allowed to have exterior nonbearing walls fronting on fire separation distances of at least 30 feet without a fire resistance rating and the window openings located above one another in those exterior walls would not be required to have a one-hour flame barrier or vertical separation between them if this code change is approved.

Based on these reasons, we urge the voting membership to overturn the Committee's recommendation for Approval as Submitted and to Disapprove Code change FS5-00.

FS15-00 D
707.14.1

Proponent: Ron Nickson, National Multi Housing Council

Revise as follows:

707.14.1 Elevator lobby. Elevators opening into a fire-resistance-rated corridor as required by Section 1004.3.3 shall be provided with an elevator lobby at each floor containing such a corridor. The lobby shall completely separate the elevators from the corridor by fire barriers and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. In office buildings, separations are not required from a street floor elevator lobby provided the entire street floor is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 707.2.
3. Where additional doors are provided in accordance with Section 3002.6.
4. In other than Groups I-2 and I-3, and buildings more than four stories above the lowest level of fire department vehicle access, lobby separation is not required where the building, including the lobby and corridors leading to the lobby, is protected by an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2.
5. In Group R-2 buildings, the lobby separation is not required where the building is protected by an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: To provide an exception for the lobby fire barrier separation requirement in apartment buildings (R-2 use) that are protected with sprinklers. The requirement for sprinkler protection more than offsets the need for an elevator lobby fire barrier. Lobby separation has not been required in the BOCA National Building Code, and there is no demonstrated need for such a requirement to be added in the IBC, particularly with respect to R-2 uses.

An analysis of US Fire Administration data from the National Fire Incident Reporting System for the period 1993 to 1997, which included data on an average of approximately 43,000 fires per year in apartments, revealed the following:

1. An average of only 58 civilian injuries/year in building fires where sprinklers operated.
2. An average of only 2.6 civilian deaths/year in building fires where sprinklers operated.
3. An average of only 10 civilian injuries/year and zero deaths in the 5-year reporting period attributed to malfunctioning sprinklers.

This data excludes fires that were too small to activate sprinklers; however, elevator lobby barriers would be expected to have an inconsequential impact in such cases. For that matter, it is clearly questionable whether the presence or lack of elevator lobbies would have any significant impact on the loss statistics quoted above.

During the 1999 code cycle, proponents of elevator lobbies attempted to substantiate their position based on a need to limit the vertical migration of smoke from a fire, and they quote statistics indicating that "smoke moved off of the floor where the fire originated" in 28 percent of reported fires involving multi-story buildings. Even if these statistics are accurate, elevator lobby proponents presented absolutely no statistics on injuries, deaths or property losses that resulted from smoke migration. Furthermore, they presented no evidence to indicate whether smoke migration occurred in these cases because of elevator openings or other avenues for vertical smoke spread. Smoke migration is arguably more likely to have resulted from floor penetrations involving other shafts or mechanical, electrical or plumbing equipment, all of which will substantially outnumber elevator shaft penetrations in an average building.

It is important to note that Section 707.14.1 does not require an elevator lobby to provide a smoke barrier. The section is specifically limited to requiring a fire barrier, which would not be specifically required to limit the passage of smoke, so the impact of elevator lobbies on smoke migration would be indirect at best.

It is also important to note that the requirement for elevator lobbies does not secure a safe staging area on each floor for firefighters that may respond to a building fire. Because Section 707.14.1, Exception 3 permits additional doors in accordance with Section 3002.6 to satisfy the elevator lobby requirement, one could simply install a swinging fire door in front of the elevator door (which will probably bear its own fire resistance rating anyway), and the requirement of Section 707.14.1 would be satisfied.

In summary, 1) No evidence has been presented to demonstrate that vertical smoke migration in sprinklered buildings has a consequential impact of safety or property loss, 2) Fire loss statistics for R-2 uses clearly show that sprinklers are effective in these occupancies, 3) The code doesn't require elevator lobbies to be smoke resistant anyway, and 4) Elevator lobbies do not secure a safe staging area for firefighters. Thereby, an exception to the elevator lobby requirement for sprinklered R-2 occupancies is clearly justified.

FS19-00 D
707.14.1

Proposed Change as Submitted:

Proponent: Sarah A. Rice, Schirmer Engineering Corp., representing American Hotel & Motel Association

Delete without substitution:

~~**707.14.1 Elevator lobby.** Elevators opening into a fire-resistance-rated corridor as required by Section 1004.3.2.1 shall be provided with an elevator lobby at each floor containing such a corridor. The lobby shall completely separate the elevators from the corridor by fire barriers and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.~~

~~**Exceptions:**~~

~~1. In office buildings, separations are not required from a street floor elevator lobby provided the entire street floor is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.~~
~~2. Elevators not required to be located in a shaft in accordance with Section 707.2.~~
~~3. Where additional doors are provided in accordance with Section 3002.6.~~
~~4. In other than Groups I-2 and I-3, and buildings more than four stories above the lowest level of fire department vehicle access, lobby separation is not required where the building, including the lobby and corridors leading to the lobby, is protected by an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Reason: The premise of the IBC was to create a document that was consistent with the philosophies and provisions presently contained in the three model codes, and yet the language that appears in Section 707.14.1 of the IBC cannot be not found in any of the current model codes.

The IBC currently requires that when there is an elevator AND that elevator opens onto a floor having corridors AND those corridors are required to have a fire resistance rating THEN that elevator must be separated from the corridor by an elevator lobby. Section 707.14.1 is a stand-alone code requirement independent of building height, configuration or occupancy. Literally, it requires that an elevator located in an unsprinklered, 5-story, Group S-2 structure (i.e., parking garage) be separated from any fire resistance rated corridor by an elevator lobby.

The language in Section 707.14.1 goes far beyond the scope of any elevator lobby criteria currently contained in the model codes and literally requires the construction of elevator lobbies in many location where they are unwarranted. The *BOCA National Building Code/1999* does not have any requirements for elevator lobbies. The 1997 *ICBO Uniform Building Code* in Section 403.7 only requires elevator lobbies in high-rise buildings of Group B or R, Division 1 Occupancies. And the 1997 *SBCCI Standard Building Code*, in Section 412.6, only requires elevator lobbies in high-rise buildings of Group B or R occupancies. No other occupancies or building configurations are ever required to have elevator lobbies.

And what about those parts of the U.S. where elevator lobbies are not required at all. Are we now saying that these buildings are unsafe? If this is true, then why haven't the NFPA fire fatality statistics increased since 1990 (when the *BOCA National Building Code* replaced the requirement for elevator lobbies with a requirement for automatic sprinkler systems)? The NFPA fire fatality statistics actually say the opposite that in non-residential buildings fatalities have decreased;

1995 - 122 Fatalities,
1996 - 140 Fatalities
1997 - 120 Fatalities.

And according to NFPA from 1991-195 the Civilian Fatalities in US High Rise Buildings are:

Office Buildings	1
Hotels	0
Apartment Buildings	201

It should be noted that this far-reaching requirement was not a provision which came out of one of the model codes or even the Life Safety Code, but rather it was solely a product of the IBC Firesafety Drafting Subcommittee. The Subcommittee chose to expanded the currently recognized provisions for elevator lobbies to be applicable to all occupancies and all building configurations, not just high-rise buildings of Groups B and R. They made this revision without technical justification or statistical substantiation.

We ask the membership to re-examine the entire issue of elevator lobbies and recognize that the extent of which Section 707.14.1 is applicable is way more than was ever intended by any of the current model codes.

Bibliography:

"The Lowdown on High-Rise Fires" by John R. Hall, Jr., NFPA Journal, November/December 1997.
"1997 Fire Loss in the U.S" by Michael J. Karter, Jr., NFPA Journal, September/October, 1998.
"1996 U.S. Fire Loss" by Michael J. Karter, Jr., NFPA Journal, September/October, 1997.
"NFPA's Latest Fire Loss Figures" by Michael J. Karter, NFPA Journal, September/October, 1996.

Committee Action: **Disapproval**

Committee Reason: Smoke movement is a real issue in taller buildings. These provisions were extensively debated last cycle, with the low rise exception (Exception 4) added. The current proposal does not adequately demonstrate that the committee's previous action was incorrect. In addition to life safety issues regarding smoke migration, the current lobby provisions also reduce the cost of property damage caused by smoke.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment

Sarah A. Rice, Schirmer Engineering Corporation, representing American Hotel & Motel Association, requests Approval as Submitted.

Commenter's Reason: All three of the current model codes (BOCA, ICBO and SBCCI) regulate the spread of fire in much the same way, but the same cannot be said about smoke. The migration of smoke through a building is not regulated with the same uniformity and in some cases not the same level of intensity. This is not to say that one model code is right and one is wrong, they are just different.

The premise of the IBC was to create a document that was consistent with the philosophies and provisions presently contained in the three model codes, creating in the IBC a fair and reasonable level of safety. Yet, on the issue of elevator lobbies, the language appearing in Section 707.13.1 of the IBC cannot be not found in any of the current model codes.

The language in Section 707.13.1 goes far beyond the scope of any elevator lobby criteria currently contained in the model codes and literally requires the construction of elevator lobbies in many locations where they are unwarranted. The *BOCA National Building Code/1999* does not have any requirements for elevator lobbies. The 1997 *ICBO Uniform Building Code* in Section 403.7 only requires elevator lobbies in high-rise buildings of Group B or R, Division 1 Occupancies. And the 1997 *SBCCI Standard Building Code*, in Section 412.6, only requires elevator lobbies in high-rise buildings of Group B or R occupancies. No other occupancies or building configurations are ever required to have elevator lobbies.

All parties agree on one thing, smoke moves, e.g., "migrates." No one is disputing this, but does it move with such ferocity and in such quantity from the floor of origin to be a hazard to the occupants of a building. It is the potential ramifications or non-ramifications of that movement that remains unresolved.

We feel that the requirement for elevator lobbies does not belong in the code. The need for such construction was never technically justified through documentation. Though defendants of this provision and, and proponents of other similar smoke-related proposed code changes cite the NFPA NFIRS data as a fundamental basis for the need, no one has ever stated that the NFIRS documentation clearly demonstrates that smoke migrate in such a quantity to be a hazard to the occupants.

We ask the membership to re-examine the entire issue of elevator lobbies and recognize that the extent of which Section 707.13.1 is applicable is way more than was ever intended by any of the current model codes.

FS37-00 D
715.5.3.1; 715.5.4.1

Proposed Change as Submitted:

Proponent: John Devlin, Schirmer Engineering Corporation

Revise as follows:

715.5.3.1 Penetrations of shaft enclosures. Shaft enclosures which are permitted to be penetrated by ducts and air transfer openings shall be protected with approved fire and smoke dampers installed in accordance with their listing.

Exceptions: ~~Fire dampers are not required at penetrations of shafts where:~~

1. Fire and smoke dampers are not required where steel exhaust subducts extend at least 22 inches (559 mm) vertically in exhaust shafts provided there is a continuous airflow upward to the outside.
2. Fire and smoke dampers are not required where penetrations are tested in accordance with ASTM E 119 as part of the rated assembly.

3. Fire and smoke dampers are not required where ducts are used as part of an approved smoke control system in accordance with Section 909.
4. Fire and smoke dampers are not required where the penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.
5. Smoke dampers are not required where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

715.5.4.1 Corridors. A listed smoke damper designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a corridor enclosure required to have smoke and draft control doors in accordance with Section 714.2.3.

Exceptions:

1. and 2. (No change)
3. In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

Reason: This proposal seeks to 1) revise the exceptions to Section 715.5.3.1 and 2) to add a new exception to Section 715.5.4.1.

Section 715.5.3.1

The proposed revision to Section 715.5.3.1 expands the application of the existing exceptions to address both fire dampers and smoke dampers. The proponent of the Code Change FS164-99 added the requirement for smoke dampers without full acknowledgment of the applicability of the exceptions.

Though now a code requirement, the need for smoke dampers is questionable in the first place. Prior to the 1999 ICC Code Development Cycle, smoke dampers and combination smoke/fire dampers were only required in smoke barriers, and smoke barriers were only required to be in Group I-2 and I-3 occupancies. Though all model codes require fire dampers, at present only one of the model codes, the ICBO Uniform Building Code, requires smoke dampers in other than smoke barriers. The UBC regulates smoke dampers almost in the exact way as it does fire dampers, even down to giving smoke dampers the same exceptions as fire dampers.

First, if the absence of smoke dampers is so dangerous, why are there no statistics which show that those parts of the country which do not require smoke dampers (areas using the BNBC or SBC), have a higher incidence of smoke related fatalities. The fire fatality statistics actually show the opposite. The NFPA fire fatality statistics for non-residential buildings, fatalities have actually decreased since 1995;

1995 - 122 Fatalities,
1996 - 140 Fatalities
1997 - 120 Fatalities.

And according to NFPA from 1991-1995, the Civilian Fatalities in US High Rise Buildings are:

Office Buildings	1
Hotels	0
Apartment Buildings	201

Without the justification that the absence of smoke damper is dangerous, why should they not be looked upon in the same light as fire dampers. We propose that until documentation is provided which demonstrates the hazards of not having smoke dampers that the exceptions be applicable to both fire dampers and smoke dampers.

Section 715.5.4.1

The proposed revision to Section 715.5.4.1 seeks to adds an exception that allows the elimination of smoke dampers in fully sprinklered buildings. Smoke dampers have not been required in corridor and shaft walls in the BOCA National Building Code and SBCCI Standard Building Code and this exception for sprinkler protection will offset the code requirement in those areas. The IBC, and the 3 model codes, through many various trade-offs, recognizes the additional protection an automatic sprinkler system gives the occupants of a building.

Committee Action: **Disapproval**

Committee Reason: The current exception was added last cycle via FS164-99 and was intended to be limited to fire dampers. The contents of the building under a fire condition produce smoke and while sprinklers control a fire, they do not always extinguish the fire. Smoke dampers are necessary to abate smoke migration via the shaft. Future consideration of smoke damper exceptions should possibly be evaluated based on occupancy, the need for increase in time to evacuate and how the entire building system works relative to providing a reasonable degree of life safety.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment 1

Sarah A. Rice, Schirmer Engineering Corporation, representing American Hotel & Motel Association, requests Approval as Submitted.

Commenter's Reason: The membership of ICC heard a lot about smoke migration at the Spring Meeting in Birmingham, AL. Most people should be pretty confused by now. Trying to figure out; Who's right – who's wrong? Which statistics are right – which ones are wrong?

No matter which side of the issue you feel has merit, there is one simple truth, smoke moves, e.g., "migrates." No one is disputing this. It is the potential ramifications or non-ramifications of that movement that remain unresolved and are being debated. How fast does smoke move, where does it move to, in what density does it move, what hazard does it present, what damage does it do and what is an acceptable level of smoke? These are the unanswered issues.

The requirement for fire dampers has been in all the model codes for a long time, but the broad requirement for smoke dampers is new to users of the BOCA National Codes and the SBCCI Standard Codes. Historically, the *BOCA National Building Code* and SBCCI *Standard Building Code* only required smoke dampers in smoke barriers, a type of assembly solely associated with institutional occupancies.

The requirement for smoke dampers in shafts in the 2000 IBC was a result of FS164-99. Though the proposal gave exceptions for fire dampers, exceptions for smoke dampers were noticeably absent. The proponent of FS164-99 testified at this years Spring Meeting in Birmingham, stating that the exceptions were never intended to apply to smoke dampers, and repeatedly stated that smoke moves. It is not that property of smoke which is being disputed. Though smoke migrates, does it move with such ferocity and in such quantity from the floor of origin to be a hazard to the occupants of a building.

We feel that FS164-99 should not have been accepted without exceptions for smoke dampers as the omission of exceptions for smoke dampers was not justified by the documentation. Though the proponent of FS164-99, and proponents of other similar smoke-related proposed code changes this cycle cited the NFPA NFIRS data as a fundamental basis for their proposal, no one have ever stated that the NFIRS documentation clearly demonstrates that smoke migrate in such a quantity to be a hazard to the occupants.

Though we are all trying to work within the bounds of the provisions in the 2000 IBC and leave our territorial prejudices behind, it just seems ironic that the buildings that were constructed under the *BOCA National Building Code* or the SBCCI *Standard Building Code* would be considered unsafe if reviewed under the 2000 IBC. If there were clear cut documentation that showed that the smoke-related regulations in these codes were inadequate we would not be contending this issue. But what we find amazing is that if smoke is such a hazard, why are there no statistics that show that buildings constructed in parts of the country using either the BOCA or SBCCI codes have higher incidences of smoke-related deaths or injuries.

We ask that the membership of ICC to re-examine this issue.

Public Comment 2

Donald Amey, P.E., Montgomery County, MD, Department of Permitting Services, requests Approval as Submitted.

Commenter's Reason: Section 715.5.3.1 of the 2000 IBC requires approved fire and smoke dampers for duct penetrations of shaft enclosures. The exceptions provide for the elimination of fire dampers only, under certain circumstances. The proponent of Item FS37-00 gave what were, in my opinion, very compelling reasons for expanding the scope of the exceptions, per the content of his code change. Along with the proponent, I fail to see any submitted data in the entire code change process, which supports that there is a significant "Life Safety Peril" in current existence without smoke dampers under the conditions of the exceptions proposed in Item FS37-00. This would particularly apply to newly proposed Exception No. 5 for buildings equipped throughout with an automatic sprinkler system per 903.3.1.1.

In testimony at Birmingham, opponents to this code change item asserted that "copious quantities of smoke" can be produced in fully sprinklered buildings, and for that reason, the smoke dampers are necessary. However, in the 2000 Code Change Development Cycle publication, as well as the Birmingham testimony itself, I failed to see any technical support for that assertion.

I fully agree that "the stack effect" is very much "alive and well" in buildings, and transfers air (and much of the particulate matter in it) vertically between levels in buildings. I used to work on the twelfth floor of a fifteen story high rise, and every day we knew what was for lunch, in our first floor cafeteria, without having to check the menu. Nonetheless, regardless of anyone's opinion regarding the quality of the "cook's creations", I'm not aware of anyone who was in any physical way injured by the odors. In my view and experience, the same has historically applied to the amount of smoke produced in fully sprinklered buildings. It may be irritating, it may appear scary, and any amount obscures and looks like a lot, but I haven't seen any "track record" to support that the smoke produced in sprinklered buildings injures or kills a multiple quantity of people. That is what "copious quantities of smoke" would mean to me. In particular this would apply to those who are not "imminently involved" with the fire. With today's low RTI sprinkler heads, protection is afforded even to those who are "imminently involved" with the fire.

I'm sure that almost anyone can conjure up low probability scenarios where a functional sprinkler system might not fully extinguish a fire (the printed concern of the code change committee in the "*2000 Report Of The Public Hearing On The International Building Code"*). Nonetheless, there is significant case history where the sprinklers in partially sprinklered buildings rendered "their" portion of the building tenable from the effects of fires originating in the non-sprinklered portion, much less the far better tenability conditions of fully sprinklered buildings. It seems to me that if you "buy the opponents' arguments" against FS37-00, then it logically must follow that we have been incredibly lucky not to have had a multiple fatality fire in the multitude of fully sprinklered buildings currently lacking the smoke dampers which they assert are so essential. When it comes to fully sprinklered buildings, I'm sorry that the opponents "have such a problem sleeping at night". As for myself, my restless nights won't start until I see that multiple fatality fire in an otherwise code conforming fully sprinklered building, much less one caused by the omission of these smoke dampers.

Frankly, if the installation, operation, and maintenance of smoke dampers was a "trivial matter", I might not care so much about this "belt and suspenders" approach. Unfortunately, that is not even remotely the case. Almost every mechanical engineer with which I confer asserts that the initial installation cost of a smoke damper is about ten times the cost of a fire damper. A typical multiple story building has, on average, about three shafts (not including dwelling unit bathroom exhaust duct shafts). For a ten-story building, if each of those three shafts has a supply and return duct, we are talking about 60 dampers, each at ten times the former cost of a fire damper alone (and most ME's I know don't consider the cost of a fire damper insignificant). It doesn't take long to see how this requirement significantly would add to the cost of construction. It doesn't end with installation cost, however. Realistically, it's inadequate to provide simply for the closing of a smoke damper, because it has to be reopened after closing. Unfortunately, the highest probability for closing a smoke damper is unwanted alarm/detection, or some control malfunction, not a real fire or smoke condition. Hence, provision has to be made to readily reopen multiple smoke dampers. This realistically means motorized dampers, and a complex controlling system to operate them, which in turn will complicate and increase the cost of the fire alarm systems, which will go in our buildings. This is not to mention the historical ineffectiveness of duct smoke detectors which are required by certain provisions of 715.5.3.1. It is probably realistic to say that about 5-10% of such motors, detectors and controls would initially have factory defects, or would be prone to some other prompt breakdown. Add to this the issues regarding wiring methods, polarity, quality control, and expertise of building engineering or maintenance, and the realistic need for qualified initial and ongoing testing of the devices.

Since testing and inspection are involved, those "headaches" will transfer to our building departments, as well. I don't know too many building officials who would assert that their agencies are adequately staffed, now. Try to imagine the increased efforts, and corresponding resource needs that our agencies will assume having to oversee all of this. It is easy to see that the increased costs and "headaches" will be both initial and ongoing, both for building owners and building departments. Again, if the life safety need was adequately demonstrated and compelling, I'd be the first to say all of these "costs and headaches would be worth it", but I just don't even remotely see the evidence of that.

Over the years, I have seen many attempts to keep the membership from supporting the numerous "sprinkler tradeoffs" in our codes. All sorts of "draconian" predictions have been placed before us regarding sprinkler system reliability, underdesigned sprinkler systems, impairments, unanticipated scenarios, the inability to control the use and occupancy of our buildings, and so on. In just about every case, the membership has rejected these arguments and embraced the values of full automatic sprinkler suppression. Somehow in last year's code change cycle, we were apparently convinced that the perceived need for smoke dampers constituted an exception to this trend. From the foregoing, it should be clear that I don't agree, and now I hope many others will not, as well.

In my entire experience of the code change process, in order to place a substantive, complicated, and costly, prescriptive new requirement into the code, there had to be both significant technical substantiation, as well as a significant demonstrated need, based upon the track record of history. With regard to the former, I understand that a theoretical modeling basis was introduced in the last code cycle, but the operative word is theoretical. With regard to the latter, I'm aware of no historical substantiation of a need for this highly complicated and expensive system.

I urge the membership to overturn the standing motion of disapproval from the code change committee, so that I can offer an alternative motion for approval as submitted for FS37-00.

F45-00 AS

Proposed Change as Submitted:

Proponent: Chris Cahill, St. Paul, Minnesota Fire Department; representing Minnesota State Fire Chief Association Code Development Committee

Revise as follows:

903.2.7 Group R ~~-1~~. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area.

~~**Exceptions:**~~

~~1. Where guestrooms are not more than three stories above the lowest level of exit~~

~~discharge and each guest room has at least one door leading directly to an exterior exit access that leads directly to approved exits, no sprinkler system is required.~~

2. ~~A residential sprinkler system installed in accordance with Section 903.3.1.2 shall be allowed in buildings or portions thereof.~~

~~**903.2.8 Group R-2.** An automatic sprinkler system shall be provided throughout all buildings with a Group R-2 fire area where more than two stories, including basements, or having more than 16 dwelling units.~~

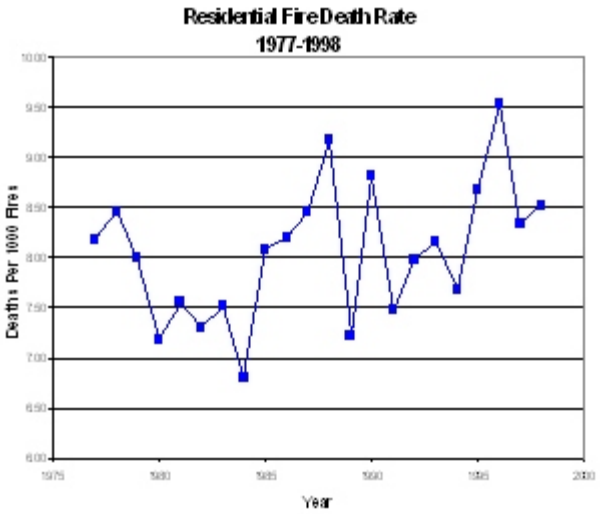
~~**Exception:** A residential sprinkler system installed in accordance with Section 903.3.1.2 shall be allowed in buildings or portions thereof.~~

~~**903.2.9 Group R-4.** An automatic sprinkler system shall be provided throughout all buildings with a Group R-4 fire area with more than 8 occupants.~~

~~**Exception:** An automatic sprinkler system installed in accordance with Section 903.3.1.2 or 903.3.1.3 shall be allowed in Group I-1 facilities.~~

Reason: We believe all fire safety professionals know the arguments for sprinklers very well. We thought for a second the reasons were so obvious the proposal should be enough. We will just mention a few highlights and comparisons. Fire deaths are dropping and the fire service has been patting themselves on the back for a job well done. Unfortunately, the decline of deaths does not put the true progress of fire safety into the proper light. Rarely is the reduction in fires mentioned. Since 1977, the number of residential fires has gone down 49% and the number of fire deaths has gone down 47%. We feel this is good correlation meaning the only reason there are less fire deaths is because there are less fires. Even more alarming is that injuries in residences have only decreased 26%. We should have had a reduction similar to the death reductions. When a fire does happen it is just as dangerous, perhaps maybe even more dangerous.

Residential fires averaged 22% of the total fires over the last 5 years. Over the same period, residential deaths averaged 82% of the total deaths and injuries averaged 74% of the total injuries.



If you look at the rates of deaths and injuries per 1000 fires the signs are even more alarming. The death and injury rates appear to be increasing. In 1998, 54 people were killed or injured in every 1000 residential fires. In 1977, 38 people were killed or injured.

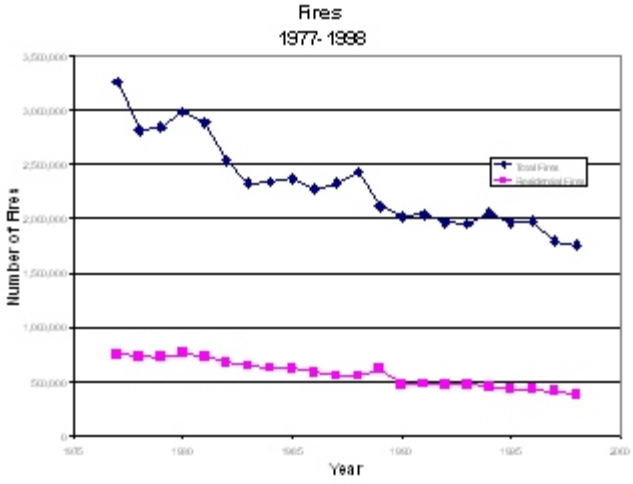
The above data is from the National Fire Protection Association. Some good news, if a linear trend continues in the reduction of fires there should be no residential fires by 2018. Obviously, this is ridiculous. We can't prevent all fires. We would agree the same rate of reduction should continue for a few more years and then level out. Based on the trends, when the fires level out the total number of deaths and injuries should start to increase.

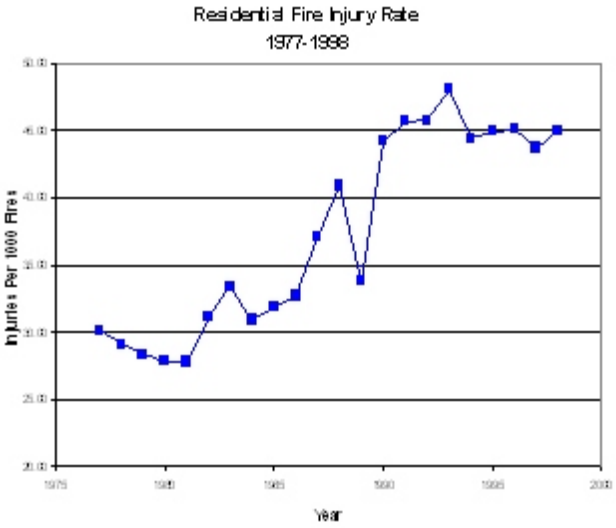
All of the reasons for these trends are not clear. What is clear is, something needs to be done. In our opinion we are ignoring the present day problem, residential fires. Think of how much safety is built into commercial l buildings on top of the sprinklers. Fire walls, multiple exits, limits on flame spread, and rated construction, all redundant systems installed to save life and property. In residential occupancies, at best, there is rated construction between the garage and attached living space. Not many fires (3.6% per NFPA) start in the garage. I guess the theory is the car is protected from the usual fire causes inside the living space.

We actually think the number of fires may increase in the future. The trend in fire prevention lately is to teach safety as a whole. Therefore, fire safety is just a piece of the total time spent on safety. We are certain the time per person the fire service has with people has not increase proportionally with the number of topics being taught. The results, we are spending less time on fire safety. If all these assumptions are true we are setting ourselves up for newer generations having less fire safety knowledge.

Keep in mind the current economic situation. Things have been good for almost the entire data period kept by the NFPA. NFPA only reports back to 1977 due to statistical recording methods. What is going to happen during the next long recession? We will have a recession, it's only a question of when.

We also believe the severity of fires will increase and the rates of deaths and injuries will continue to increase. Residential occupancies are being built with less built-in fire safety. The construction industry has embraced wood trussing. There is no debate, structure fires spread faster in wood truss construction than in solid member construction. Residential occupancies are being built tighter for energy efficiency. A fire is a source of energy. If the residential occupancies can stay warm in the winter they can hold more heat longer from the furnace or a fire. How can a residential building know the difference? Residences are never going to have less combustibles in them. The trend is for more 'things' in bigger residences. Not only are there more 'things' but more 'things' are made of plastic. We all know plastic burns faster and more toxic than wood. The results are faster, hotter, more toxic fires.





We all know the cost effective solution is SPRINKLERS. The current price is in the neighborhood of $0.60 per square feet in some parts of the south to $2.00 per square feet in costly parts of the north That's the cost for an emerging technology. The costs will go down with demand and competition. In Minnesota there is very little demand and no companies have set up efficient business arrangements. We have been finding the cost to be $1.75-$2.25 per square feet. The cost of sprinklers has remained rather constant for the past 20 years, according to the National Fire Sprinkler Association. Accounting for inflation, sprinklers are cheaper today. There are multiple studies showing residential sprinklers could be done for as little as $0.30 per square feet. The Residential Fire Safety Institute (formerly Operation Life Safety) has plenty of information regarding residential sprinklers if there are any doubters.

Remember automobile air bags. They were options in only the most expensive cars. The bags were very expensive, especially when compared to the cost of the vehicle. In less than 10 years they became required in almost all vehicles. At the current pace all six sides of the vehicle will have air bags. I read in the newspaper about 4600 people a year are saved by air bags. That's 10% of the total deaths from automobiles. That's not very effective numbers for a what is hailed as a major success. How many people have first hand knowledge of a death in a sprinklered building? We haven't met one yet. This tells me a death in a sprinklered building is a pretty rare event. We believe we could save almost all of the fire victims if everything were sprinklered. Now compare this to the percent saved by the successful air bags. Sounds like sprinklers are an effective solution.

Our motivation comes from a recent tragedy in Minnesota. A family lost a 3 year-old girl in a fire. The cause was accidental: extension cord under combustibles. The adult in the home wasn't impaired, the smoke detectors were spaced and functioned properly, the police attempted rescues within 3 minutes of the call, the first engine was on scene in 5 minutes, the fire was controlled with one handline. We reviewed this call and keep coming to the same conclusion, the only practical thing that could have saved this girl is sprinklers. This fire will never make sense, everything was done right and a 3-year-old died. This should be unacceptable to the public and the fire protection community. For the most part, the public relies on the fire department. They just don't know there is a better option, sprinklers.
If this doesn't pass this time we can always bring it back with arguments about property loss reductions, reduced burden on the taxpayer for fire protection and firefighter safety. We think many of you know these argument as well as the causality arguments. We don't think many of you learned anything new in this presentation. We all know the facts, now is the time to act.

Committee Action: **Approval as Submitted**

Committee Reason: There are several factors noted for the approval of this proposed code change. The majority of fire deaths and injuries occur in residential occupancies. Statistics used by the proponent indicate that residential fires equaled 22% of all fires over the last five years. Over the same period, residential fires accounted for 82% of the total fire deaths and 74% of total injuries. Another statistic cited indicates that in 1998, 54 people were killed or injured per 1000 residential fires. In 1978, the number killed or injured per 1000 residential fires was 38 people.

Estimates place the cost of a fire sprinkler system between $.60 and $2.00 per square foot. There are many reasons for this disparity, including location, demand and competition. However, the price of sprinkler systems is reported to have remained constant over the last 20 years.

This code change does not require that sprinkler systems be placed in existing residences. However, the new occupancies of today are the existing occupancies of tomorrow.

Placing this proposed code change into the code will assist those jurisdictions that want fire sprinkler systems in residential occupancies. It was noted that it would be more difficult for a jurisdiction to enact sprinkler requirements rather than to amend this provision.

Staff Note: IFC Section 102.4 requires the design and construction of new structures to comply with the *International Building Code*. The scope of the IBC, Section 101.2, defers certain residential occupancies to the construction regulations of the *International Residential Code*. As such, this provision found in Chapter 9 of the IFC and IBC applies only to those residential structures constructed under the requirements of the *International Building Code*.

Assembly Action: **Disapproval - Failed**

Individual Consideration Agenda:

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

Public Comment1

Paul Hayward, Consultant, City of Farmington, requests Disapproval.

Commenter's Reason: The fact it is not as easy to amend a local ordinance requiring fire sprinkler systems to be installed into residences as it is to convince a small, national committee of persons, who do not live or work in the same community, to vote for such a proposal is a safeguard we should all applaud. In the City of Farmington we have adopted, through approval of a State-Regulated process, a sprinkler ordinance that is more restrictive than the present building code, but it does not require the installation of sprinkler systems in every new dwelling. It could not be justified. Such a requirement, while preferred by some, is not feasible in every remote location in this vast and diverse country, nor is it in our best interest to try and solve every fire problem in our homes by adding a mandatory sprinkler requirement. What type of water supply is available in a cabin built in the mountains and served only by a well?

Because someone is killed due to smoking in bed, why must one fire sprinkler their house if they don't smoke? Were not smoke detectors added to the life-safety requirements for dwellings? Have they proven to be inadequate, or are the fire deaths occurring in dwellings that are not equipped with detectors?

If we wish to provide minimum life safety standards and common sense, not to mention the goal of ostensibly writing a code that is palatable to the point of being adopted by the majority of jurisdictions in this land, such grand-standing type of requirement as this must be defeated. This proposal lies in the realm of "what if the world were a perfect place?" and not in the sphere of reality with which most of us must deal on a daily basis.

Public Comment 2

Lawrence Brown, CBO, National Association of Home Builders, requests Disapproval.

Commenter's Reason: This proposal will only effect R-1 and R-2 Occupancies. It will in no way effect R-3 dwellings built under the IRC as seems to be the proponent's purpose. The proponent did not show in his "Reason" that R-1 or R-2 Occupancies are contained in the statistics. How the data relates to the purported problem, or that the proposed code change will have any effect in changing these statistics. For example, the fire injury rates are more related to firefighters, not the occupants. One very important fact is missing. That is the time of construction or the building code and edition the structure was constructed under is not shown. Studies have shown that buildings constructed after 1986 have a very low fire rate, with only 2% of dwelling fires occurring in buildings built in the past 10-years. Most importantly, the data did not show the losses as they relate to the presence of working smoke alarms. The installation of interconnected, hardwired, with battery back-up smoke alarms installed in locations as required by NFPA 72, is alone, the most proven reason for the lowering of loss-of-life in residential occupancies. Industry statistics also shows that almost all of the lives lost are in older buildings where installations for working smoke alarms are not in compliance with fire regulations. Before society is mandated to spend billions of dollars to comply with proposed code change, the current laws that require "working" smoke alarms in R Occupancies has to be strictly enforced. For Every $1,000.00 increase in the cost of a dwelling, 2% of the perspective buyers are shut out of the market. This, in turn, forces them to remain living in less fire-safe dwellings. The turnover for existing residential housing stock is paramount to reducing fire losses. Using data that does not validate the Proposal should not be the basis for a proposed code change. As the proponent states, he "guesses", "believes" and "thinks" this is a good idea. What the proponent's data does show is that, due to the fire-safety requirements already in the codes, fire losses are dropping. This is not guess work - it is true data. There is no need to change a minimum fire or building code that is already working to achieve the goals of preventing fire losses.

Public Comment 3

Sara A. Rice , Schirmer Engineering Corp/American Hotel & Motel Association, requests Disapproval.

Commenter's Reason: The Report of the Public Hearing for the International Codes states that the basis for the hearing action was that:

- The majority of fire deaths and injuries occur in residential occupancies.
- The price for sprinklering a residential occupancies is between $0.60 – $2.00/square foot, and
- By placing this proposed code change into the code, it will assist those jurisdictions that want fire sprinkler systems in residential occupancies as "…it would be more difficult for a jurisdiction to enact sprinkler requirements rather than to amend this provision."

We strongly disagree with the public hearing action and ask the ICC membership to revisit the issue and to analyze the proponents' reasons logically, not emotionally.

The proponent clearly had a single objective in mind when they submitted this proposed code change - to require one- and two-family dwellings to be sprinklered. Rather than taking each type of residential occupancies and analyzing each one for its hazards and safety records, the proponents lumped all "residential" occupancies into one category. Though well meant, the ramifications of the proposed code change go far beyond their intended objective.

The proponent, over and over again, in both their Reason statement and their verbal testimony in Birmingham, AL stated that their primary intent in submitting this proposed code change was to get one- and two-family dwellings sprinklered. In their Reason statement, the proponent repeatedly cited statistics for "residential" deaths and "residential" fires in "residential" occupancies without distinction or regard for the type of "residential" occupancy. **Not** all "residential" occupancies are created equal.

In the IBC there are four residential categories, Group R-1, Group R-2, Group R-3 and Group R-4. Not one of these categories includes the typical one- and two-family dwelling. That occupancy is solely regulated by the International Residential Code (IRC) and not subject to the provisions of the IBC. By categorizing all residential occupancies into a single entity, the proponents' logic and statistics are incorrect, misleading and misrepresent the dangers associated with some residential occupancies.

A requirement to sprinkler all Group R occupancies is totally unfounded. Of particular note is Group R-1 occupancies, hotels and motels. The NFPA no longer records deaths related to hotel/motel fires because there are none to report. Therefore, the proponent's rationale and more importantly statistics are flawed.

The proponent cited that 22% of all reported fire are "residential" fires, 82% of all reported deaths are "residential" deaths, and that 74% of all reported injuries are "residential" injuries. But given that NFPA doesn't record statistics for Group R-1 occupancies, then what type of "residential" occupancies are these statistics based upon?

They also stated that in 1998, 54 people were killed or injured in every 1000 residential fires, compared to 1977 when only 38 people were killed or injured in every 1000 residential fires. But hasn't the population of the US dramatically increased in the last 21 years?

The incredibly broad requirement to sprinkler all Group R occupancies is totally unfounded. The IBC adequately addresses the residential occupancies it regulates and additional requirements are not necessary. The current thresholds are realistic.

If it is truly the intent of the proponent to have one- and two-family dwellings sprinklered then they should submit a proposed code change to the IRC.

Public Comment 4

Edmund C. Domian, West Valley City Utah, requests Disapproval.

Commentor's Reason: While I can applaud requiring an automatic fire extinguishing system in every apartment building, extending this requirement to every single family dwelling is extreme. Typically most single family dwellings are on a average around 2,000 square feet. Many commercial buildings much larger in size, with much greater travel distance, and inherent hazards, are not required to be sprinklered. The only thing this change will accomplish is to create an immediate movement nationwide for local amendments to eliminate this requirement from the code in Anytown, USA. Fire sprinklers are not the answer to every fire situation, they are mechanical and can fail. While there are no shortage of horrible stories concerning deaths in fire, there has to be a balance between risk and cost. While I agree there should be some floor area threshold for requiring sprinkler systems in single family residences, the requirement as written goes too far.

F64-00 D

Proposed Change as Submitted:

Proponent: Gregory R. Keith, Professional Heuristic Development; representing The Boeing Company

Revise as follows:

907.2.2 Group B. A manual fire alarm system shall be installed in Group B occupancies having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system and the notification appliances will activate upon sprinkler water flow.
2. A manual fire alarm system is not required if the building is completely sprinklered, occupied by a single tenant and is provided with an audible and visual sprinkler water flow signal in the interior of the building in an approved, normally occupied location.

Reason: Section 907.2.2 requires a manual fire alarm system in Group B Occupancies beyond certain occupant load thresholds. The existing exception merely exempts the pull stations creating what in effect is an automatic fire alarm system. In the past, the model building and fire code requirements for manual fire alarm systems in Group B Occupancies have been limited to high rise buildings. There are no performance data which would dictate the need for a manual fire alarm system in low rise, sprinklered offices. Historically, these are among the safest occupancies in this country. The proposed second exception is intended to eliminate the requirement for manual fire alarm systems and maintain the technical status quo under specific design conditions. Such manual fire alarm systems are not cost effective in this application. Perhaps one of the greatest negative cost impacts occurs with the lack of productivity associated with building evacuation caused due to inadvertent operation of water flow devices (water surges, maintenance, testing, etc.). The single tenant restriction should exclude high rise buildings from exercising the provisions of the proposed exception.

Committee Action: **Disapproval**

Committee Reason: The current provisions of the code are preferred.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment

Gregory R. Keith, The Boeing Company, requests Approval as Submitted.

Commenter's Reason: At the code development hearings in Birmingham, there were a number of proposals to eliminate manual fire alarm systems in sprinklered buildings. The Boeing Company had two such proposals (Items F-64 and F-65) which were applicable to Group B and Group F Occupancies respectively. The basis of the proposed code changes was the exemplary fire and life safety record in sprinklered buildings containing those occupancies, the lack of cost effectiveness of the alarm systems in such occupancies and the desensitivity to such systems by building occupants due to false alarms. To narrow the applicability of the proposed exceptions, the provisions were limited to single tenant buildings with an audible and visual sprinkler water flow signal in the interior of the building in an approved normally occupied location. The two proposals were considered jointly and defeated by the fire code committee by a vote of 9-2. The published committee reason stated, "the current provisions of the code are preferred".

Item F-66 proposed the elimination of fire alarm systems in Group M Occupancies. Due to the presence of higher occupant loads and fire loading, Group M Occupancies are generally regarded as being more sensitive than Group B or F Occupancies. The accumulative testimony of the relative value of fire alarm systems in sprinklered buildings was apparently beginning to convince some committee members. The item was defeated; however, by a split vote of 6-5. It should be noted the Item F-66 proposed the total elimination of Group M fire alarm requirements with no additional controls such as those contained in the Boeing proposals.

Item F-69 addressed similar concerns in Group R-2 Occupancies. Clearly, residential occupancies are among the most sensitive in the building and fire codes. The fire and life safety loss history of such occupancies is considerably less impressive than that experienced by sprinklered ordinary hazard business occupancies. Nevertheless, the fire code committee approved Item F-69 as submitted. The published committee reason states, "Statistical evidence provided indicates that fire alarms seem to be of little benefit in sprinklered buildings, but are of substantial cost".

Unfortunately, there were no parliamentary procedures for reconsideration of items during the hearings. In the final analysis, committee actions on related items were very inconsistent. To not require a fire alarm system in apartment houses where occupants are cooking, sleeping and have fireplaces may or may not be appropriate. But to not require such alarms in Group R-2 Occupancies while maintaining alarm requirements in sprinklered Group B and F Occupancies with their impeccable statistical record is totally contradictory. It is strongly urged that the ICC membership restore balance of fire alarm system requirements and approve Items F-64 and F-65 as submitted.

F79-00 D
910 (IBC 910)

Proponent: Richard C. Schulte, Schulte & Associates

Delete entire section without substitution:

~~**SECTION 910**~~
~~**SMOKE AND HEAT VENTS**~~

Reason: In a memorandum dated September 10, 1999, the American Architectural Manufacturers Association (AAMA) announced the commencement of AAMA Smoke Vent Task Group's research project on the use of smoke/heat vents. The announcement states that the purpose of this research project is to "study the interaction between sprinklers, smoke/heat vents and draft curtains" and "to develop scientifically based engineering design criteria for the installation of draft curtains and vents."

The AAMA memorandum is essentially an admission by the AAMA Smoke Vent Task Group that we do not presently have sufficient information on the interaction between sprinklers, smoke/heat vents and draft curtains to utilize smoke/heat and draft curtains in buildings which are protected by sprinklers. Given this admission by the AAMA, it would seem questionable that the International Fire Code should mandate the use of smoke/heat vents and draft curtains in buildings which are protected throughout by a sprinkler system.

Chapter 10 in Section 5 of the 15th Edition of the Fire Protection Handbook published by the National Fire Protection Association in 1981 states the following:

"Even though there is no universally accepted conclusion from either fire experience or research, concern has been raised by a recent series of model studies that indicate the following trends when the present Smoke and Heat Venting Guide is implemented:

-Venting delays loss of visibility;

-Venting results in increased fuel consumption; and

-Depending on the location of the fire relative to the vents, the necessary water demand to achieve control is either increased or decreased over an unvented condition. With the fire directly under the vent, water demand is decreased. With the fire equidistant from the vents, water demand is increased."

Chapter 6 in the 1991 edition of NFPA 204M, the Guide for Smoke and Heat Venting, specifically addresses the use of smoke/heat vents in sprinklered buildings. Section 6-1 in this edition of NFPA 204M states the following:

"A broadly accepted equivalent design basis for using both sprinklers and vents together for hazard control (e.g. property protection, life safety, water usage, obscuration, etc.) has not been universally recognized."

Section 6-2 in the 1991 edition of NFPA 204M further states the following:

"For occupancies that present a high challenge to sprinkler systems, concern has been raised that inclusion of automatic roof venting may be detrimental to the performance of automatic sprinklers."

In addition to this statement, Chapter 6 in the 1991 edition of NFPA 204M contains a similar statement to that quoted above from the 15th edition on the NFPA Fire Protection Handbook.

Chapter 8 in the 1998 edition of NFPA 204 contains the same statements regarding the use of smoke/heat vents in sprinklered buildings as contained in the 1991 edition of NFPA 204M and a similar statement to that contained in the 15th edition of the Fire Protection Handbook. In addition, the 1998 edition of NFPA 204 states the following regarding the use of curtain boards:

"Large-sale fire tests [Troup 1994] indicates that the presence of curtain boards can cause increases in sprinkler operation, smoke production, and fire damage (i.e. sprinklers opened well away from the fire).

The above is an indication that, from the early 1980's to the present day, questions still persist about whether it is appropriate to use of smoke/heat vents and draft curtains in storage buildings which are protected by sprinklers.

Section 2-6.1 in the 1995 edition of NFPA 13E, the Guide for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems states the following with regard to routine ventilation in sprinklered storage buildings:

"Occupancies with a wide variety of configurations and a wide range of storage commodities might need special procedures, particularly where storage heights are in excess of 15 feet. In some cases, routine ventilation procedures in the early stages of a fire can hinder effective sprinkler operation. It is desirable for the fire department to discuss its pre-fire plan for warehouse occupancies with the occupant, sprinkler designer, and insurance carrier to determine if a modification in procedures is appropriate."

Section 2-6.2 in NFPA 13E (1995 edition) further states the following:

"For those cases where search and rescue operations have been completed prior to ventilation work being performed by the fire department, it might be appropriate to allow the automatic sprinklers to continue to operate without further ventilation to enable them to achieve full control of the fire. This might take 20 to 30 min[utes] or more."

The information from NFPA 13E regarding the use of ventilation in storage buildings is further supported by information contained in NFPA 231 and NFPA 231C.

Section 3-2 in the 1998 edition of NFPA 231, the Standard for General Storage, states the following with the respect to the use of smoke/heat vents and draft curtains in sprinklered storage buildings:

"The protection outlined in the standard shall apply to buildings with or without roof vents and draft curtains."

The exception to this section in NFPA 231 states the following:

"Where local codes require heat and smoke vents in buildings that are protected by ESFR sprinklers, the vents shall be manually operated or shall have an operating mechanism with a standard response fusible element that is rated no less

that 360°F. Drop out vents shall not be permitted."

Section A-3-2 in NFPA 231 provides additional information regarding the use of smoke/ heat vents in sprinklered buildings to which NFPA 231 is applicable. This section states the following:

"Smoke removal is important to manual fire fighting and overhaul. Since most fire tests were conducted without smoke and heat venting, the protection specified in Sections 5-1, 6-1 and 7-1 was developed without the use of such venting. However, venting through eaveline windows, doors, monitors, or gravity or mechanical exhaust systems is essential to smoke removal after control of the fire is achieved. (See NFPA 204, Guide for Smoke and Heat Venting.)"

While section 3-2 in NFPA 231 states that the use of smoke/heat vents is acceptable in buildings where NFPA 231 is applicable, the explanatory material contained in Appendix A of NFPA 231 clearly indicates that the use of manually operated roof vents or some other method of ventilation is preferred. The fact that an exception regarding the use of vents with ESFR sprinklers is included in NFPA 231 is an admission that heat/roof vents can affect the operation of ESFR sprinklers. Given the exception to section 3-2 in NFPA 231, along with the information on venting in sprinklered buildings provided in NFPA 204, certainly the wisdom of providing automatic smoke/heat vents in buildings protected by standard sprinklers should be questioned.

NFPA 231C, the Standard for Rack Storage of Materials, also addresses the use of smoke/heat vents in sprinklered buildings. Section 3-3 in the 1998 edition of NFPA 231C reads as follows:

"Design curves are based on the assumption that roof vents and draft curtains are not being used."

Explanatory material provided in section B-3-3 in NFPA 231 provides further information on the use of smoke/heat vents in sprinklered storage buildings which contain storage racks. This section reads as follows:

"Tests were conducted as a part of this program with eave line windows and louvers open to simulate smoke and heat venting. These tests opened 87.5 percent and 91 percent more sprinklers that did comparative tests without windows and louvers open. Venting tests that have been conducted in other programs were without the benefit of sprinkler protection and, as such, are not considered in this report, which covers only buildings protected by sprinklers. The design curves are based upon the absence of roof vents or draft curtains in the building. During mop-up operations, ventilating systems, were installed, should be capable of manual exhaust operations."

NFPA 231C also contains information on fire department operations for buildings protected by sprinkler systems designed to comply with NFPA 231C. Section A-12-6 in NFPA 231C reads as follows:

"Sprinkler protection installed as required in this standard is expected to protect the building occupancy without supplemental fire department activity. Fires that occur in rack storage occupancies are likely to be controlled within the limits outlined in B-1.1, since no significant building damage is expected. The first fire department pumper arriving at a rack storage-type fire should connect immediately to the sprinkler siamese fire department connection and start pumping operations.

In the test series for storage up to 25 ft [feet], the average time from ignition to smoke obscuration in the test building was about 13 minutes. The first sprinkler operating time in these same fires averaged about 3 minutes. Considering response time for the waterflow device to transmit a waterflow signal, approximately 9 minutes remains between the time of receipt of a waterflow alarm signal at fire department headquarters and the time of smoke obscuration with the building as an overall average.

In the test series for storage over 25 ft [feet], the visibility time was extended. If the fire department or plant protection department arrives at the building in time to have sufficient visibility to locate the fire, suppression activities with small hose lines should be started. . . . . .Manual fire-fighting operations in such a warehouse should not be considered a substitute for sprinkler operation.

Smoke removal capability should be provided. Examples of smoke removal equipment include:

-Mechanical air-handling systems

-Powered exhaust fans

-Roof-mounted gravity vents

-Perimeter gravity vents

Whichever system is selected, it should be designed for manual actuation by the fire department, thus allowing personnel to coordinate the smoke removal (ventilation) with mop-up operations.

During the testing program, the installed automatic extinguishing system was capable of controlling the fire and reducing all temperatures to ambient within 30 minutes of ignition. Ventilation operations and mop-up were not started until this point. The use of smoke removal equipment is important."

While it has been stated by proponents of heat/smoke vents that the use of eave line windows is different from the operation of automatic smoke/heat vents, the explanatory materials contained in NFPA 231C clearly states that automatic venting should not be provided. Given the explanatory material cited above, it can be concluded that providing automatic smoke/heat vents in a building which is required to comply with NFPA 231C is, in fact, a violation of NFPA 231C.

The purpose of providing heat/smoke vents in a storage building is to vent both heat and smoke to improve visibility within the building and prevent structural damage to the roof of the building. Venting heat and smoke from the building will more safely permit the fire department to enter the building and attack the fire. Given the information provided in both NFPA 13E and in NFPA 231C, the question is why should the fire department enter the building to attack the fire? NFPA 231C clearly indicates that a sprinkler system designed per NFPA 231C is "capable of controlling the fire and reducing all temperature to ambient within 30 minutes of ignition." If the sprinkler system is capable of achieving this level of control without supplemental fire department activity, why should the fire department enter the building and put its personnel at risk? Providing smoke/heat vents in the building encourages fire department personnel to enter the building and puts firefighters at risk.

Factory Mutual's opinion of the use of automatic smoke/heat vents is expressed by the following excerpt from FM Data Sheet 8-33 dated January, 1984:

"Factory Mutual recommended protection is based on roof vents and draft curtains not being provided. Fire tests have not shown automatic vents to be cost effective and they may even increase sprinkler water demand. Hence, permanent heat and smoke vents, if any, should be arranged for manual operation. Smoke removal during mop-up operations can frequently be achieved through eave-line windows, doors, monitors, non-automatic exhaust systems (gravity or mechan-

ical), or manually operated heat and smoke vents. Fire departments can cut holes in steel or wood roofs and also use their smoke exhausters."

If the premier property insurer in the United States is on record as stating that the installation of smoke/heat vents is not cost effective (as early as 1984), then the question should be asked why should the membership of the International Code Council mandate this technology.

Prior to the development of the International Fire Code, two of the three model fire prevention codes used in the United States, the Uniform Fire Code and the Standard Fire Prevention Code, required the installation of the smoke/heat vents in large storage buildings, while the third model fire prevention code, the BOCA National Fire Prevention Code, did not include requirements for smoke/heat vents. Given this, it should be a relatively easy research task to compare the property losses from fires in storage buildings in jurisdictions using the BOCA National Fire Prevention Code and the losses from fire in storage buildings located in jurisdictions using the two other model fire prevention codes. If the fire loss statistics for storage buildings in BOCA jurisdictions are not significantly higher than the fire loss statistics in ICBO and SBCCI jurisdictions, this would be an indication that the installation of smoke/heat vents is simply not effective. Prior to commencing the AAMA study of smoke/heat vents, the AAMA should concentrate on providing statistics which demonstrate the effectiveness of vents.

Given the technical information presented above, along with the fact that the manufacturers of smoke/heat vents have presented no statistics that their product s are, in fact, effective at reducing property losses, the membership of the ICC should remove the requirements for smoke/heat vents from the International Fire Code (until such time as the industry provides conclusive proof that vents actually work as represented).

The fire protection community has wrestled with this issue for more that 20 years. There is absolutely no reason why the vent industry couldn't have conducted its proposed research 20 years ago. Eliminating the requirement for vents in the code should be an incentive for the vent manufacturers to quickly complete its testing program and provide conclusive proof one way or the other on the need for vents.

Bibliography:

American Architectural Manufacturers Association (AAMA) memorandum, September 10, 1999.

Fire Protection Handbook, 15th edition, Chapter 10, Section 5.

NFPA 204M (1991 edition), the Guide for Smoke and Heat Venting.

NFPA 204 (1998 edition), the Guide for Smoke and Heat Venting.

NFPA 13E (1995 edition), the Guide for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems.

NFPA 231 (1998 edition), the Standard for General Storage.

NFPA 231C (1998 edition), the Standard for Rack Storage of Materials.

FM Data Sheet 8-33, January, 1984

F79-00

Committee Action: **Disapproval**

Committee Reason: More information is still needed. Since this is not an urgent issue and previous studies at NFPRF demonstrate no adversities with sprinklers, it is preferred to wait for the results of the current research project to make this decision. Not only is it an occupant protection issue and a fire protection issue with the inter relationship with sprinklers, but it is also a firefighter safety issue.

The research may indicate that revisions are necessary to the automatic requirements of smoke and heat vents.

Assembly Action: **No Motion**

2001 CYCLE

G45-01 D
504.2

Proposed Change as Submitted:

Proponent: Burt Folce, Chairman, BOAF Code Development Committee; representing BOAF Code Development Committee

Revise as follows:

504.2 Automatic sprinkler increase. For buildings protected throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height ~~is~~ shall be permitted to be increased by 20 feet (6096 mm) and the maximum number of stories ~~is~~ shall be permitted to be increased by one story. ~~For Group R buildings protected throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four stories or 60 feet (18 288 mm), respectively.~~ These increases ~~are~~ shall be permitted in addition to the area increase.

Proponent's Reason: The proposed change address two issues: 1. The language in the second sentence changes "is" to "shall be permitted" for consistency with the rest of the Code. 2. The proposal deletes the increase in height and the number of stories for NFPA 13R systems.

The primary function of the height and number of stories limits is property protection with life safety a secondary concern. Life safety is the primary concern of provisions addressing exits, means of egress, interior finish, and many other sections of the Code. The primary function of NFPA 13R sprinkler systems is life safety as evidenced by the following:

"A-1-2 Various levels of sprinkler protection are available to provide life safety and property protection. This standard is designed to provide a high, but not absolute, level of life safety and a lesser level of property protection. Greater protection to both life and property could be achieved by sprinklering all areas in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, which permits the use of residential sprinklers in residential areas.

This standard recommends, but does not require, sprinklering of all areas in the building; it permits sprinklers to be omitted in certain areas. These areas have been proved by NFPA statistics to be those where the incidence of life loss from fires in residential occupancies is low. Such an approach provides a reasonable degree of fire safety. (See Table A-1-2 for deaths and injuries in multifamily residential buildings.)

It should be recognized that the omission of sprinklers from certain areas could result in the development of untenable conditions in adjacent spaces. Where evacuation times could be delayed, additional sprinkler protection and other fire protection features, such as detection and compartmentation, could be necessary."[1]

BOAF recognizes the value of sprinkler systems, however, sprinkler systems are active systems subject to failure, incorrect design or manufacture, the vagaries of nature, man made disasters, and deliberate deactivation. We believe in a balanced design incorporating compartmentation, detection, structural fire resistance, and suppression. The current provision is a gross misapplication of the NFPA 13R Standard in that it substitutes a "life safety system" for what are primarily property protection provisions. Such a substitution could severely reduce life safety during a period when the sprinkler system may not be functioning.

Committee Action: **Disapproved**

Committee Reason: NFPA 13R sprinkler systems properly installed within the scope of the standard work and should be retained in this section. There is no fire data available to justify this proposed change.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment 1

Rick Thornberry, P.E., The Code Consortium, Inc.; representing Masonry Alliance for Codes and Standards (MACS), requests Approval as Submitted.

Commenter's Reason: This code change was recommended for disapproval on a vote of 9 to 6. It received a great deal of discussion which caused the Committee to split their vote on the issue. We support the proponents, the Building Officials Association of Florida Code Development Committee, and share their concerns about the present provisions in Section 504.2 that allow a height increase of one story and up to 20 feet for Group R residential occupancy buildings protected with an NFPA 13R sprinkler system.

We strongly believe that the Committee recommendation for disapproval should be overturned and this code change voted for approval as submitted. We are very concerned that when an NFPA 13R sprinkler system is provided, the combustible wood framed attics and exterior balconies, for example, are not required to be protected with sprinklers. Thus, an unprotected "lumber yard" is allowed to be located 20 feet higher and one more story in height and that much farther out of reach of the fire department when the Group R building is protected with an NFPA 13R sprinkler system. In effect, this allows a Type VB (unprotected wood frame) building to be three stories and 60 feet in height and a Type VA (one-hour protected wood frame) building to be four stories and 60 feet in height. This compares with a Group B office building (which has a lesser life hazard) which is allowed the same height limits but only when a complete NFPA 13 sprinkler system is installed. In our opinion, this just doesn't make good sense.

We believe this is both a property protection issue and a fire fighter safety issue. In fact, an actual fire incident recently demonstrated the severity of the property protection problem this section presently allows to occur. A fire stared on a balcony of a third floor apartment unit in a building in Ohio which was protected with an NFPA 13R sprinkler system. The fire subsequently spread into the attic and other combustible concealed spaces. The building was virtually a total loss of more than $1 million including the destruction of 27 units. Fortunately, there were only two injuries and no life loss. This was reported in the NFPA Journal, March/April, 2001, page 22.

Regarding fire fighter safety, ground ladders are not very effective for fighting fires in attics of buildings three stories or more in height. Their effective reach is about 30 feet for all practical purposes. Thus, the fire fighting attack must be conducted from within the interior or else master streams and aerial ladder apparatus must be used. Allowing the building height to be increased for an NFPA 13R sprinkler system without providing sprinklers in the highest part of the building (the attic) will pose greater fire fighting challenges and safety hazards to the responding fire department.

It should be noted that neither the ICBO Uniform Building Code nor the SBCCI Standard Building Code allows such a trade-off for a residential sprinkler system (NFPA 13R). In fact, both codes specifically prohibits any such trade-offs. Refer to Section 904.1.3 of the 1997 UBC and Sections 903.2 and 903.7.6, Exception No.2, of the 1999 SBC.

In conclusion, this code section is basically an issue of costs: the cost to install an NFPA 13 sprinkler system versus an NFPA 13R sprinkler system in order to build one more story without having to change the type of construction of the building. In our opinion, the cost trade-off is not justified for the decreased level in fire safety that results. Therefore, this code change should be disapproved.

Public Comment 2

Richard Licht, President, Alliance for Fire and Smoke Containment and Control (AFSCC), requests Approval as Submitted.

Commenter's Reason: The Alliance believes in a balanced design approach to fire and life safety in buildings. This code change is an attempt by the proponents, the Building Officials Association of Florida, to bring the code more back into balance regarding the issue of automatic sprinkler trade-offs, especially those trade-offs utilizing NFPA 13R sprinkler systems. The Alliance also believes that certain sprinkler trade-offs are appropriate since they do help to maintain a balance in the level of fire and life safety provided, while achieving cost effective solutions to the fire problem. But those trade-offs should be appropriate for the type of system being proposed to allow the trade-off.

In this case, the code presently allows the use of an NFPA 13R life safety sprinkler system to trade-off what is basically a property protection feature: the type of construction of the building. In effect, by allowing an increase of one story and up to 20ft. (not to exceed 4 stories and 60ft.) in building height when an NFPA 13R sprinkler system is provided allows for a lesser type of construction to be used or allows the type of construction to accommodate a larger total area of building, thus increasing the exposure of a building to potential property loss.

The Alliance notes that the sprinkler trade-off in increased building height is already permitted by the code when an NFPA 13 sprinkler system is installed throughout a building. This applies across the board to virtually all occupancies (other the Group H) and not just to Group R residential occupancies. The Alliance believes that this is a reasonable trade-off since an NFPA 13 system is a complete sprinkler system designed for both property protection and life safety . Such a trade-off has been traditionally allowed by the three model building codes prior to the IBC. In fact, only one of the three model codes allowed the NFPA 13R sprinkler system trade-off for the increase in story height. The other two model codes did not allow any trade-off whatsoever for NFPA 13R sprinkler systems, whether for life safety or property protection.

A significant problem with allowing this height increase for the NFPA 13R sprinkler system is that the system does not provide sprinkler protection in all areas of the building, especially in attics and exterior balconies of combustible construction. Why should such a trade-off be permitted to allow an increase in building height when it makes a fire in such spaces that are not sprinklered that much more difficult to access and extinguish by the responding fire department? Is the minimal cost savings of installing an NFPA 13R sprinkler system in lieu of an NFPA 13 sprinkler system worth the added risk and potential property damage that may result from a fire developing within or gaining access to nonsprinklered combustible spaces?

We do not see that there is any significant benefit in allowing the increased story and building height for NFPA 13R sprinkler systems

in Group R residential occupancies in lieu of NFPA 13 sprinkler systems presently allowed for virtually all occupancies. Presently there is very little incentive for a designer or builder to sprinkler a Group R residential occupancy using an NFPA 13 sprinkler system, especially since all Group R occupancies regulated by the International Building Code (IBC) are now required to be protected with either an NFPA 13 or 13R sprinkler system based on the 2001 Supplement, Section 903.2.7. Thus, there is no need to provide an incentive to sprinkler such occupancies using an NFPA 13R system. Instead, the incentive should be to utilize a complete NFPA 13 sprinkler system which can be accomplished if this proposed code change is approved.

For example, a comparison of the allowable building heights, types of construction, and fire resistance ratings of both Type VA and Type VB construction will show how this code change can provide such an incentive as compared to the present code requirements. Please refer to the following tables:

COMPARISONS

Table 1—Type VA NFPA 13R vs. Type VA NFPA 13: Present code.

	Type VA (13R)	Type VA (13) (Option 1[a])	Type VA (13) (Option 2[a])
Total height allowed	4 stories 60ft.	4 stories 70ft.	4 stories 70ft.
Area increase allowed	No	Yes[a]	No[a]
1-hour separation required	Yes	Yes	Yes
Interior bearing wall rating	1-hour	1-hour[a]	- 0 -[a]
Exterior bearing wall rating	1-hour	1-hour	1-hour
Exterior nonbearing wall rating	- 0 -	- 0 -	- 0 -
Floor rating/separation	1-hour	1-hour	1-hour
Roof rating	1-hour	1-hour	- 0 -[a]

Table 2— Type VA NFPA 13R vs. Type VA NFPA 13: If code Change is approved.

	Type VA (13R)	Type VA (13) (Option 1[a])	Type VA (13) (Option 2[a])
Total height allowed	3 stories 50ft.	4 stories 70ft.	4 stories 70ft.
Area increase allowed	No	Yes[a]	No[a]
1-hour separation required	Yes	Yes	Yes
Interior bearing wall rating	1-hour	1-hour[a]	- 0 -[a]
Exterior bearing wall rating	1-hour	1-hour	1-hour
Exterior nonbearing wall rating	- 0 -	- 0 -	- 0 -
Floor rating/separation	1-hour	1-hour	1-hour
Roof rating	1-hour	1-hour	- 0 -[a]

[a] Either an increase in allowable area can be used when an NFPA 13 sprinkler system is provided or the one-hour fire resistive construction required throughout can be omitted for Type VA construction, but not for the dwelling unit/guest room separation.

Table 3—Type VB NFPA 13R vs. Type VB NFPA 13: Present code.

	Type VA (13R)	Type VA (13)
Total height allowed	3 stories 60ft.	3 stories 60ft.
Area increase allowed	No	Yes
1-hour separation required	Yes 1-hour	½ hour
Interior bearing wall rating	- 0 -	- 0 -
Exterior bearing wall rating	- 0 -	- 0 -
Exterior nonbearing wall rating	- 0 -	- 0 -
Floor rating/separation	1-hour	½ hour

Roof rating	- 0 -	- 0 -

Table 4—Type VB NFPA 13R vs. Type VB NFPA 13: If Code Change is approved.

	Type VA (13R)	Type VA (13)
Total height allowed	2 stories 40ft.	3 stories 60ft.
Area increase allowed	No	Yes
1-hour separation required	Yes 1-hour	½ hour
Interior bearing wall rating	- 0 -	- 0 -
Exterior bearing wall rating	- 0 -	- 0 -
Exterior nonbearing wall rating	- 0 -	- 0 -
Floor rating/separation	1-hour	½ hour
Roof rating	- 0 -	- 0 -

In conclusion, it is the Alliance's opinion that this code change must be approved by the membership in order to maintain reasonable balance and adequate property protection for Group R multistory residential occupancies of Type V wood frame construction. The allowable use of an NFPA 13R sprinkler system for an increase in building height is not justified and can potentially allow for greater property damage and loss of apartment units should a fire occur in an unsprinklered area and spread to other unsprinklered areas including combustible concealed spaces. An example of this type of fire condition occurring has been recently documented in the March/April, 2001, NFPA Journal. A fire in a multistory wood frame constructed apartment building in Ohio resulted in total building property damage of approximately $1 million and the loss of all 27 apartments. This was due to a fire that occurred in a building protected with an NFPA 13R sprinkler system. The fire started on a wood balcony which did not have sprinkler protection as allowed by NFPA 13R and spread into the combustible concealed spaces within the building including the attic which is also not required to be sprinklered by NFPA 13R. From there the fire spread throughout the building and grew to such proportion that it was beyond the capability of the responding fire department to control and contain it, resulting in the catastrophic property loss. Fortunately, there were only a couple of minor injuries so the NFPA 13R sprinkler system performed its main function of life safety but failed to achieve adequate property protection. This is why the Alliance believes that the present code allowance of the NFPA 13R sprinkler system trade-off for increased building height is not appropriate for assuring a reasonable level of property protection in these Group R occupancy buildings.

G48-01 D
506.2

Proponent: Steven V. Skalko, Portland Cement Association

Revise as follows:

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~~ 30 feet (~~6096~~ 9144 mm), the frontage increase shall be determined in accordance with the following:

$I_f = 100 \left[F/P - 0.25 \right] (W/30)$ **(Equation 5-2)**

where:

I_f = Area increase due to frontage (percent).

F = Building perimeter which fronts on a public way or open space having 20 feet (6096 mm) open minimum width.

P = Perimeter of entire building.

~~W = Minimum width of public way or open space.~~

~~**506.2.1 (Supp) Width limits.** W must be at least 20 feet (6096 mm) and the quantity W divided by 30 shall~~

~~not exceed 1.0.~~

506.2.~~2~~1 Open space limits. (No change)

Reason: Further examination of the allowable area increases of the IBC show that for buildings where the area can be increased due to open space with a width between 20 and 30 feet, significantly larger areas are permitted than are allowed by any of the three predecessor model codes. This occurs because the IBC allows a 50% area increase at 20 feet, whereas the NBC and SBC allow no increase at less than 30 feet, and the UBC only allows a 5% area increase for each foot of width over 20 feet. All of this assumes that 100% of the building perimeter fronts on the minimum width space (i.e., 20 feet) to qualify for the area increase. Not until the width of the open space is 30 feet does the UBC grant an area increase of 50%.

The attached tables compare the relative allowable areas of buildings under the IBC using Section 506.2 to the three mode codes. In all cases, the allowable areas for the buildings considered under the IBC with an open space having a width between 20 feet and less than 30 feet exceeds the allowable areas of the model codes. This is shown by the ratio of allowable IBC area to each of the model codes (NBC, SBC & UBC) being greater than one in every cell of the table except for separation distances of 30 feet or more. To correct this and bring areas more in line with the model codes, the open space needs to be a minimum of 30 feet in width before an area increase for frontage is granted. Even with this change, allowable areas under the IBC where less than 30 feet of open space is provided will still equal or exceed those of the three model codes.

TABLE 1
Ratio of Allowable Area Permitted by IBC to that Permitted by NBC For Various Separation Distances and Select Occupancies

IBC	Type of Construction						
Occupancy	NBC	2B	2C	3A	3B	5A	5B
Group	IBC	2A	2B	3A	3B	5A	5B
	NBC AA[0]	22,500	14,400	19,800	14,400	15,300	7,200
	IBC AA[0]	37,500	23,000	28,500	19,000	18,000	9,000
	<20[1]	1.67	1.60	1.44	1.32	1.18	1.25
B	20[2]	2.50	2.40	2.16	1.98	1.76	1.88
	25[3]	2.71	2.60	2.34	2.14	1.91	2.03
	<30[4]	2.92	2.80	2.52	2.31	2.06	2.19
	30[5]	1.17	1.12	1.01	0.92	0.82	0.88
	NBC AA[0]	15,000	9,600	13,200	9,600	10,200	4,800
	IBC AA[0]	21,500	12,500	18,500	12,500	14,000	9,000
	<20[1]	1.43	1.30	1.40	1.30	1.37	1.88
M	20[2]	2.15	1.95	2.10	1.95	2.06	2.81
	25[3]	2.33	2.12	2.28	2.12	2.23	3.05
	<30[4]	2.51	2.28	2.45	2.28	2.40	3.28
	30[5]	1.00	0.91	0.98	0.91	0.96	1.31
	NBC AA[0]	15,000	9,600	13,200	9,600	10,200	4,800
	IBC AA[0]	24,000	16,000	24,000	16,000	12,000	7,000
	<20[1]	1.60	1.67	1.82	1.67	1.18	1.46
R1 & R2	20[2]	2.40	2.50	2.73	2.50	1.76	2.19
	25[3]	2.60	2.71	2.95	2.71	1.91	2.37
	<30[4]	2.80	2.92	3.18	2.92	2.06	2.55

	30[5]	1.12	1.17	1.27	1.17	0.82	1.02
	NBC AA[0]	13,125	8,400	11,550	8,400	8,925	4,200
	IBC AA[0]	26,000	17,500	26,000	17,500	14,000	9,000
	<20[1]	1.98	2.08	2.25	2.08	1.57	2.14
S1	20[2]	2.97	3.13	3.38	3.13	2.35	3.21
	25[3]	3.22	3.39	3.66	3.39	2.55	3.48
	<30[4]	3.47	3.65	3.94	3.65	2.75	3.75
	30[5]	1.39	1.46	1.58	1.46	1.10	1.50

0. AA - Allowable area from code's height and area table.
1. Fire separation distance less than 20 ft. - no area increase permitted by either code.
2. Fire separation distance 20 ft. - area increase permitted by IBC but not by NBC.
3. Fire separation distance 25 ft. - area increase permitted by IBC but not by NBC.
4. Fire separation distance slightly less than 30 ft. - area increase permitted by IBC but not by NBC.
5. Fire separation distance 30 ft. - area increase permitted by both codes.

TABLE 2
Ratio of Allowable Area Permitted by IBC to that Permitted by SBC
For Various Separation Distances and Select Occupancies

IBC		Type of Construction					
Occupancy	SBC	IV - 1-HR.	IV UNP.	V - 1-HR.	V UNP.	VI - 1-HR.	VI UNP.
Group	IBC	2A	2B	3A	3B	5A	5B
	SBC AA[0]	25,500	17,000	21,000	14,000	13,500	9,000
	IBC AA[0]	37,500	23,000	28,500	19,000	18,000	9,000
	<20[1]	1.47	1.35	1.36	1.36	1.33	1.00
B	20[2]	2.21	2.03	2.04	2.04	2.00	1.50
	25[3]	2.39	2.20	2.21	2.21	2.17	1.63
	<30[4]	2.57	2.37	2.38	2.38	2.33	1.75
	30[5]	1.29	1.18	1.19	1.19	1.17	0.88
	SBC AA[0]	13,500	9,000	13,500	9,000	9,000	6,000
	IBC AA[0]	21,500	12,500	18,500	12,500	14,000	9,000
	<20[1]	1.59	1.39	1.37	1.39	1.56	1.50
M	20[2]	2.39	2.08	2.06	2.08	2.33	2.25
	25[3]	2.59	2.26	2.23	2.26	2.53	2.44
	<30[4]	2.79	2.43	2.40	2.43	2.72	2.63
	30[5]	1.39	1.22	1.20	1.22	1.36	1.31
	SBC AA[0]	18,000	12,000	18,000	12,000	10,500	7,000
	IBC AA[0]	24,000	16,000	24,000	16,000	12,000	7,000
	<20[1]	1.33	1.33	1.33	1.33	1.14	1.00
R1 & R2	20[2]	2.00	2.00	2.00	2.00	1.71	1.50
	25[3]	2.17	2.17	2.17	2.17	1.86	1.63
	<30[4]	2.33	2.33	2.33	2.33	2.00	1.75

	30[5]	1.17	1.17	1.17	1.17	1.00	0.88
	SBC AA[0]	24,000	16,000	24,000	16,000	9,000	6,000
	IBC AA[0]	26,000	17,500	26,000	17,500	14,000	9,000
	<20[1]	1.08	1.09	1.08	1.09	1.56	1.50
S1	20[2]	1.63	1.64	1.63	1.64	2.33	2.25
	25[3]	1.76	1.78	1.76	1.78	2.53	2.44
	<30[4]	1.90	1.91	1.90	1.91	2.72	2.63
	30[5]	0.95	0.96	0.95	0.96	1.36	1.31

0. AA - Allowable area from code's height and area table.
1. Fire separation distance less than 20 ft. - no area increase permitted by either code.
2. Fire separation distance 20 ft. - area increase permitted by IBC but not by SBC.
3. Fire separation distance 25 ft. - area increase permitted by IBC but not by SBC.
4. Fire separation distance slightly less than 30 ft. - area increase permitted by IBC but not by SBC.
5. Fire separation distance 30 ft. - area increase permitted by both codes.

TABLE 3
Ratio of Allowable Area Permitted by IBC to that Permitted by UBC
For Various Separation Distances and Select Occupancies

IBC		Type of Construction					
Occupancy	UBC	II - 1 HR.	II - N	III -1 HR.	III - N	V - 1 HR.	V - N
Group	IBC	2A	2B	3A	3B	5A	5B
	UBC AA[0]	18,000	12,000	18,000	12,000	14,000	8,000
	IBC AA[0]	37,500	23,000	28,500	19,000	18,000	9,000
	<20[1]	2.08	1.92	1.58	1.58	1.29	1.13
B	20[2]	3.13	2.88	2.38	2.38	1.93	1.69
	25[3]	2.71	2.49	2.06	2.06	1.67	1.46
	30[4]	2.43	2.24	1.85	1.85	1.50	1.31
	40[5]	1.82	1.68	1.39	1.39	1.13	0.98
	UBC AA[0]	18,000	12,000	18,000	12,000	14,000	8,000
	IBC AA[0]	21,500	12,500	18,500	12,500	14,000	9,000
	<20[1]	1.19	1.04	1.03	1.04	1.00	1.13
M	20[2]	1.79	1.56	1.54	1.56	1.50	1.69
	25[3]	1.55	1.35	1.34	1.35	1.30	1.46
	30[4]	1.39	1.22	1.20	1.22	1.17	1.31
	40[5]	1.05	0.91	0.90	0.91	0.88	0.98
	UBC AA[0]	13,500	9,100	13,500	9,100	10,500	6,000
	IBC AA[0]	24,000	16,000	24,000	16,000	12,000	7,000
	<20[1]	1.78	1.76	1.78	1.76	1.14	1.17
R1 & R2	20[2]	2.67	2.64	2.67	2.64	1.71	1.75
	25[3]	2.31	2.29	2.31	2.29	1.49	1.52
	30[4]	2.07	2.05	2.07	2.05	1.33	1.36

	40[5]	1.56	1.54	1.56	1.54	1.00	1.02
	UBC AA[0]	18,000	12,000	18,000	12,000	14,000	8,000
	IBC AA[0]	26,000	17,500	26,000	17,500	14,000	9,000
	<20[1]	1.44	1.46	1.44	1.46	1.00	1.13
S1	20[2]	2.17	2.19	2.17	2.19	1.50	1.69
	25[3]	1.88	1.90	1.88	1.90	1.30	1.46
	30[4]	1.69	1.70	1.69	1.70	1.17	1.31
	40[5]	1.26	1.28	1.26	1.28	0.88	0.98

0. AA - Allowable area from code's height and area table.
1. Fire separation distance less than 20 ft. - no area increase permitted by either code.
2. Fire separation distance 20 ft. - area increase permitted by IBC but not by UBC.
3. Fire separation distance 25 ft. - area increase permitted by both codes.
4. Fire separation distance 30 ft. - maximum area increase permitted by IBC but not by UBC.
5. Fire separation distance 40 ft. - minimum distance for maximum area increase permitted UBC.

G48-01

Committee Action: **Disapproved**

Committee Reason: The proposal has not portrayed its effect upon all occupancy groups and has not been adequately justified with data.

Assembly Action: **No Motion**

G57-01 D
Table 601

Proponent: Lee G. Jones, Association of the Wall and Ceiling Industries, Intl.; representing AWCI Fire Safety Task Group

Delete without substitution:

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

(No change to table)

a. through c. (No change)

~~d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be premitted.~~

e. and f. (No change)

Reason: Studies show that fire sprinklers fail to function properly as much as 17% of the time. When they do function, they are effective in fire suppression only 92%[2] of the time, for an overall effectiveness rating of 77%. Thus, sprinklers do not perform effectively 23% of the time.

On October 14, 1998, the *U.S. Consumer Product Safety Commission (CPSC)* and a major sprinkler system supplier

announced a nationwide recall of approximately 8.4 million units manufactured since 1982 because the CPSC alleged that such sprinklers are defective an could likely fail in a fire. In the case of one series, 20% of tested units failed to operate at the UL minimum pressure of 5 psi or the NFPA 13 minimum pressure of 7 psi.

An NFPA report concluded that the major factors in unsatisfactory sprinkler performance are poor operational maintenance, partial coverage, antiquated installations and inadvertent disabling. When collecting sprinkler performance data, they identified some 13 modes and upwards of 45 sub-conditions that primarily led to sprinkler system failure. Most of these conditions were linked to human action that resulted in unsatisfactory sprinkler performance. In addition to mechanical and human error the introduction of microbes (MIC) have been show to attack sprinkler pipe resulting in construction and head performance.

A 77% performance rating is not adequate to exchange passive protective for active suppression. To rely totally on an active system eliminates the redundancy principles for public life safety. The IBC has defined which occupancy and types of construction require a passive hourly rating in accordance with the values provided in Table 503. Permitting a structure that required a passive fire rating to be reduced from one hour down to zero creates a potential for liability. The presence of an effective sprinkling system does not obviate the need for the containment of smoke. When the passive fire rating requirement for a building is reduced from one hour to zero the requirement for penetration seals of one hour is also eliminated. More lives are lost due to smoke inhalation than from burns.

G57-01

Committee Action: **Disapproved**

Committee Reason: No documentation to justify the change was submitted. The proposal would remove an incentive to install automatic sprinklers in smaller buildings. Automatic sprinkler systems and trade-offs for them have worked well for many years.

Assembly Action: **No Motion**

FS7-01 D
705.5

Proponent: Jeffrey H. Greenwald, P.E., National Concrete Masonry Association; representing Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

705.5 Horizontal continuity. Fire walls shall be continuous from exterior wall to exterior wall and shall extend ~~at least 18 inches (457 mm) beyond~~ to the exterior ~~surface~~ face of exterior walls.

Exceptions:

1. Fire walls shall be permitted to terminate at the interior surface of combustible exterior sheathing or siding provided the exterior wall has a fire-resistance rating of at least 1 hour for a horizontal distance of at least 4 feet (1220 mm) on both sides of the fire wall. Openings within such exterior walls shall be protected by fire assemblies having a fire- protection rating of not less than $^3/_4$ hour.
2. Fire walls shall be permitted to terminate at the interior surface of noncombustible exterior sheathing, exterior siding or other noncombustible exterior finishes provided the sheathing, siding, or other exterior noncombustible finish extends a horizontal distance of at least 4 feet (1220 mm) on both sides of the fire wall.
3. ~~Fire walls shall be permitted to terminate at the interior surface of noncombustible exterior sheathing where the building on each side of the fire wall is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Reason: With great reluctance, we are proposing this code change which eliminates the 18" extension of a fire wall beyond the exterior surface of the exterior walls of the buildings being separated by the fire wall. However, this change also deletes exception 3 which is intended to eliminate that 18" projection when the building is protected with an automatic sprinkler system. We have serious concerns about allowing any type of trade-off for the construction of a fire wall when automatic sprinkler systems are installed, especially NFPA 13R or 13D residential sprinkler systems which are also included in exception 3. Fire walls are a passive fire protection feature that establish distinct buildings and are presumed to withstand any foreseeable fire exposure while not allowing the fire to penetrate around, above or through the wall and fire walls are intended to remain standing and be structurally independent of the adjacent buildings it

separates.

The 18" projection presently contained in the IBC comes from the SBCCI Standard Building Code, Section 704.5.1.2. However, that section specifically requires such a projection only when the exterior walls are of combustible construction or have combustible projections or veneers. Neither the BOCA National Building Code nor the ICBO Uniform Building Code contain similar termination provisions for fire walls (area separation walls) where they terminate at exterior walls. Section 707.6 of the BOCA National Building Code simply requires that the exterior wall construction extend through the stud space to the exterior sheathing. Section 504.6.3 of the ICBO Uniform Building Code requires area separation walls (fire walls) to extend to the outer edges of horizontal projecting elements, such as balconies or roof overhangs, but does not address the combustibility of the exterior wall or where the area separation wall (fire wall) shall terminate otherwise. Some guidance is given in Section 504.6.1 which states, "The extent and location of such area separation walls (fire walls) shall provide a complete separation." This could be interpreted to mean that the fire wall must extend to the exterior face of exterior walls.

It is our opinion that a fire wall should perform adequately when the fire wall extends to the exterior face of the exterior wall even if the exterior wall is of combustible construction. In essence, this provides a fire break at the exterior wall surface for the width of the fire wall. In order for a fire to spread beyond the fire break created by the fire wall at the exterior wall interface, the fire would have to completely burn through the exterior wall or break out of an opening in the exterior wall with wind blowing parallel to the exterior wall face in the direction of the building on the opposite side of the fire wall. Such a wind would have to be constant in order for the adjacent wall surface to reach its ignition temperature and subsequently begin to burn. We believe this would be a highly unlikely condition which should be well within the acceptable risk for such fire wall installations. Since two of the model building codes already allow similar fire wall terminations, we feel certain that if there had been a demonstrated problem with such installations, it would have been identified by now.

In conclusion, we would prefer that the 18" projection for fire walls beyond exterior walls not be required in order to eliminate any sprinkler system trade-off for the construction of such fire wall projections. The construction of fire walls should not rely upon active fire protection systems to do their job, especially residential sprinkler systems.

FS7-01

Committee Action: **Disapproved**

Committee Reason: The 18 inch horizontal extension is a viable fire safety feature necessary to completely separate adjacent buildings. This level of complete separation is necessary when evaluating the required fire flows of Appendix B of the IFC. The current exception 3 for sprinklered buildings (NFPA 13 and 13R) is a reasonable trade-off, with protected areas under both systems providing the same level of protection. The reference to an NFPA 13 D system in the reason is incorrect as the sections referenced due not include an NFPA 13 D system.

Assembly Action: **No Motion**

FS16-01 D
707.14.1

Proposed Change as Submitted:

Proponent: Sarah A. Rice, Schirmer Engineering Corporation

Delete without substitution:

~~**707.14.1 (Supp) Elevator lobby.** Elevators opening into a fire-resistance-rated corridor as required by Section 1004.3.2.1 shall be provided with an elevator lobby at each floor containing such a corridor. The lobby shall completely separate the elevators from the corridor by fire barriers and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.~~

~~**Exceptions:**~~

~~1. In office buildings, separations are not required from a street floor elevator lobby provided the entire street floor is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

~~2. Elevators not required to be located in a shaft in accordance with Section 707.2.~~

~~3. Where additional doors are provided in accordance with Section 3002.6.~~

~~4. In other than Group I-3, and buildings more than four stories above the lowest level of fire department vehicle access, lobby separation is not required where the building, including the lobby and corridors leading to the lobby, is protected by an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Proponent's Reason: The IBC currently requires that when there is an elevator AND that elevator opens onto a floor having corridors AND those corridors are required to have a fire resistance rating THEN that elevator must be separated from the corridor by an elevator lobby. Section 707.13.1 is a stand-alone code requirement independent of building height, configuration or occupancy. Literally, it requires that an elevator located in an unsprinklered, 5-story, Group S-2 structure (i.e., parking garage) be separated from any fire resistance rated corridor by an elevator lobby.

The language in Section 707.13.1 goes far beyond the scope of any elevator lobby criteria currently contained in the model codes and literally requires the construction of elevator lobbies in many location and is unwarranted or justified.

The supporter of elevator lobbies stated at the hearings in Nashville, TN last fall, that the majority of smoke movement in a building is through the elevator shaft and that is why they must be enclosed within a lobby. And yet, only a short time later that same day the same parties stated that the majority of smoke movement in a building is not through the elevator shaft but through unprotected shafts within the building (those covered by Section 715.5.2.1).

Over the past few years the membership of ICC heard a lot about smoke migration. Most people should be pretty confused by now trying to figure out; Who's right – who's wrong? Which statistics are right – which ones are wrong?

No matter which side of the issue you feel has merit, there is one simple truth, smoke moves, e.g., "migrates." No one is disputing this. It is the potential ramifications or non-ramifications of that movement that remain unresolved and are being debated. How fast does smoke move, where does it move to, in what density does it move, what hazard does it present, what damage does it do and what is an acceptable level of smoke? These are the unanswered issues.

We ask that the membership closely examine this issue for there with this provisions included in the IBC there exists a obvious inconsistency. Section 707.2 in the 2000 IBC lists 11 instances where vertical openings are not required to be enclosed in a shaft or any other type of protection/isolation. Included are:

f. Openings connecting more than 4 stories for with escalators or non-exit stairways, when the building is equipped with sprinklers,
g. Atriums or covered malls.
h. Openings connecting 2 stories in unsprinklered buildings.
i. Automobile ramps in open parking garages.
j. Openings between mezzanines and the floor below.

The odd thing is, that if there was an elevator in any of these buildings and the corridors were required to be rated, the elevator would be required to have an elevator lobby while these spaces were allowed to remain open.

There are some basic building configurations that have been examined and deemed to not present a hazard by all of the model codes, and now the ICC. Those acceptable configurations are listed in Section 707.2. And yet if some of those "acceptable" configurations contained elevators, a lobby would be required under 707.13.1

And what about those parts of the U.S. where elevator lobbies are not and have not been required for almost 2 decades. Are we now saying that these buildings are unsafe? If this is true, then why haven't the NFPA fire fatality statistics increased since 1990 (when the *BOCA National Building Code* replaced the requirement for elevator lobbies with a requirement for automatic sprinkler systems)? The NFPA fire fatality statistics actually say the opposite for non-residential buildings.

1995 - 122 Fatalities,
1996 - 140 Fatalities
1997 - 120 Fatalities.

And according to NFPA from 1991-195 the Civilian Fatalities in US High Rise Buildings are:

Office Buildings	1
Hotels	0
Apartment Buildings	201

It should be noted that this requirement was not a provision which came out of one of the model codes or even the Life Safety Code, but rather it was soley a product of the IBC Firesafety Drafting Subcommittee. The Subcommittee chose to expanded the currently recognized provisions for elevator lobbies to be applicable to all occupancies and all building configurations, not just high-rise buildings of Groups B and R. They made this revision without technical justification or statistical substantiation.

We ask the membership to re-examine the entire issue of elevator lobbies and recognize that the extent of which Section 707.13.1 is applicable.

Committee Action: **Disapproved**

Committee Reason: When considering data regarding fire loss, it is often not readily apparent as to the building features, thus it is sometimes difficult to determine whether or not a building feature would abate a hazard. Relative to lobbies, the data does not identify the impact of a lobby or lack there-of. Lobbies also serve as a staging area for the fire department.

Assembly Action: **No Motion**

Individual Consideration Agenda:

This item is on the agenda for individual consideration because two 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: Elevator lobbies have been debated and discussed ad-nauseam over the past few years. Fundamentally, these elements in a building do very little to form barriers to the spread of smoke. The code permits features of buildings that are designed to be open that are much less able to provide a means of protection for the passage of smoke than an elevator shaft. Unfortunately, atriums, escalators, and open stairs do not lend themselves to installation of barriers and therefore no changes have been proposed to them.

What is really accomplished by an elevator lobby? Corridors must be separated from them if the building isn't protected by a sprinkler system, even though the corridor can open into an atrium, requiring that people pass through that space to gain access to an exit. The barriers must be continuous and there must be protected openings in those barriers. Except for increasing the number of openings that must be protected, the corridor can be easily exposed by other means beyond the elevator.

No record of loss nor documentation that this change was ever needed has been submitted despite the lack of elevator lobbies in large portions of the United States. This section of the code is unnecessary and costly for little or no benefit.

Public Comment 2

Sarah A. Rice, CBO,; representing Schirmer Engineering Corp., requests Approval as Submitted.

Commenter's Reason: The advocates for elevator lobbies in the IBC have typically justified the requirement based on essentially 2 lines of reasoning, uncontrolled smoke migration within is always a hazard and that elevator lobbies provide a staging area for the fire service during a fire incident.

Let's really look at the IBC to see if these concerns are supported by the rest of the code. But first we have to know when an elevator lobby will be required. In accordance with Section 707.1.4.1 (Supp) an elevator lobby is requirement when the following are true:

1. There is an elevator,
2. That elevator must open onto floors that have corridors, and
3. Those corridors must be required to have a fire-resistance rating.

It should be noted that this unique protection feature is only applicable to holes in the floor made by elevators. It does not apply to openings for escalators, non-required stairs, penetrations or even plain old floor openings.

There are 4 exceptions to the requirement for elevator lobbies, those include 1) grade-floor lobbies in office buildings, 2) elevators not required to be located in a shaft per Section 707.2 (of which there is only one), 3) where additional doors are provided, and 4) buildings that are 4 stories or less in height and are sprinklered.

So in reality, in what kind of buildings would elevator lobbies be required? Let's look at a building with the following characteristics:

k. 5 stories in height,
l. Group B occupancy,
m. Not sprinklered,
n. The elevators do not serve as part of the accessible route or accessible means of egress,
o. Has a floor opening connecting the 3rd and 4th stories, and
p. Has two elevator banks; one bank of elevators connects the 1st through 5th stories, while the other bank of elevators only connects the 3rd and 4th stories.

As the building is not sprinklered, all corridors will be required to be fire-resistance rated and therefore both the 2-story and the 5-story bank of elevators would be required to have an elevator lobby. BUT at the same time Section 707.2, Item 7 is going to allow the floor opening that connects the 3rd and 4th stories to be unenclosed. This makes no sense, if the movement of smoke within a building through elevators is so hazardous why aren't floor openings just as dangerous?

The selective requirement for elevator lobbies makes no sense. Why is an office building with corridors more dangerous that one without corridors, i.e./ open-floor plan arrangement? If the lobby area is so important for staging by the fire service why is it not required regardless of the presence of corridors or the corridor rating?

We urge the ICC membership to overturn the committee's recommendation and approve this proposal.

FS26-01 W
702, 712.4

Proponent: Matthias J. Mulvey, Thermafiber

1. Add new definition (Section 702) as follows:

CURTAIN WALL PERIMETER FIRE CONTAINMENT ASSEMBLY. An assembly fire rated for the time required by the building construction classification comprised of the following elements: (1) an exterior curtain wall, (2) a floor assembly and (3) the perimeter joint protection installed between the curtain wall and the floor.

2. Revise as follows:

712.4 Exterior curtain wall/floor intersection. Where fire- resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be sealed with an approved ~~material~~ curtain wall perimeter fire containment assembly. The installation of curtain wall perimeter fire containment assembly is to maintain the required floor rating at the exterior perimeter of the building. A curtain wall perimeter fire containment assembly creates a barrier to impede the vertical spread of fire and smoke from the floor of fire origin to the floors above, at all exterior perimeter. ~~Such material~~ The curtain wall perimeter fire containment assembly shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (0.254 mm) of water column (2.5 Pa) for the time period at least equal to the fire-resistance rating of the floor assembly.

Reason: Section 712.4: The purpose of this change is to clarify how the slab edge is protected to maintain a floor fire rating. To maintain the rated floor assembly at the perimeter slab edge, one must install a sufficient amount of fire rated material attached to the curtain wall in a height determined by the floor rating and the exterior curtain wall framing and finish. Material also needs to be placed and the slab edge in a specific manner to maintain the required floor fire rating. In a fire condition, as noted in the ASTM E119 Time Temperature Chart, a fiberglass will melt at a temperature of 1050 degrees F, six minutes into a fire. Aluminum melts at 1220 degrees F, nine minutes into a fire. Plate glass melts at 1510 degrees F, twenty-five minutes into a fire. These are materials commonly used in curtain wall construction. Fiberglass and other materials, some combustible, are often substituted for mineral or ceramic wool in the containment area. The requirement for an assembly at the perimeter slab edge is understood by some of the construction community, but not all. The proposed addition clears up the issue and gives the designer, the code official and the builder clear direction with this important aspect of building safety.

702 (Definition): There is universal lack of understanding in how to protect the slab edge for the required fire rating at the perimeter of a multi-story building. This additional definition explains a common method of constructing exterior walls with a fire rated assembly at the slab edge. Some in the construction community believe that if the slab edge alone is sealed with noncombustible material, that the material at the slab edge alone will retard the passage of fire and smoke for the required floor rating. Testing done by all major testing laboratories proves this assumption to be false. Some noncombustible materials melt early into a fire (see E119 chart).

All model building codes require that based upon the use and occupancy of a building, the floors must be rated for a prescribed duration. For example, a business use building is generally required to have floors rated to withstand the passage of fire and smoke for two hours. In many common types of construction there is a void created between the floor slab edge and the exterior wall of the building. The fire rated curtain wall assembly protects the floor system for the required duration so in the event of a fire, occupants can safely exit a building and fire fighters can safely enter the building to knock down the fire. Current testing of curtain wall assemblies notes that at least five (5) feet of containment is required to contain fire at the slab edge of a two hour rated floor with an aluminum framed, aluminum curtain wall system (see UL System numbered CW-S-2002 as an example).

Some in the construction community think that the sprinkler system installed complying with the requirements of NFPA 13, one does not need to rate the perimeter slab edge. The introduction of sprinklers into a building does not offset the requirements for rating the floor system. Studies done by the Canadian National Research Council (see Canadian Building Digest Number 248) indicate that to reduce the exposure of fire from one building to another, a deluge type sprinkler system with separate feeds and monitoring would need to be installed. No testing has been done to test the effects of a deluge system on a floor to floor fire. There is confusion in the construction community about protecting a building from itself and protecting a building from another building. This definition will clear up that misunderstanding.

FS26-01

Withdrawn by Proponent

FS33-01 D
715.5.3.1

Proponent: Sarah A. Rice, representing Schirmer Engineering Corporation

Revise as follows:

715.5.3.1 Penetrations of shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with approved fire and smoke dampers installed in accordance with their listing.

Exceptions: ~~Fire dampers are not required at penetrations of shafts where:~~

1. Fire and smoke dampers are not required where steel exhaust subducts extend at least 22 inches (559 mm) vertically in exhaust shafts provided there is a continuous airflow upward to the outside.
2. Fire dampers are not required where penetrations are tested in accordance with ASTM E 119 as part of the fire-resistance rated assembly
3. Fire and smoke dampers are not required where ducts are used as part of an approved smoke-control system in accordance with Section 909.
4. Fire and smoke dampers are not required where the penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.
5. Smoke dampers are not required where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

Reason: Over the past few years the membership of ICC heard a lot about smoke migration. Most people should be pretty confused by now trying to figure out; Who's right – who's wrong? Which statistics are right – which ones are wrong?

No matter which side of the issue you feel has merit, there is one simple truth, smoke moves, e.g., "migrates." No one is disputing this. It is the potential ramifications or non-ramifications of that movement that remain unresolved and are being debated. How fast does smoke move, where does it move to, in what density does it move, what hazard does it present, what damage does it do and what is an acceptable level of smoke? These are the unanswered issues.

The requirement for fire dampers has been in all the model codes for a long time, but the broad requirement for smoke dampers is new to users of the BOCA National Codes and the SBCCI Standard Codes. Historically, the *BOCA National Building Code* and SBCCI *Standard Building Code* only required smoke dampers in smoke barriers, a type of assembly solely associated with institutional occupancies.

The requirement for smoke dampers in shafts in the 2000 IBC was a result of Code Change FS164-99. Though the proposal gave exceptions for fire dampers, exceptions for smoke dampers were noticeably absent. The proponent of FS164-99 testified at this years Spring Meeting in Birmingham, stating that the exceptions were never intended to apply to smoke dampers, and repeatedly stated that smoke dampers are needed because smoke moves beyond the floor of origin. It is not concept of smoke movement that is being disputed. Though smoke migrates, the question is - does it move with such ferocity and in such quantity from the floor of origin to constitute a hazard to the occupants of a building?

We feel that FS164-99 should not have been accepted without exceptions for smoke dampers as the omission of exceptions for smoke dampers was not justified by the documentation. The proponent of FS164-99, and proponents of other similar smoke-related proposed code changes cited the NFPA NFIRS data as a fundamental basis for their proposal, but did not prove that the NFIRS data clearly shows that smoke migrated in such a quantity beyond the floor of origin to be a hazard to the occupants.

There was little or no technical documentation provided to support the broad-based requirement for smoke dampers in the original code change, and in fact the supporters of smoke dampers have still yet to be produce technical justification for the requirement. We thought the day of approving code requirements without sound technical documentation had past.

If there were clear cut documentation that showed that the smoke-related regulations in the 2000 IBC was inadequate we would not be contending this issue. But what we find amazing is that if smoke is such a hazard, why are there no statistics that show that buildings constructed in the parts of the country using either the BOCA or SBCCI codes have higher incidences of smoke-related deaths or injuries.

We ask that the membership of ICC to re-examine this issue.

Staff Analysis: This submittal is a follow-up to FS 37-00 last cycle which was disapproved. This proposal includes revisions that were not considered last year.

FS33-01

Committee Action: **Disapproved**

Committee Reason: Regarding proposed Exception 5, fires in sprinklered buildings result in smoke which warrants smoke dampers. The 22 inch subduct exception requires additional criteria relative to minimum flow rates in order to justify the removal of the smoke damper.

Assembly Action: **No Motion**

FS36-01 AS
715.5.4

Proponent: Vickie Lovell, Intercode, Inc.; representing Air Movement & Control Association/International Firestop Association

Revise as follows:

715.5.4 Fire partitions. Duct penetrations in fire partitions shall be protected with approved fire dampers installed in accordance with their listing.

Exceptions: In occupancies other than Group H, fire dampers are not required where any of the following apply:

1. The partitions are tenant separation and corridor walls in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and the duct is protected as a through penetration in accordance with Section 711.
2. The duct system is constructed of approved materials in accordance with the *International Mechanical Code* and the duct penetrating the wall meets all of the following minimum requirements:
   - 2.1. The duct shall not exceed 100 square inches (0.06 m^2).
   - 2.2. The duct shall be constructed of steel a minimum of 0.0217-inch (0.55 mm) in thickness.
   - 2.3. The duct shall not have openings that communicate the corridor with adjacent spaces or rooms.
   - 2.4. The duct shall be installed above a ceiling.
   - 2.5. The duct shall not terminate at a wall register in the fire-resistance-rated wall.
   - 2.6 A minimum 12 inch (0.30 m) long by 0.060 inch thick (0.52 mm) steel sleeve shall be centered in each duct opening. The sleeve shall be secured to both sides of the wall and all four sides of the sleeve with minimum 1 1/2 inch x 1 1/2 inch x 0.060 inch (0.038 m x 0.038 m x 1.52 mm) steel retaining angles. The retaining angles shall be secured to the sleeve and the wall with No. 10 (M5) screws. The annular space between the steel sleeve and wall opening shall be filled with rock (mineral) wool batting on all sides.

Reason: During last year's cycle, the Fire Safety Committee recommended approval for this code change, plus the Committee itself approved an additional modification after they had the opportunity to review the 1985 test itself. They unanimously agreed that the exception should reflect more precisely when the damper can be safely eliminated. The code change was supported by 58% of the voting building officials who agreed with the committee that additional information is needed in order to permit the trading off of a fire damper in a 1 hour rated assembly. Approval of the code change failed by only 13 votes because the voting membership was split between the As Submitted and As Modified proposals.

It is not uncommon that, in the field, some have inappropriately applied this fire damper exception to all 1 hour rated wall assemblies, regardless of how the duct is constructed and installed. These revised exceptions outline the more specific conditions as to how the steel duct without a fire damper was tested. A review of the actual test report conducted in 1985 from which this exception was originally created indicates that there are specific installation conditions which enabled the steel duct to survive the ASTM 119 wall test. These are critically important aspects of the installation requirements that need to be included in the exception in order for the exception to be technically valid.

UL 555 allows for a maximum visible opening of no more than 3/8 inch (9.5 mm) in the vertical plane and no more than 1/32 inch (0.8 mm) in the horizontal plane. Thus, a through opening from one side of the rated partition to the other side of the rated partition that exceeds these limits would have represented a failure of the test. This includes the space between the sleeve and the wall.

Furthermore, the ASTM E119 test prescribes specific thermal performance requirements be maintained on the unexposed side of the wall assembly. Tests have shown that without the thermal barriers imposed by the rock wool batting and the retaining angle system these thermal limits will be exceeded and thus the assembly would also have failed the test by that criteria.

The sprinkler exception was revised because, unlike doors and other features, which may be "non-rated" yet provide some minimum level of protection, an opening in a ventilation duct is simply that, a large hole covered by some type of cosmetic covering. There is no such thing as a nonrated damper and a trade-off for dampers simply leaves a large opening by which other areas of a building may be contaminated through the ventilation system regardless of sprinkler performance.

Staff Analysis: The code change from last cycle was FS 40-00.

FS36-01

Committee Action: **Approved as Submitted**

Committee Reason: Based on proponent's published reason.

Assembly Action: **No Motion**

F37-01 - ITEM 1
903.2.2, 903.2.3, 903.2.10 (IBC 903.2.2, 903.2.3, 903.2.10)

Proposed Change as Submitted:

Proponent: Gene B. Endthoff, The National Fire Sprinkler Association; representing The National Fire Sprinkler Association

Add new text as follows:

903.2.2 Group B. An automatic fire sprinkler system shall be provided throughout all buildings where the fire area containing a Group B occupancy, where one of the following conditions exist:

1. The fire area exceeds 12,000 square feet
2. The fire area is located more than three stories, above grade
3. Where combined area of all Group B fire areas on all floors and mezzanines exceeds 24,000 square feet (2230 m2)

(Renumber remaining sections accordingly)

Proponent's Reason: It is time to require fire sprinklers in all occupied buildings. Over the years of code development we have permitted, an d by our inaction, encouraged developers and building owners to pass on their fire protection costs to the overall community. Although construction design options allow sprinklers to be installed at no additional cost, and often a savings in overall cost, we continue to permit non-sprinklered buildings to be constructed. The only buildings that have sprinklers are those where they are required. It is time therefore to make them mandatory for all buildings. This proposal would at least start the process by reducing the allowable size of one of the last three occupancies that do not have a sprinkler threshold.There is a dramatic savings advantage to the community that requires sprinklers in all buildings. This is clearly shown in the Scottsdale Report, a Ten Year Study. It is time we act. The IBC with it's sprinkler options can make non-sprinklered building economically foolish. By
dropping the construction type by only 1 grade the cost of the sprinkler system can be covered. Other design options can actually lower the overall construction costs. Don't be mislead by those who want to keep the keep municipalities responsible for their fire protection. Stop subsidizing non-sprinklered buildings.

Committee Action: **Approved as Modified**

Modify proposal as follows:

903.2.2 Group B. An automatic fire sprinkler system shall be provided throughout all buildings ~~where the fire area~~ containing a Group B occupancy, where one of the following conditions exist:

1. The fire area exceeds 12,000 square feet
2. The fire area is located more than three stories, above grade
3. Where combined area of all Group B fire areas on all floors and mezzanines exceeds 24,000 square feet (2230 m2)

Committee Reason: The proposal as modified correlates with other sections of the code and the removal of fire area language.

Staff note: The Secretariat combined three code change submittals into one proposal, which was not approved by the proponent prior to printing of the monograph. F37-01 is actually three separate code change proposals.

Assembly Action: **Disapproved – Passed**

Individual Consideration Agenda:

This item is on the agenda for individual consideration because there was a successful assembly action, and public comments were submitted.

Public Comment 1

Sarah A. Rice, Schirmer Engineering, requests Disapproval.

Commenter's Reason: In Item 1 of proposed code change F37-01,the proponent seeks to add sprinkler thresholds for Group B occupancies where currently there are none. Though the adding of new code provisions is something commonly done within the development of a model code, it is rare for a proposal of this significance to be accepted without technical justification. And unfortunately that is what has occurred here.

The issue of which buildings should be mandated to have sprinkler protection is at the heart of a heated debate these days. Though sprinklers have been found to provide a layer of safety to any types of occupancies, this is not always the case. It is highly inappropriate for not only the proponent, but also the committee and membership of ICC, to assume that just because an automatic sprinkler system is installed in a building that it will be a safer place than it was without the sprinkler system.

And it is even more inappropriate for anyone to make this supposition or reach this conclusion without having first justified it through technical documentation and statistical data substantiating the need and benefit (safety- and cost-related) of such a far-reaching code requirement.

The proponent failed to provide technical substantiation within their Reason statement for the membership to review, or to the committee to support the proposal. Therefore our question to the proponent is -**WHY** should Group B occupancies be sprinklered when of the size and/or configuration described in the proposed code change?

What documentation is there that first supports the conclusion that a Group B occupancy having a fire area of more than 12,000 sf. ft. is dangerous and poses a tremendous threat to the general public, and second that the installation of an automatic sprinkler will definitely make the building safer.

If the proponent has technical documentation that substantiates the need for an automatic sprinkler system in Group B buildings having the size and/or configuration found in their proposed change, then let them present it for all to review, analyze and openly discuss. Because of the unsubstantiated nature of the proposed code change, and until the time when the proponent can show just cause for Group B occupancies to sprinklered, we strongly urge the ICC membership to overturn the committee's recommendation and disapprove this proposal.

Public Comment 2

Ronald W. Clements Jr., Chesterfield County, representing VA Building and Code Official Association, requests Disapproval.

Commenter's Reason: There was no technical substantiation for requiring sprinkler protection in these areas. Fire loss data was not submitted that supports the sprinkler requirements in B use buildings. Sprinkler thresholds specified in Chapter 9 are based on fuel loading. Is there a high fuel load in a B occupancy?

Public Comment 3

David S. Collins, The PREVIEW Group, Inc., representing The American Institute of Architects, requests Disapproval.

Commenter's Reason: This change will require fire suppression for B Business occupancies when a fire area in these buildings exceed 12,000 square feet. None of the codes have ever had a threshold for sprinklers in these occupancies at this level. There is no evidence provided by the proponent to indicate that significant losses are occurring in these occupancies. Simply the supporting statement says, "it is time to require fire sprinklers in all occupied buildings." This is not what the proponent is asking, they are simply creating a threshold in an occupancy that has never had one and support it with no justification. This type of change should not be approved. The assembly overwhelmingly voted to deny both part 1 and part 2 of this change. The committee did vote to disapprove part 3. We urge you to deny this entire approach to code development.

Public Comment 4

Lawrence G. Perry, AIA, representing BOMA International, requests Disapproval.

Commenter's Reason: BOMA's primary reason for seeking disapproval of this code change is that the IBC already provides enough incentive to sprinkler new B occupancies, without introducing an artificially low threshold that is not based on any proportional life safety comparison with other occupancies.

The Committee provided **no** reason for their approval of this change. The only rationale offered was for the amendment to the original proposal. The amendment, which supposedly attempted to make this section consistent with other sections, imposed a far more stringent test on office buildings than that applied to any other occupancy. All other occupancies have thresholds based on the size of **that** occupancy. The B section, as modified by the committee, requires sprinkler throughout the building when a fire area (of any occupancy) exceeds 12,000 SF or three stories.

Current text allows E occupancies to have fire areas as large as 20,000 SF without sprinklers. Apparently, the committee felt that the hazard presented by the introduction of a B occupancy somewhere within the E occupancy represents a threat warranting sprinklers throughout the building, even if the B is in a separate fire area. Every other occupancy uses the fire area of that occupancy as the trigger for sprinklers. Why is the B threshold based on the fire area of any occupancy in the building?

This item was not handled appropriately during the hearings. It was published as one proposal addressing three separate occupancies, and the assembly was never told that it had been divided into three separate code changes until after all testimony and the committee vote occurred. Following the late explanation, and assembly debate, the item was overwhelmingly recommended for disapproval by the floor, including a majority of the committee who had just approved it. This flawed proposal should be disapproved.

F37-01 - ITEM 2
903.2.2, 903.2.3, 903.2.10 (IBC 903.2.2, 903.2.3, 903.2.10)

Proposed Change as Submitted:

Proponent: Gene B. Endthoff, The National Fire Sprinkler Association; representing The National Fire Sprinkler Association

Revise as follows:

903.2.3 (Supplement) Group F~~-1~~. An automatic sprinkler system shall be provided throughout all buildings containing a Group F~~-1~~ Occupancy where one of the following conditions exist:

1. Where a Group F~~-1~~ fire area exceeds 12,000 square feet (1115 m²);
2. Where a Group F~~-1~~ fire area is located more than three stories above grade; or
3. Where the combined area of all Group F-1 fire areas on all floors, including any mezzanines,exceeds 24,000 square feet (2230 m²).

Proponent's Reason: It is time to require fire sprinklers in all occupied buildings. Over the years of code development we have permitted, an d by our inaction, encouraged developers and building owners to pass on their fire protection costs to the overall community. Although construction design options allow sprinklers to be installed at no additional cost, and often a savings in overall cost, we continue to permit non-sprinklered buildings to be constructed. The only buildings that have sprinklers are those where they are required. It is time therefore to make them mandatory for all buildings. This proposal would at least start the process by reducing the allowable size of one of the last three occupancies that do not have a sprinkler threshold. There is a dramatic savings advantage to the community that requires sprinklers in all buildings. This is clearly shown in the Scottsdale Report, a Ten Year Study. It is time we act. The IBC with it's sprinkler options can make non-sprinklered building economically foolish. By dropping the construction type by only 1 grade the cost of the sprinkler system can be covered. Other design options can actually

lower the overall construction costs. Don't be mislead by those who want to keep the keep municipalities responsible for their fire protection. Stop subsidizing non-sprinklered buildings.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal correlates with other sections of the code and there are processes that may be a hazard in Group F-2.

Staff note: The Secretariat combined three code change submittals into one proposal, which was not approved by the proponent prior to printing of the monograph. F37-01 is actually three separate code change proposals.

Assembly Action: **Disapproved – Passed**

Individual Consideration Agenda:

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

Public Comment 1

Ronald C. Clements Jr., Chesterfield County, representing VA Building and Code Officials Association, requests Disapproval.

Commenter's Reason: There was no technical substantiation for requiring sprinkler protection in these areas. Fire loss data was not submitted that supports the sprinkler requirements in F-2 use buildings. Sprinkler thresholds specified in chapter 9 are based on fuel loading. What is the fuel loading of a factory full of non-combustible product?

Public Comment 2

Gene Boecker, Code Consultants, Inc, requests Disapproval.

Commenter's Reason: In support of the assembly action, this proposal simply goes too far. F-1 occupancies are appropriately suppressed under the current code provisions due to their combustible loading and potential fuel source. F-2 occupancies which would also be included under this proposal include such things as ceramics fabrication and ice production. Clearly, it makes no sense to provide sprinkler protection for an ice house. If there are specific F-2 occupancies that are deemed to be significant hazards then those should be reclassified as F-1 or should be provided with specific code language to address the unique hazards. Requirements for automatic fire sprinklers should be based on demonstrable hazards not on correlation with other code sections. There are clearly benefits to sprinkler protection for almost every type of building - but not these.

Public Comment 3

Sarah A. Rice, Schirmer Engineering, requests Disapproval.

Commenter's Reason: The proponent in Item 2 of proposed code change F37-01, seeks to add sprinkler thresholds for Group F-2 occupancies where currently there are none. We do not disagree that the adding of new code provisions is something commonly done within the development of a model code, but wish to point out that when it comes to issues of this significance it is rarely done unless valid technical documentation has been provided. Again as in Item 1, technical justification supporting the proponent's proposal was never provided to the committee or membership.

The issue of which buildings should be mandated to have sprinkler protection is at the heart of a heated debate these days. Though sprinklers have been found to provide a layer of safety to many types of occupancies, this is not always the case. It is highly inappropriate for not only the proponent, but also the committee and membership of ICC, to assume that just because an automatic sprinkler system is installed in a building that it will be s safer place than it was without the sprinkler system.

And it is even more inappropriate for anyone to make this supposition or reach this conclusion without having first justified it through technical documentation and statistical data substantiating the need and benefit (safety- and cost-related) of such a far-reaching code requirement.

Section 306.3 identifies some of the fabrication and manufacturing type facilities that, under the IBC, are classified as Group F-2 occupancies. They include:

Beverages (nonalcoholic)
Brick and masonry
Ceramic products
Foundries
Glass products

Gypsum
Ice
Metal products (fabrication and assembly)

The Committee Reason shown in the ICC Public Hearing Results state "The proposal correlates with other sections of the code and there are processes that may be a hazard in Group F-2."

We are puzzled by the committee's statement as the proponentfailed to provide any technical substantiation within their Reason statement for the membership to review, or even to the committee that showed that the "processes" in Group F-2 occupancies are dangerous or hazardous. How can the conclusion be reached that the installation of sprinklers in these occupancies will somehow make them safer when it was never proved that there is a problem to begin with?

We ask the proponent - **WHY** is a Group F-2 occupancies of the size and/or configuration described in the proposed code change so dangerous that it should be sprinklered? And **WHAT** is so hazardous about making of bricks, or ice that justifies the installation of a sprinklers system?

If the proponent has technical documentation that substantiates the need for an automatic sprinkler system in Group F-2 occupancies having the size and/or configuration found in their proposed change, then let them present it for all to review, analyze and openly discuss.

Because of the unsubstantiated nature of the proposed code change, and until the time when the proponent can show just cause for Group F-2 occupancies to sprinklered, we strongly urge the ICC membership to overturn the committee's recommendation and disapprove this proposal.

Public Comment 4

Jonathan Humble, American Iron and Steel Institute, representing AISI, requests Disapproval.

Commenter's Reason: The code change proposal as written in the 2001 Proposed Changes to the 2000 Editions* of the International Fire Code (and IBC) is not complete in that it:

- Fails to substantiate why an F-2 "factory Industrial Low-Hazard Occupancy" is a hazard sufficient enough to warrant sprinklers (e.g. When assessed against all types of construction and contents),
- Fails to adequately address the conflict which will occur with IBC -2000 Section 507.1 "Unsprinklered, One Story buildings",
- Fails to address the cost impact to F-2 occupancies,
- Fails to address the specific issue concerning the amount of noncombustibles (e.g. The commodity produced) versus theamount of combustibles (e.g. Packaging) which is defined aswhat constitutes low, moderate and high hazards, and where the combustibles are protected by sprinklers pursuant to IFC/IBC Sections 903.2.4 and 903.2.15.

We would submit that a rational approach is necessary in this case to determine what issues are significant, and in turn apply them to a reasonable proposal. We do not believe that such due diligence has been performed, and therefore recommend denial.

Public Comment 5

Rick Thornberry, The Code Consortium, Inc., representing Masonry Alliance for Codes and Standards, requests Disapproval.

Commenter's Reason: This code change will require Group F-2 occupancies to be sprinklered when they exceed 12,000 sq. ft. in area on a single floor. This code change was approved on a vote of 7 to 4 and a subsequent floor motion for disapproval was successful. Obviously, this is a very controversial code change. We strongly believe that the code change is unjustified. There was no technical justification provided to indicate that there is a fire problem in Group F-2 occupancies that requires sprinklers at such low area thresholds, if at all. In fact, the fire record for such occupancies is excellent. Section 306.3 defines a Group F-2 occupancy as a low hazard factory-industrial occupancy. These occupancies involve the fabrication or manufacturing of noncombustible materials which during finishing, packing, or processing do not involve a significant fire hazard. Examples given for such occupancies include the following:

Beverages (nonalcoholic)
Brick and masonry
Ceramic products
Foundries
Glass products
Gypsum
Ice
Metal products (fabrication and assembly)

Such low hazard factory-industrial operations, in our opinion, do not pose any significant fire threat and certainly not one that would justify the mandatory installation of automatic sprinklers. As the proponent indicates in his reason, if the installation of sprinklers is economical and can actually achieve overall cost savings in the construction and operation of buildings, then let the economics be

the driving factor for installing sprinklers in those occupancies that have a very good fire safety record and pose minimal fire hazards, not the code.

It should also be noted that presently none of the three model building codes requires such occupancies to be protected with automatic sprinklers, regardless of the area of that occupancy. And we're certainly not aware of any additional fire statistics that have become available since the development of the IBC that would indicate such a requirement is necessary at this time. This is simply a case of overkill. Therefore, we strongly urge the membership to vote for disapproval and support the floor action taken during the ICC Spring Code Hearings in Portland, OR.

Public Comment 6

David S. Collins, The PREVIEW Group, Inc., representing The American Institute of Architects, requests Disapproval.

Commenter's Reason: This change will require fire suppression for F-2 Factory occupancies when a fire area in these buildings exceed 12,000 square feet. None of the codes have ever had a threshold for sprinklers in these occupancies at this level. There is no evidence provided by the proponent to indicate that significant losses are occurring in these occupancies. Simply the supporting statement says, "it is time to require fire sprinklers in all occupied buildings." This is not what the proponent is asking, they are simply creating a threshold in an occupancy that has never had one and support it with no justification.

This type of change should not be approved. The assembly overwhelmingly voted to deny both part 1 and part 2 of this change. The committee did vote to disapprove part 3. We urge you to deny this entire approach to code development.

Public Comment 7

Mark Kluver, Portland Cement Association, representing Portland Cement Association, requests Disapproval.

Commenter's Reason: We strongly believe that this code change is unjustified and should be disapproved. Low hazard factory and industrial (Group F-2) operations, such as cement manufacturing plants, do not pose a sufficient fire hazard to require the mandatory installation of sprinkler protection.

Following the committee's recommendation on this change, the Portland Cement Association surveyed our member companies to determine if their cement manufacturing facilities are sprinklered. Of the 118 plants owned by member companies, survey forms for 66 were returned. From this survey data, we can report that only 11 or 17% of cement-manufacturing plants are provided with automatic sprinkler systems. No company that owned more than one plant reported more than one plant was sprinklered.

It is our understanding that all cement-manufacturing facilities in the United States are insured against fire and other losses. The relatively small percentage of plants with sprinklers strongly suggests that plant owners and insurance companies must believe that fire hazards in these facilities do not justify the cost of installing and maintaining sprinklers. We strongly believe that unless automatic sprinkler protection of cement plants can be economically justified based on a comprehensive cost versus benefit analysis, they should not be required by the IBC. Apparently no such analysis was submitted to the committee on any of the many Group F-2 uses that will be impacted by this sweeping change.

In addition to the foregoing, if this code change is approved, it will create a significant inconsistency in the IBC. Currently, Section 507.1 allows an unsprinklered unlimited area, one-story Group F-2 building to be of any type of construction, including Tupe V-B construction where surrounded by public ways or yards not less than 60 feet in width. Based on the application of this provision, it must be assumed that potential fire hazards in Group F-2 uses are considered to be relatively minor. In view of this provision, it will be inconsistent to add a provision to Section 903.2.3 that requires all Group F-2 buildings exceeding 12,000 square feet to be sprinklered. We urge disapproval of this code change.

F40-01 W
903.2.12.3 (IBC 903.2.12.3)

Proponent: Steven Rocklin, N.Y.S., Department of State; representing New York State, Department of State, Codes Division

Revise as follows:

903.2.12.3 Buildings over ~~55~~ 30 feet in height. An automatic sprinkler system shall be installed throughout buildings with a floor level having an occupant load of 30 or more that is located ~~55~~ 30 feet or more above the lowest level of fire department vehicle access.

Exceptions: (No change)

Reason: This proposed code change coordinates with a proposed code change to section 905.3.1 being submitted at this time, which sets requirements for standpipes based on building height. The coordinated proposal would add an exception to permit a Class I manual wet standpipe system in buildings where the highest story is not more than 75 feet above the lowest level of fire department vehicle access, and where such buildings are provided with an automatic sprinkler system. If the proposed change to section 905.3.1 is not approved, this proposal will be withdrawn. The purposes of the coordinated proposals are to improve fire protection of mid-rise buildings, reduce installation costs, and coordinate requirements for automatic sprinkler systems and standpipe systems.

The current provision would not require the installation of a sprinkler system in many buildings up to five stories in height. For example, a sprinkler system would not be required in a building of Group B occupancy and Type II A construction, having a gross area of 112,500 square feet and a height of five stories, provided that the building does not exceed 65 feet in height. [see IBC, Section 503 & Table 503]. Based on the floor area allowances of Table 1003.2.2.2, such a building could have an occupant load of over 1,100 persons. It is our view that such a building is too large and may have too many occupants to provide a reasonable degree of safety to occupants unless an automatic fire-suppression system is installed.

The current provisions of section 905.3.1 require the installation of a Class III standpipe system where the floor level of the highest story is more than 30 feet above the lowest level of fire department vehicle access. As provided in NFPA 14-2000, section 3-3.3, a Class III standpipe system "... shall provide 1½ inch hose stations to supply water for use by building occupants ..." Section 7-1.1 provides, "Manual standpipe systems shall have an approved water supply accessible to a fire department pumper." It follows that a Class III standpipe system ***must*** have an automatic water supply in order to be useable by building occupants prior to the arrival of fire department forces.

The coordinated proposals improve fire protection by requiring the installation of automatic sprinkler systems in buildings where the Code does not currently require them. Where properly installed and maintained, such systems have been shown to consistently protect persons not intimate with fire development, and extend the period of time in which tenable conditions for egress are maintained. In that many fire departments hold the view that the use of 1½ inch hose by untrained occupants may endanger their safety by encouraging closer contact with fires and/or extending egress time, Class III standpipe systems can be viewed as not contributing to life safety. A manual Class I standpipe system would provide equivalent levels of property protection.

The cost impact of the coordinated proposals cannot be accurately predicted for all potential conditions. However, the cost of an automatic sprinkler system will always be lower than the cost of an automatic wet standpipe system. The cost differential is predicated on water pressure and flow requirements for the respective systems, and the resulting costs of additional required components.

For Class I and III standpipe systems, NFPA 14 requires a minimum residual pressure of 100 psi and a minimum flow rate of 500 gpm

for the hydraulically most remote standpipe and 250 gpm for each additional standpipe, not to exceed 1250 gpm [sections 5-7 & 5-9.1.1]. For light hazard occupancies, NFPA 13-1999 requires a minimum residual pressure of 15 psi and a minimum flow rate of 500 to 750 gpm, by pipe schedule method; pressure and flow under hydraulic calculation method are to be sufficient for four sprinkler heads operating. Water supply for both systems is required to be sufficient to provide for system demand for 30 minutes. In locations with water supply systems, automatic wet standpipes will typically require a fire pump; in most cases, a fire pump would not be required for a sprinkler system. Even where a fire pump is required for the sprinkler system, the required size and consequent cost would be substantially reduced.

The current provision would not require the installation of a sprinkler system in many buildings up to five stories in height. For example, a sprinkler system would not be required in a building of Group B occupancy and Type II A construction, having a gross area of 112,500 square feet and a height of five stories, provided that the building does not exceed 65 feet in height. [see IBC, Section 503 & Table 503]. Based on the floor area allowances of Table 1003.2.2.2, such a building could have an occupant load of over 1,100 persons. It is our view that such a building is too large and may have too many occupants to provide a reasonable degree of safety to occupants unless an automatic fire-suppression system is installed.

The current provisions of section 905.3.1 require the installation of a Class III standpipe system where the floor level of the highest story is more than 30 feet above the lowest level of fire department vehicle access. As provided in NFPA 14-2000, section 3-3.3, a Class III standpipe system "... shall provide 1½ inch hose stations to supply water for use by building occupants ..." Section 7-1.1 provides, "Manual standpipe systems shall have an approved water supply accessible to a fire department pumper." It follows that a Class III standpipe system ***must*** have an automatic water supply in order to be useable by building occupants prior to the arrival of fire department forces.

The coordinated proposals improve fire protection by requiring the installation of automatic sprinkler systems in buildings where the Code does not currently require them. Where properly installed and maintained, such systems have been shown to consistently protect persons not intimate with fire development, and extend the period of time in which tenable conditions for egress are maintained. In that many fire departments hold the view that the use of 1½ inch hose by untrained occupants may endanger their safety by encouraging closer contact with fires and/or extending egress time, Class III standpipe systems can be viewed as not contributing to life safety. A manual Class I standpipe system would provide equivalent levels of property protection.

The cost impact of the coordinated proposals cannot be accurately predicted for all potential conditions. However, the cost of an automatic sprinkler system will always be lower than the cost of an automatic wet standpipe system. The cost differential is predicated on water pressure and flow requirements for the respective systems, and the resulting costs of additional required components.

For Class I and III standpipe systems, NFPA 14 requires a minimum residual pressure of 100 psi and a minimum flow rate of 500 gpm for the hydraulically most remote standpipe and 250 gpm for each additional standpipe, not to exceed 1250 gpm [sections 5-7 & 5-9.1.1]. For light hazard occupancies, NFPA 13-1999 requires a minimum residual pressure of 15 psi and a minimum flow rate of 500 to 750 gpm, by pipe schedule method; pressure and flow under hydraulic calculation method are to be sufficient for four sprinkler heads operating. Water supply for both systems is required to be sufficient to provide for system demand for 30 minutes. In locations with water supply systems, automatic wet standpipes will typically require a fire pump; in most cases, a fire pump would not be required for a sprinkler system. Even where a fire pump is required for the sprinkler system, the required size and consequent cost would be substantially reduced.

For a typical four story 20,000 square foot office building, the additional costs for an automatic water supply for the standpipe system are:

fire pump	$20,000	
controller	$20,000	
electrical	$50 - 60,000	(generator and appurtenances per NFPA 20 & 70)
TOTAL	$90 - 100,000	

The cost of a sprinkler system for a similar building would be approximately $30,000 (20,000 sf @ $1.50/sf).

While the cost advantages are most striking for small buildings, there are substantial savings available for larger structures as well. Using the example of the five story office building cited above, the cost of a sprinkler system would be approximately $175,000; the cost of an automatic water supply for the standpipe system would be approximately $125,000. However, section 504.2 of the IBC would now permit the building to be of Type II B construction, rather than II A, although with a somewhat smaller building area. For the protection of corrugated decking alone, excluding beams, columns and accessories, 1 inch thick sprayed cementitious fireproofing costs approximately $1.60/sf, about the same cost as the sprinkler system.

F40-01

Withdrawn by Proponent

F56-01

907.2.9 & 907.3.1.8

Proposed Change as Submitted:

Proponent: Jeffrey M. Shapiro, International Code Consultants, L. I. Neibauer, Automatic Fire Alarm Association, Bill Hopple, Simplex

1. Revise as follows:

907.2.9 (Supplement) Group R-2. A fire alarm system shall be installed in Group R-2 occupancies where:
1. Any dwelling unit is located three or more stories above the lowest level of exit discharge;
2. Any dwelling unit is located more than one story below the highest level of exit discharge of exits serving the dwelling unit; or
3. The building contains more than 16 dwelling units.

Exceptions:

1. A fire alarm system is not required in buildings not over two stories in height where all dwelling units and contiguous attic and crawl spaces are separated from each other and public or common areas by at least 1-hour fire partitions and each dwelling unit has an exit directly to a public way, exit court or yard.
2. A separate fire alarm system is not required in buildings that are equipped throughout with an approved supervised automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and which have a local alarm that meets the notification requirements of Section 907.10.2.

3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with Sections 903.3.1.1 or 903.3.1.2, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by openended corridors designed in accordance with Section 1005.3.6.5 Exception #4.

2. Revise as follows:

907.3.1.8 Group R-2. A fire alarm system shall be installed in existing Group R-2 apartment buildings with more than three stories or with more than 16 dwelling units.

Exceptions:

1. Where each living unit is separated from other contiguous living units by fire barriers having a fireresistance rating of not less than 0.75 hour, and where each living unit has either its own independent exit or its own independent stairway or ramp discharging at grade.

2. A separate fire alarm system is not required in buildings that are equipped throughout with an approved supervised automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and having a local alarm to notify all occupants.

3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with Sections 903.3.1.1 or 903.3.1.2, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open ended corridors designed in accordance with Section 1005.3.6.5 Exception #4.

Proponent's Reason: In last year's code cycle, the National Multi Housing Council (NMHC) submitted proposal F69, which recommended deletion of local fire alarm notification equipment in sprinklered buildings. That proposal was approved by the code development committee; however, NMHC later decided to request that the item be disapproved so that interested parties would have an opportunity to develop a joint proposal that would satisfy concerns of those who opposed the original proposal.
The exception recommended in this proposal reflects the results of that additional effort, and the proposal has been co-sponsored by organizations representing property owners/developers and the fire alarm industry. Text of the exception that currently appears in the code for R-1 uses, and it permits omission of a fire alarm system when a building is fully sprinklered, has no interior egress corridors and provides direct exterior egress from each dwelling unit. Note that in such buildings, rated fire separations are still required between units. Also note that the exception is being added to two sections, one for new construction and one for existing buildings. Suggested modifications to the R-2 exception recognize the superior record of sprinklered multi-family occupancies as reported by the National Fire Incident Reporting System (NFIRS). An analysis of NFIRS data for the period 1993 to 1997, which includes data on an average of approximately 43,000 fires per year in apartments, revealed the following:

1) An average of only 589 civilian injuries/year in building fires where sprinklers operated.
2) An average of only 2.6 civilian deaths/year in building fires where sprinklers operated.
3) An average of only 10 civilian injuries/year and ZERO deaths in the 5-year reporting period attributed to malfunctioning sprinklers.

This data excludes fires that were too small to activate sprinklers;however, there would be no benefit gained by having notification devices in such cases because, lacking sprinkler waterflow, the alarm would not be initiated.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides an option for new and existing buildings between a fire alarm system or a sprinkler system.

Assembly Action: **No Motion**

Individual Consideration Agenda:

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

Public Comment 1

Paul Hayward, City of Farmington, Utah, representing Farmington City, requests Disapproval.

Commenter's Reason: This is basically saying 13R systems are equivalent to a regular, full-blown 13 system. They're not. Also, Corridors are defined in the IBC as being enclosed. One might then wonder what an open-ended corridor is and how it is constructed. Additionally, what is an "interior corridor" – is it one that is not exterior? If so, what is an exterior corridor?

Public Comment 2

Bill Hopple, Simplex Grinnell, representing Self, requests Disapproval.

Commenter's Reason: As stated during my testimony in Portland, although the "Love Fest" (Shapiro, Neibauer, Hopple) agreed on the text (exception 3) for new construction, Mssr's Neibauer and Hopple did not agree to the addition of exception 3 for existing Group R-2's. I would like to ask that this item be approved by deleting **Part 2** of the proposal dealing with Existing R-2 occupancies, but due to the procedures for the meetings in Cincinnati and Greensboro, that motion is out of order. Therefore, I am requesting disapproval. During Mr. Shapiro's testimony in Portland, he mentioned that the proponents worked together and agreed on this massaged proposal. Indeed, that is a true statement, but only as it relates to NEW construction. We agreed that in lieu of a fire alarm system providing occupant notification, under the specific conditions of exception 3; and the fact that in new construction, all apartments are required to have multiple smoke alarms, interconnected, and located in many areas of each apartment, which will provide an early warning to the occupants, this then, seemed acceptable. Additionally, it is acceptable in "other" fire-safety codes.
However, we did not discuss, and certainly do not agree that occupant notification from a fire alarm system can be removed from existing R-2 occupancies meeting the exception 3 requirements, because most existing R-2's probably do not have interconnected smoke alarms, "IF" they have more than ONE (1) smoke alarm per apartment. This is certainly not an equivalent level of fire protection for early warning to what is required for new construction and what the proponents agree on. The omission of ". . .a local alarm to notify all occupants" was considered ONLY because new apartments contain several interconnected smoke alarms and it was considered an acceptable alternative to the otherwise required system notification approach. . .as long as all provisions of new exception 3 are met. These provisions will provide an early warning to occupants and a safe method of hasty egress should they choose to evacuate theirapartment.

G17-02 D
Table 302.1.1

Proponent: Herbert W. Yingling, CBO, CEAP, Greenvile County, South Carolina; representing Myself and the Building Officials Association of South Carolina

Revise as follows:

TABLE 302.1.1 (Supp)

INCIDENTAL USE AREAS

ROOM OR AREA	SEPARATION[a]
Storage rooms over 100 square feet [b]	1 hour or provide automatic fire extinguishing system

(Portions of table content not shown do not change)

a. (No change to current text)

b. Occupancy separation need not be provided for incidental storage areas within Groups B and M where the:

1. Area is less than 10 percent of the floor area;
2. Area is provided with an automatic fire-extinguishing system and is less than 3,000 square feet; or
3. Area is less than 1,000 square feet

Reason: This change is for clarification only. The exception exists under table 302.3.3 and should remain, however because of the direct reference to table 302.1.1 "incidental use areas" I feel the footnote is necessary under that table as well.

G17-02

Committee Action: **Disapproved**

Committee Reason: These incidental uses (in 302.1.1) are not part of the occupancy but, rather, exist to support and care for it, such as a janitor closet. The storage uses in Groups B and M (in 302.3.3) contain the products that are part of the main business. This proposed code change appears to confuse this distinction.

Assembly Action: **No Motion**

G21-02 AS
302.3.3

Proposed Change as Submitted:

Proponent: Marshall A. Klein, P.E., Marshall A. Klein & Associates, Inc.; representing National Multi Housing Council (NMHC)

Revise as follows:

302.3.3 (Supp) Separated uses. Each portion of the building shall be individually classified as to use and shall be completely separated from adjacent areas by fire barrier walls or horizontal assemblies or both having a fire-resistance rating determined in accordance with Table 302.3.3 for uses being separated. Each fire area shall comply with the code based on the use of that space. Each fire area shall comply with the height limitations based on the use of that space and the type of construction classification. In each story, the building area shall be such that the sum of the ratios of the floor area of each use divided by the allowable area for each use shall not exceed 1.

Exception. Except for Group H and I-2 areas, where the building is equipped throughout with an automatic sprinkler system, installed in accordance with Section 903.3.1.1 or 903.3.1.2 the fire-resistance ratings in Table 302.3.3 shall be reduced by 1 hour but to not less than 1 hour and to not less than that required for floor construction according to the type of construction.

Proponent's Reason: This code change is a perfect example where 13R should be permitted to be used under this exception.

At most, the maximum height of a building sprinklered in accordance with NFPA #13R is 4 stories in height and of one hour protected wood frame construction. This existing code section only permits an occupancy separation reduction of one hour off the Table 302.3.3, BUT in no case lee than a one hour separation MUST be maintained. What sense does it make to provide 2-3 hour occupancy separations in a building would be at most only one hour fire rated construction?

NFPA #13R addresses the mixed use issue under Section 2-5.2: Areas outside the dwelling units are required to be sprinklered in accordance with NFPA #13.

It is very common in apartment buildings that are sprinklered in accordance with NFPA 13R to have dining/kitchen areas, lounges, hair salons, gift shops, administrative offices and the like. Such areas are sprinklered in accordance with NFPA #13 under the requirement of NFPA #13R, Section 2-5.2. To require that such sprinklered areas be separated by 2-3 hour barriers from the rest of the apartment building is unwarranted from a life safety or even a property loss standpoint. By acceptance of Code Change G9-01 (submitted by the Masonry Alliance for Codes and Standards) last cycle, this exception was made applicable to only NFPA #13 sprinklered buildings. By permitting this exception for also NFPA #13R apartment buildings, the Code will not adversely affect the occupant safety or property protection, since the minimum separation of one hour will be consistent with the maximum one hour construction type of these typical, 4 story building types.

Committee Action: **Approved as Submitted**

Committee Reason: Based on the proponent's published reason and because this proposed change is an appropriate follow-up to code change F41-00 (AS) which deleted the specific prohibition on the use of NFPA 13 R systems in construction trade-offs when appropriate.

Assembly Action: **No Motion**

Individual Consideration Agenda

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

Public Comment 1:

Charles Clark, AIA, P.E., National Concrete Masonry Association (NCMA), representing the Masonry Alliance for Codes and Standards (MACS) requests Disapproved.

Commenter's Reason: We are submitting a Public Comment to request that this code change be disapproved because we do not believe it is appropriate to allow an NFPA 13R sprinkler system to be used for a construction trade-off in this situation. If this code change is approved, it will allow an occupancy separation between a Group R Occupancy and an adjacent occupancy that is sprinklered to be reduced by one-hour with the installation of an NFPA 13R sprinkler system. For example, this would allow an occupancy

separation required to be of 2-hours between a Group R-1 and a Group R-4 occupancy to be reduced to 1-hour where both occupancies would be allowed to be protected with an NFPA 13R sprinkler system.
Since an NFPA 13R sprinkler system is primarily a life safety system, in certain situations it may not provide adequate property protection, as does an NFPA 13 sprinkler system. Therefore, it should not be entitled to the reduction in the fire resistance rating of the occupancy separation. The occupancy separation provides both life safety and property protection. As such, it should not be allowed to be reduced in that case. This is especially critical where the occupancy separation may be adjacent to large unsprinklered concealed spaces in the occupancy protected with an NFPA 13R sprinkler system, such as in an attic or open truss or open joist floor-ceiling assembly. In those cases a fire could get into the concealed space and gain significant headway before it attacked the occupancy separation. If that occupancy separation is reduced by 1-hour as proposed by this code change, then there is a greater likelihood that the occupancy separation could be breached, thus jeopardizing the adjacent occupancy.

We were the proponent of Code Change G9-01 mentioned in the proponent's reason. That code change was approved during the last code change cycle because it clarified that the exception to allow the reduction of 1-hour in the occupancy separation was only to apply to NFPA 13 sprinkler systems. That was always the intent of this section. In fact, that code change was not necessary until Code Change F41-00 deleted Section 903.1.2. Section 903.1.2 stated that modifications and trade-offs were not allowed for NFPA 13R and 13D sprinkler systems unless specifically noted. Thus, we submitted Code Change G9-01 and it was approved and is now included in the 2002 Accumulative Supplement to the IBC.

Finally, we would like to respond to the part of the proponent's reason for the code change where he states that the types of buildings where the NFPA 13R sprinkler system would be used would, at most, require 1-hour fire resistive construction throughout which does not justify requiring higher fire resistance rated occupancy separations. That statement is totally unfounded and unjustified. There are many mixed occupancy buildings that have *no* fire-resistance ratings required throughout, yet still require 2 and 3-hour occupancy separations in the case where the separated use option in Section 302.3.3 is used. The occupancy separation is provided for fire and life safety reasons and is not based on the building type of construction. Otherwise, the same argument could be applied to most of the building types of construction, which do not require more than 1-hour fire-resistive construction throughout, thus negating the need for occupancy separations of more than 1-hour when the separated use provisions of Section 302.3 are used.

In conclusion, we strongly believe that this code change should be disapproved by the voting membership since it is inappropriate to utilize an NFPA 13R sprinkler system for a construction trade-off in this case.

Public Comment 2:

Gilbert Gonzales, Murray City Corp., representing Utah Chapter of ICC, requests Disapproved.

Commenter's Reason: While this proposal has merit, the exception has unintended consequences and needs more consideration and evaluation before

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G50-02 D
403.3, 403.3.1, 403.3.2

Proposed Change as Submitted:

Proponent: Barry N. Gupton, P.E., North Carolina Department of Insurance; representing SBCCI Means of Egress, Code Action Committee

Revise as follows:

403.3 Reduction in fire-resistance rating. The fire-resistance-rating reductions listed in Sections ~~s~~ 403.3.1 ~~and 403.3.2~~ shall be allowed in buildings that have sprinkler control valves equipped with supervisory initiating devices and water-flow initiating devices for each floor.

403.3.1 Type of construction. The following reductions in the minimum construction type allowed in Table 601 shall be allowed as provided in Section 403.3:

~~1.~~ Type IA construction shall be allowed to be reduced to Type IB.

~~2. In other than Groups F-1, M and S-1, Type IB construction shall be allowed to be reduced to Type IIA.~~

~~**403.3.2 Shaft enclosures.** The required fire-resistance rating of the fire barrier walls enclosing vertical shafts, other than exit enclosures and elevator hoistway enclosures, shall be reduced to 1 hour where automatic sprinklers are installed within the shafts at the top and at alternate floor levels.~~

Proponent's Reason: Section 403.3.1(2) permits a reduction in the fire resistance rating of Type IB construction down to Type IIA construction. This lower type of construction requires only 1-hour protection of the beams, columns and floor systems. Effectively, the allowable height of Groups A-2, A-3, A-4, B, F-2, R-1, R-2, R-3, R-4 and S-2 is increased by as much as 8-stories on buildings with reduced fire resistance. The allowable height in feet is also increased from 65-feet to 160-feet. Arguments have been made that 1-hour fire resistance is adequate to evacuate these buildings in a timely manner. Consider the fire that occurs on the 8th floor of an 11-story, Type IIA hotel building. The occupants of the 9th, 10th, and 11th floors may have to remain in place until emergency personnel can assist their evacuation. The rescue operation will have to be staged from the inside of the building with only 1-hour protection of the structural systems.

Section 403.3.2 has no basis and should be deleted along with Section 403.3.1(2). Section 707.4 requires 2-hour shaft protection in Type I construction.

Committee Action: **Disapproved**

Committee Reason: The one hour reduction in fire resistance rating for sprinklers concept has been used successfully since it was first introduced by New York City in the early 1970's and the current text has existed through two drafts of the IBC and a number of code change cycles without being challenged. The basis for overturning a proven code provision has not been portrayed. The current text has within it an implicit 160 foot height limit and is adequate as written.

Assembly Action: No Motion

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 Approved as Submitted.

Commenter's Reason: Section 403.3.1(2) permits a reduction in the fire resistance rating of Type IB construction down to Type IIA construction. This lower type of construction requires only 1-hour protection of the beams, columns and floor systems. Effectively, the allowable height of Groups A-2, A-3, A-4, B, F-2, R-1, R-2, R-3, R-4 and S-2 is increased by as much as 8-stories on buildings with reduced fire resistance. The allowable height in feet is also increased from 65-feet to 160-feet. Arguments have been made that 1-hour fire resistance is adequate to evacuate these buildings in a timely manner. Consider the fire that occurs on the 8 th floor of an 11-story, Type IIA hotel building. The occupants of the 9 th , 10 th , and 11 th floors may have to remain in place until emergency personnel can assist their evacuation. The rescue operation will have to be staged from the inside of the building with only 1-hour protection of the structural systems. Section 403.3.2 has no basis and should be deleted along with Section 403.3.1(2). Section 707.4 requires 2-hour shaft protection in Type I construction.

We believe that Type IIA Construction provides inadequate passive fire protection for an 11 story high-rise building.

G56-02 D
403.3.1

Proponent: Richard Licht, President; representing Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

403.3.1 Type of construction. ~~The following reductions in the minimum construction type allowed in Table 601 shall be allowed as provided in Section 403.3:~~

~~1.~~ Type IA construction shall be allowed to be reduced to Type IB.

~~2. In other than Groups F-1, M and S-1, Type IB construction shall be allowed to be reduced to Type IIA.~~

Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) has initiated an in-depth review of the 2000 International Building Code (IBC) in an effort to identify requirements and sprinkler trade-offs that may be excessive compared to the three model building codes upon which the IBC is based or which may be even less restrictive than the three model building codes. We are attempting to develop a series of code changes over the next few years that, in our opinion, will create a code that is more internally consistent and provides a reasonable level of fire and life safety that incorporates a balanced design approach of active and passive fire protection features and systems. One of our first projects is an analysis of the high rise provisions in Chapter 4 regarding the allowable reductions in types of construction based on the installation of an automatic sprinkler system provided with additional supervisory features as specified in Section 403.

In our analysis of the three model building codes and their requirements and trade-offs allowed for sprinklered high rise buildings, we have determined that the allowable reduction from Type IB to IIA construction for all use groups other than Groups F-1,M, and S-1 is more liberal than any of the three model building codes.

Of course, no reductions in fire resistance ratings for high rise buildings were allowed by both the 1999 SBCCI Standard Building Code and the 1997 ICBO Uniform Building Code for other than Group R occupancies. Even so, the reductions never permitted such high rise buildings to be constructed with only one hour fire resistance throughout. An analysis of the 1999 BOCA National Building Code which does allow the types of construction reductions for use groups other than Groups F-1, M, and S-1 for BOCA Type 2A to 2B which is similar to the reduction allowed in the IBC from Type IB to IIA shows that the other occupancy groups A, E, and I (other than I-1) would not qualify for the reduction in fire resistance ratings. The Group I-1 Residential Care occupancy in the BOCA Code would allow a maximum 10 stories and 120 feet for a sprinklered high rise building. However, it should be noted that the 1999 SBCCI Standard Building Code would only allow 6 stories and 65 feet in height for such a sprinklered occupancy and the UBC would allow at most a 3 story and 65 foot height limit. Because the I-1 occupancy poses more of a life safety risk to the occupants than a Group R occupancy, we believe it is appropriate not to allow the reduction in type if construction for the I-1 occupancy from Type IB to Type IIA construction.

Presently, the IBC will allow a Group B occupancy high rise building to have a maximum height of 12 stories and 180 feet for a building of Type IIA construction based on the trade-off permitted in Section 403.3.1(2). This, in essence, only requires one hour fire resistive construction throughout. However, an analysis of the three model building codes, upon which the IBC is based, shows that the maximum height allowed by any of those codes is 8 stories and 105 feet for the comparable type of construction which is found in the 1999 BOCA National Building Code. Furthermore, the 1999 SBCCI Standard Building Code would only allow such a building to be 6 stories and 65 feet in height and the 1997 ICBO Uniform Building Code would only allow the building ro be 6 stories and 65 feet in height. On that basis, we believe that the Group B occupancies should also be deleted from this reduction in fire resistance rating/type of construction. If that were the case, then the IBC would allow a Group B occupancy of Type IIA construction with automatic sprinkler protection to be built to a height of 6 stories and 85 feet. Thus, the only difference between what any of the model codes had previously allowed and what is presently allowed by the IBC for Type IIA construction (if not a high rise) is two stories and 20 feet. We do not believe that is a significant difference and, given the fact that the other two model building codes allowed much lesser heights, we believe it is more appropriate not to allow such a reduction to one hour fire resistance throughout for high rise buildings containing Group B occupancies. Certainly, the present IBC limit of 12 stories and 180 feet is excessive and has not been substantiated by any building code allowing such a condition to exist. Therefore, there is no fire experience to our knowledge that could justify such a height allowance for one hour fire resistive construction.

Also, presently, the IBC will allow a Group R occupancy high rise building to have a maximum of 12 stories and 180 feet in height when of Type IIA construction which is basically, as previously indicated, a one hour fire resistive construction throughout. An analysis of the three model building codes upon which the IBC is based will indicate that the highest Group R building allowed by any of the codes was 10 stories and 120 feet in the 1999 BOCA National Building Code. It should be noted that the 1999 SBCCI Standard Building Code would allow a maximum height for a Group R sprinklered building of 6 stories and 65 feet as compared to the 1997 ICBO Uniform Building Code which would allow a maximum height for a sprinklered building of Group R occupancy of 5 stories and 65 feet. If the high rise trade-off is not allowed for the reduction in type of construction, the IBC would presently allow a Group R building of Type IIA construction with automatic sprinklers to be 5 stories and 85 feet in height. This compares favorably with two of the three model building codes and, in our opinion, justifies the deletion of Group R occupancies from the trade-off of types of construction in a high rise building. We are concerned about allowing such a tall building (which is even greater than that allowed by any of the model building codes serving as the source documents for the IBC for a building of one-hour fire resistive construction) where the occupants will be asleep overnight. In our opinion , this is an important fire and life safety issue for which the allowable height for Group R high rise buildings qualifying for a trade-off in types of construction should definitely be reduced, if such a trade-off is not eliminated , since it goes beyond any of the model codes upon which the IBC is based. Thus, there is no experience to justify such an allowable height for one hour fire resistive construction. This should only be allowed if adequate technical substantiation and documentation can be provided to indicate that such a practice is reasonably safe.

We intend to provide the Committee with a comprehensive analysis documenting the maximum allowable heights for various occupancy groups based on the typical types of construction that qualify for use in high rise buildings. This documentation will clearly show that only, at best, the Group R occupancy buildings should be allowed to have the reduction in fire resistance ratings from Type IB construction to Type IIA construction.

For all of the above reasons, it is the opinion of the Alliance that the more prudent approach regarding sprinkler trade-offs for fire resistive construction in high rise buildings is to not allow the reduction in type of construction from Type IB to IIA for any occupancy classification.

G56-02

Committee Action: Disapproved

Committee Reason: For consistency based on the committee's disapproval of code change G55-02.

Assembly Action: **No Motion**

G58-02 D
403.9.1(new); 1003.2.13.3

Proposed Change as Submitted:

Proponent: Hassan Alameddine, Los Angeles Basin Chapter of ICBO

1. Add new text as follows:

403.9.1 Elevator lobby. Elevators on all floors shall open into elevator lobbies that are separated from the remainder of the building, including corridors and other means of egress, by smoke partitions complying with Section 710. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within the code. Elevator lobbies separated from a fire resistance rated corridor shall have walls of not less than one-hour fire resistance rating and openings shall conform to Section 714.

Exceptions:
1. Separations are not required from a street floor elevator lobby.
2. In atria complying with the provisions of Section 404 elevator lobbies are not required.

2. Revise as follows:

1003.2.13.3 Elevators. An elevator to be considered part of an accessible means of egress shall comply with the emergency operation and signaling devices requirements of Section 211 of ASME A17.1. Standby power shall be provided in accordance with Sections 2702 and 3003. The elevator shall be accessed from either an area of refuge complying with Section 1003.2.13.5 or a horizontal exit.

Exceptions:
1. (No change)
2. ~~Elevators are not required to be accessed from an area of refuge or horizontal exit in buildings and facilities equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Proponent's Reason: The elimination of elevator lobbies in the 2000 IBC is tied to the requirement for fire-resistive construction in corridors. Since all high rise buildings are required to be sprinklered, and since corridors in fully sprinklered office buildings are not required to be fire-resistive, there is no requirement for elevator lobby separation. This proposal would require elevator lobbies in high rise buildings to be separated from the rest of the building, but it would not require that the separation be fire-resistive, just that it be capable of resisting the passage of smoke.

Because smoke is the major threat in all fires, particularly in fires in multistory buildings, protection of vertical openings is vital to the welfare and safety of building occupants; and since elevator shafts are generally the largest vertical shafts in most buildings, protecting those shafts by enclosing elevator lobbies is critical.

These lobbies not only provide barriers that can prevent the migration of smoke throughout the building, but can also serve as safe areas of refuge for those fleeing the initial stages of a fire, afford safe haven for people incapable of using the exit stairs to evacuate the fire floor, maintain a clean elevator shaft for more efficient and effective fire department operations, and provide protected staging areas for fire fighters in fighting the fire.

This proposal is similar in content to a change presented at the 1999 (O140-99) hearings in Costa Mesa, California. The Committee asked the proponents to specifically address the development of a performance criteria for "smoke partitions" which was accomplished in the 2001 code change cycle by code change FS18-01 which added new Section 710 to the code.

Committee Action: **Disapproved**

Committee Reason: The proposed text does not indicate the type of fire resistance rated assembly to be used in constructing elevator lobbies which makes it difficult to determine construction and opening protective requirements. Several uses for elevator lobbies are offered in the reason statement , however no size requirements for the lobby are included which could adversely affect intended lobby uses. Moreover, a recent NIST report took a position against using elevator lobbies as an area of safety for persons not able to use the exit stairs. The term "street floor" is not adequately defined and it is unclear how that term would be properly applied to a building built on a sloped site.

Assembly Action: **Approved as Submitted**
Motion-Failed

Note: Published Part 2 of G58-02 duplicated the proponent's code change E20-02. See IBC Means of Egress Report of Hearing for code change E20-02.

Individual Consideration Agenda

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

Public Comment:

Roger Evans, Salt Lake City, UT, representing, Utah Chapter of ICC, requests Approved as Submitted.

Commenter's Reason: The elimination of elevator lobbies in the 2000 IBC is tied to the requirement for fire-resistive construction in corridors. Since all high rise buildings are required to be sprinklered, and since corridors in fully sprinklered office buildings are not required to be fire-resistive, there is no requirement for elevator lobby separation. This proposal would require elevator lobbies in high rise buildings to be separated from the rest of the building, but it would not require that the separation be fire-reisistive, just that it be capable of resisting the passage of smoke.

Because smoke is the major threat in all fires, particularly in fires in multistory buildings, protection of vertical openings is vital to the welfare and safety of building occupants. Every reliable study on smoke migration between floors shows elevator shafts to be the largest source. Since elevator shafts are the largest vertical shafts in most buildings, protecting those shafts by enclosing elevators lobbies is critical.

G93-02 D
504.2

Proponent: Richard Licht, President; representing Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

504.2 Automatic sprinkler increase. For buildings protected throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height ~~is~~ shall be increased by 20 feet (6096 mm) and the maximum number of stories ~~is~~ shall be increased by one story. ~~For Group R buildings protected throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four stories or 60 feet (18 288 mm), respectively.~~ These increases are permitted in addition to the area increase.

Reason: The Alliance believes in a balanced design approach to fire and life safety in buildings. This code change is an attempt to bring the code more back into balance regarding the issue of automatic sprinkler system trade-offs, especially those trade-offs utilizing NFPA 13R sprinkler systems. The Alliance also believes that certain sprinkler trade-offs are appropriate since they do help to maintain a balance in the level of fire and life safety provided, while achieving cost effective solutions to the fire problem. But those trade-offs should be appropriate for the type of system being proposed to allow the trade-off.

In this case, the code presently allows the use of an NFPA 13R life safety sprinkler system to trade-off what is basically a property protection feature: the type of construction of the building. In effect, by allowing an increase of one story and up to 20 ft. (not to exceed 4 stories and 60 ft.) in building height when an NFPA 13R sprinkler system is provided allows for a lesser type of construction to be used or allows the type of construction to accommodate a larger total area of building, thus increasing the exposure of a building to potential property loss.

The Alliance notes that the sprinkler trade-off in increased building height is already permitted by the code when an NFPA 13 sprinkler system is installed throughout a building. This applies across the board to virtually all occupancies (other than Group H) and not just to Group R residential occupancies. The Alliance believes that this is a reasonable trade-off since an NFPA 13 system is a complete sprinkler system designed for both property protection and life safety. Such a trade-off has been traditionally allowed by the three model building codes prior to the IBC. In fact, only one of the three model codes allowed the NFPA 13R sprinkler trade-off for the increase in story height. The other two model codes did not allow any trade-off whatsoever for NFPA 13R sprinkler systems, whether for life safety or property protection.

A significant problem with allowing this height increase for the NFPA 13R sprinkler system is that the system does not provide sprinkler protection in all areas of the building, especially in attics and exterior balconies of combustible construction. Why should such a trade-off be permitted to allow an increase in building height when it makes a fire in such spaces that are not sprinklered that much more difficult to access and extinguish by the responding fire department? Is the minimal cost savings of installing an NFPA 13 sprinkler system in lieu of an NFPA 13 sprinkler system worth the added risk and potential property damage that may result from a fire developing within or gaining access to nonsprinklered combustible spaces?

The allowable use of an NFPA 13R sprinkler system for an increase in building height is not justified and can potentially allow for greater property damage and loss of apartment units should a fire occur in an unsprinklered area and spread to other unsprinklered areas including combustible concealed spaces. An example of this type of fire condition occurring has been documented in the March/April, 2001, NFPA Journal. A fire in a multistory wood frame constructed apartment building in Ohio resulted in total building property damage of approximately $1 million and the loss of all 27 apartments. This was due to a fire that occurred in a building protected with an NFPA 13R sprinkler system.. The fire started on a wood balcony which did not have sprinkler protection as allowed by NFPA 13R and spread into the combustible concealed spaces within the building including the attic which is also not required to be sprinklered by NFPA 13R. From there the fire spread throughout the building and grew to such proportion that it was beyond the capability of the responding fire department to control and contain it, resulting in the catastrophic property loss. Fortunately, there were only a couple of minor injuries so the NFPA 13R sprinkler system performed its main function of life safety but failed to achieve adequate property protection. This example shows why the Alliance believes that the present code allowance of the NFPA 13R sprinkler system trade-off for increased building heights is not appropriate for assuring a reasonable level of property protection in these Group R occupancy buildings.

We do not see that there is any significant benefit in allowing the increased story and building height for NFPA 13R sprinkler systems in Group R residential occupancies in lieu of NFPA 13 sprinkler systems presently allowed for virtually all occupancies. Presently there is very little incentive for a designer or builder to sprinkler a Group R residential occupancy using an NFPA 13 sprinkler system, especially since all Group R occupancies regulated by the International Building Code (IBC) are now required to be protected with either an NFPA 13 or 13R sprinkler system based on the 2001 Supplement, Section 903.2.7. Thus, there is no need to provide an incentive to sprinkler such occupancies using an NFPA 13R system. Instead, the incentive should be to utilize a complete NFPA 13 sprinkler system which can be accomplished if this proposed code change is approved.

For example, a comparison of the allowable building heights, types of construction, and fire resistance ratings of both Type VA and Type VB construction will show how this code change can provide such an incentive as compared to the present code requirements. Please refer to the following tables:

COMPARISONS

Table 1—Type VA NFPA 13R vs. Type VA NFPA 13: Present code.

Type VA (13R)	Type VA (13)	Type VA (13) (Option 1[a])	(Option 2[a])
Total height allowed	4 stories 60 ft.	4 stories 70 ft.	4 stories 70 ft.
Area increase allowed	No	Yes[a]	No[a]
1-hour separation required	Yes	Yes	Yes
Interior bearing wall rating	1-hour	1-hour[a]	- 0 -[a]
Exterior bearing wall rating	1-hour	1-hour	1-hour
Exterior nonbearing wall rating	- 0 -	- 0 -	- 0 -
Floor rating/separation	1-hour	1-hour	1-hour
Roof rating	1-hour	1-hour[a]	- 0 -[a]

Table 2—Type VA NFPA 13R vs. Type VA NFPA 13: If Code Change is approved.

	Type VA (13R)	Type VA (13)	Type VA (13) (Option 1[a])	Type VA (13) (Option 2[a])
Total height allowed		3 stories 50 ft.	4 stories 70 ft.	4 stories 70 ft.
Area increase allowed	No	Yes[a]	No[a]	
1-hour separation required	Yes	Yes	Yes	
Interior bearing wall rating	1-hour	1-hour[a]	- 0 -[a]	
Exterior bearing wall rating	1-hour	1-hour	1-hour	
Exterior nonbearing wall rating		- 0 -	- 0 -	- 0 -
Floor rating/separation	1-hour	1-hour	1-hour	
Roof rating	1-hour	1-hour[a]	- 0 -[a]	

[a] Either an increase in allowable area can be used when an NFPA 13 sprinkler system is provided or the one-hour fire resistive construction required throughout can be omitted for Type VA construction, but not for the dwelling/unit guest room separation.

COMPARISONS

Table 3—Type VB NFPA 13R vs. Type VB NFPA 13: Present code.

	Type VB (13R)	Type VB (13)
Total height allowed	3 stories 60 ft.	3 stories 60 ft.
Area increase allowed	No	Yes
1-hour separation required	Yes: 1-hour	½ hour
Interior bearing wall rating	- 0 -	- 0 -
Exterior bearing wall rating	- 0 -	- 0 -
Exterior nonbearing wall rating	- 0 -	- 0 -
Floor rating/separation	1-hour	½ hour
Roof rating	- 0 -	- 0 -

Table 4—Type VB NFPA 13R vs. Type VB NFPA 13: If Code Change is approved.

	Type VB (13R)	Type VB (13)
Total height allowed	2 stories 40 ft.	3 stories 60 ft.
Area increase allowed	No	Yes
1-hour separation required	Yes: 1-hour	½ hour
Interior bearing wall rating	- 0 -	- 0 -
Exterior bearing wall rating	- 0 -	- 0 -

Exterior nonbearing wall rating	- 0 -	- 0 -
Floor rating/separation	1-hour	½ hour
Roof rating	- 0 -	- 0 -

In conclusion, it is the Alliance's opinion that this code change should be approved by the Committee in order to maintain reasonable balance and aqequate property protection for Group R multistory residential occupancies of Type V wood frame construction.

G93-02

Committee Action: **Disapproved**

Committee Reason: See the Committee Reason statement for code change G92-02.

Assembly Action: **No Motion**

FS27-02 D
707.14.1 (Supp)

Proponent: Ralph W. Jones III CBO, City of Lake Mary, Florida; representing SBCCI ICC-Fire Safety Code Action Committee

Revise as follows:

707.14.1 (Supp) Elevator lobby. Elevators ~~opening into a fire-resistance-rated corridor as required by Section 1004.3.2.1~~ serving a Group R-1 or Group I Occupancy having an occupant load of 10 or more, or serving other occupancies having an occupant load of 30 or more shall be provided with an elevator lobby at each floor ~~containing such a corridor~~. The lobby shall completely separate the elevators from the ~~corridor~~ remainder of the floor by 1-hour fire barriers and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. (No change to current text).

2. (No change to current text)

3. ~~Where additional doors are provided in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.~~

4. ~~In other than Group I-3, and buildings more than four three stories above the lowest level of fire department vehicle access, lobby separation is not required where the building, including the lobby and corridors leading to the lobby, is protected by an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Reason: Elevator hoist ways are the single largest floor-to-floor openings in buildings. Smoke and other products of combustion are known to migrate to areas not directly involved in a fire scene. This smoke and other products of combustion are not eliminated by the presence of a fire sprinkler system.. Means of egress are sized only for exiting a single floor; therefore, products of combustion should be limited from migrating to other floors. A means to control the migration of these products of combustion from floor to floor is essential to providing safe egress to occupants in a building involved in a fire.

Exception 2 references Section 3002.6. Section 3002.6 is a prohibition of doors other than hoist way doors leading into the elevator car. It does not provide equivalence to an elevator lobby, and therefore should not be included as an exception.

Exception 4 allows buildings that are less than six stories, equipped with a 13 or 13r sprinkler system to be exempt from the elevator lobby requirement. If you agree with the physics of fluid dynamics, migration of smoke is not a function of building height or the presence of sprinkler systems, but a function of moving from an area of higher concentration to areas of lesser concentrations. Therefore, exempting the requirement for elevator lobbies based on height or the presence of a sprinkler system would be a fallacy.

Analysis: The difference between this proposal and FS26-02 is the deletion of Exception 4.

FS27-02

Committee Action: **Disapproved**

Committee Reason: See the reason for disapproval of FS25-02 relative to occupant load. If the concern is smoke migration, a fire resistance rated barrier may not be the solution.

The proposal lacks justification for the removal of the sprinkler trade-off. The end result of this proposal may be a requirement for 2 story buildings to have an elevator lobby which is overly restrictive.

Assembly Action: **No Motion**

FS61-02 AM
715.5.3.1

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

Revise as follows:

715.5.3.1 Penetrations of shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with approved fire and smoke dampers installed in accordance with their listing.

~~**Exception:** Fire dampers are not required at penetrations of shafts where:~~

~~1. Steel exhaust subducts extend at least 22 inches (559 mm) vertically in exhaust shafts provided there is a continuous airflow upward to the outside.~~

~~2. Penetrations are tested in accordance with ASTM E 119 as part of the fire-resistance rated assembly~~

~~3. Ducts are used as part of an approved smoke- control system in accordance with Section 909.~~

~~4. The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.~~

Exceptions:

1. Fire dampers are not required at penetrations of shafts where:

2. 1.1 Steel exhaust sub-ducts extended at least 22 inches vertically in exhaust shafts provided there is a continuous airflow upward to the outside, or

1.2 Penetrations are tested in accordance with ASTM E 119 as part of the rated assembly, or

1.3 Ducts are used as part of a smoke control system designed in accordance with Section 909, or

1.4 The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire resistance rated construction.

3. In Group B occupancies, equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, smoke dampers are not required at penetrations of shafts where:

2.1 Steel exhaust sub-ducts extended at least 22 inches vertically in exhaust shafts provided there is a continuous airflow upward to the outside, or

2.2 Ducts are used as part of a smoke control system unless otherwise required with Section 909, or

2.3 The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than a 2-hour fire resistance rated construction.

Reason: The purpose of the International Building Code is to provide minimum requirements to safeguard occupants of buildings from fire and other hazards attributed to the built environment. We would like to stress the term "minimum". To date, we are unaware of any current Model Building Code requiring smoke dampers in locations specified in paragraph 715.5.3.1. We believe that the below information clearly indicates why the current text is flawed and overly restrictive and that it needs to be revised. We also believe the current text will significantly increase building construction and maintenance costs without increasing safety to the building occupants. In addition, we are unaware of any technical research that indicates that the installation of smoke dampers in the noted locations will significantly increase safety to the building occupants in a sprinklered office building.

Smoke dampers are usually required in air conditioning or ventilating ducts that pass through required smoke barriers. Smoke dampers are intended to resist smoke spread within a duct. They normally operate automatically upon detection of smoke by duct smoke detectors and must function so that smoke movement through the duct is halted. Due to dilution effects of entrained air, these duct smoke detectors cannot be expected to reliably provide "early warning" smoke detection.

Exception 1 is just re-formatting of the existing text in Section 715.5.3.1. Exception 2 recognizes the advantages of Group B occupancies that are protected with automatic sprinklers. The need of smoke dampers in the following locations are therefore not warranted.

Exception 2.1 recognizes that requiring smoke dampers in steel exhaust sub-ducts extended at least 22 inches vertically in exhaust shafts providing there is a continuous airflow upward to the outside would not significantly increase safety to the building occupants. It recognizes that the continuous upward airflow to the outside will create a negative pressure in the shaft as compared to other spaces, thereby minimizing the spread of smoke from the shaft.

Exception 2.2 recognizes that smoke dampers are not required where the ducts are used as part of a smoke control system and where smoke dampers are not required as part of the operation of the smoke control system. Requiring smoke dampers in all ducts that are used as part of an approved smoke control system would not significantly increase safety to the building occupants.

Exception 2.3 recognizes that requiring smoke dampers in garage exhaust and supply shafts would not significantly prevent the spread of smoke within the garage, since the vehicle ramp from floor is a much greater means to transport smoke in a garage.

As stated above, the purpose of the International Building Code is to provide minimum requirements, not unwarranted and unnecessary requirements. As written, Paragraph 715.5.3.1 only increases the number of smoke dampers, smoke detectors, etc. and costs of construction to a building without providing a substantial increase in safety to the building occupants.

Analysis: The only difference between this change and FS62-02 is proposed Exception 2.1.

FS61-02 AM

Committee Action: **Approved as Modified**

Modify proposal as follows:

715.5.3.1 Penetrations of shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with approved fire and smoke dampers installed in accordance with their listing.

Exceptions:

1. Fire dampers are not required at penetrations of shafts where:
   1.1 Steel exhaust sub-ducts extended at least 22 inches vertically in exhaust shafts provided there is a continuous airflow upward to the outside, or
   1.2 Penetrations are tested in accordance with ASTM E 119 as part of the rated assembly, or
   1.3 Ducts are used as part of an approved smoke control system designed and installed in accordance with Section 909, and where the fire damper will interfere with the operation of the smoke control system, or
   1.4 The penetrations are in parking garage exhaust or supply

shafts that are separated from other building shafts by not less than 2-hour fire resistance rated construction.

2. In Group B occupancies, equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, smoke dampers are not required at penetrations of shafts where:

2.1 Bathroom and toilet room exhaust openings with, ~~S~~steel exhaust sub-ducts, having a wall thickness of at least 0.019 inches (0.48 mm) and that extend~~ed~~ at least 22 inches (559 mm) vertically ~~in exhaust shafts provided there is a continuous~~ and the exhaust fan at the upper terminus, powered continuously in accordance with the provisions of Section 909.11, and maintains airflow upward to the outside, or

2.2 Ducts are used as part of an approved smoke control system ~~unless otherwise required with Section 909~~, designed and installed in accordance with Section 909, and where the smoke damper will interfere with the operation of the smoke control system, or

~~2.3 The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than a 2-hour fire resistance rated construction.~~

3. Smoke dampers are not required at penetration of exhaust or supply shafts in parking garages that are separated from other building shafts by not less than 2-hour fire-resistance rated construction.

Committee Reason: Based on proponent's published reason. The modifications clarify the following exceptions:

1.3—The smoke control system must be approved and the absence of the fire damper must not adversely impact the system.
2.1—The exception is limited to bath and toilet exhaust with exhaust fans which are continuously powered.
2.2—See 1.3.
3.—Restated current Exception 4 to allow the deletion of smoke dampers given the open communication between floors due to the ramps.

Assembly Action: **No Motion**

F91-02 D

903.2.8 (New) (IBC 903.2.8 [New])

Proponent: Matthew D. Dobson, National Association of Home Builders; representing National Association of Home Builders

Add new text as follows:

903.2.8 Group R-2. An automatic sprinkler system shall be provided throughout all buildings with a Group R-2 fire area.

Exception: Where the building is two (2) stories or less, including the abasement, and where one or more of the following egress patterns exist:

1. Where the primary egress from the dwelling unit is directly to grade.
2. Where there is direct egress from each dwelling unit to an outside stairway that does not service more than two units on the same floor.
3. Where there is direct access to an interior stair that only serves that unit, is protected with a 1-hour fire rated construction and is without other openings.

Reason:.This revision makes the IBC more consistent with the provisions of the current NFPA 101 - Life Safety Code.

This application provides exception to specific egress designs that are low risk and whose living arrangements are more similar to one and two family than apartments. The egress arrangements are more separated and less communal. These exemptions facilitate

construction of more affordable housing without comprising occupant safety by maintaining the occupant's ability to easily and quickly exit the dwelling.

The acceptability of this proposal is further substantiated by the tremendous progress made in fire safety in the residential building industry. Our building codes have done a great job of addressing fire safety, reducing residential fires by 19% - 22% in the last 10 years alone. As we continue to modernize our housing stock, this trend will continue.

The application of this style of residential construction is truly an affordable home. Not having these exemptions will increase the cost and hinder the affordability, with little impact on fire safety. Finally this change makes the IBC more consistent with other established provisions for life safety.

F91-02

Committee Action: **Disapproved**

Committee Reason: The code change was disapproved to be consistent with previous membership actions in F45-00 and F39-01 and is considered a life safety issue.

Assembly Action: **No Motion**

2003-2004 CYCLE

G55-03/04 AM
403.3.1

Proposed Change as Submitted:

Proponent: Jason T. Thompson, National Concrete Masonry Association; representing Masonry Alliance for Codes and Standards (MACS)

1. Revise as follows:

403.3.1 Type of construction. The following reductions in the minimum construction type allowed in Table 601 shall be allowed as provided in Section 403.3:

1. For buildings not greater than 420 feet in height, Type IA construction shall be allowed to be reduced to Type IB.
2. In other than Groups F-1, M and S-1, Type IB construction shall be allowed to be reduced to Type IIA.
3. The height and area limitations of the reduced construction type shall be allowed to be the same as for the original construction type.

403.3.2 Shaft enclosures. For buildings not greater than 420 feet in height, ~~T~~the required fire-resistance rating of the fire barrier walls enclosing vertical shafts, other than exit enclosures and elevator hoistway enclosures, shall be reduced to 1 hour where automatic sprinklers are installed within the shafts at the top and at alternate floor levels.

2. Add new text as follows:

403.15 Buildings greater than 420 feet in height. Buildings greater than 420 feet in height shall comply with the requirements of Sections 403.15.1 through 403.15.6.

403.15.1 Floor and roof construction. Floor and roof construction, including supporting beams and joists, shall have a fire-resistance rating of not less than 3 hours.

Exception: Compliance with the ASTM E119 criteria for unexposed surface temperature rise and ignition of cotton waste due to passage of flame or gases shall only be required for the first two hours for floor and roof construction.

403.15.2 Exit enclosures. Exit stairs and exit passageways shall be enclosed as required by Sections 1019.1 and 1020.3, respectively. The fire resistance rating of the exit enclosures shall not be less than 3 hours.

403.15.3 Area of refuge. Each area of refuge specified in Section 1007.6 shall be separated by fire barriers having a fire resistance rating of not less than 3 hours in accordance with Section 706.

403.15.4 Elevator hoistway enclosures. Elevators used as an accessible means of egress in accordance with Section 1007.4, and elevators provided for fire department emergency access in accordance with Section 3002.4 shall have hoistway enclosures with a fire resistance rating of not less than 3 hours constructed in accordance with Chapter 7.

403.15.5 Separation distance between exits. The required separation distance between exits prescribed in Section 1014.2.1 shall not be allowed to be reduced in accordance with Exceptions 1 and 2. In no case shall the exit enclosure walls be separated by less than 30 feet at any point as measured in a straight line.

403.15.6 Hose stream test for walls. Walls enclosing shafts, including exit enclosures and elevator hoistway enclosures, and areas of refuge shall be tested in accordance with the hose stream test specified in Section 11.3 of ASTM E119.

Reason: The events at the World Trade Center on 2/26/1993 and 9/11/2001 show that taller buildings occupied by a large number of people represent likely targets for terrorists. Because of the increased risk of catastrophic damage to structural systems of such buildings, the structural systems should be provided with increased fire resistance in order to perform their intended function for the code specified period of time. During the development of the National Fire Protection Association's (NFPA) Building Construction and Safety Code (NFPA 5000), this increased risk was recognized. Therefore, NFPA 5000 requires that buildings greater than 420 feet in height be of a higher type of construction than permitted by the International Building Code (IBC). Under NFPA 5000, columns are required to have a fire resistance rating of 3 hours, compared to 2 hours in the IBC. The change proposed to Section 403.3.1 will require that columns meet the requirements of Type IA construction with no reduction for sprinkler protection. Thus, columns will need to have a fire resistance rating of not less than 3 hours.

Because of the importance that shaft enclosures play in preventing floor-to-floor fire spread in high-rise buildings, NFPA 5000 does not permit the 2-hour rating of shafts to be reduced due to the presence of sprinklers. The change proposed to Section 403.3.2 will remove the sprinkler trade-off for buildings greater than 420 feet in height. Thus, all shafts in buildings exceeding 420 feet in height will be required to have the more robust fire resistance rating of at least 2 hours.

Because of the increased risk of very tall buildings, the terrorist threat has made it necessary to require special life safety and property protection features in such buildings. Therefore, a new Section 403.15 is proposed to address these features in one location in the code. The following paragraphs provide individual reason statements for each of the four subsections to proposed new Section 403.15.

403.15.1 - For many decades, building codes in this country have required additional fire protection for a column supporting more than one floor, compared to a column supporting only one floor or the roof. This approach seems to make sense when considering the structural importance of the former column to the latter. However, it ignores the potential for a floor or roof that has less fire resistance than the column supporting it to collapse, most likely resulting in a total catastrophic progressive collapse of the structure. Proposed Section 403.15.1 will require that floors and roofs have a minimum 3-hour structural fire resistance rating, which is equal to the rating required for the columns. The proposed 3-hour requirement for floors and roofs only applies to the ability of the floor or roof to sustain the applied load during the 3-hour period. The other ASTM E119 fire endurance test provisions that require 1) the assembly not develop conditions on the unexposed surface that will ignite cotton waste, and 2) the average unexposed surface temperature not rise by more than 250° F above its initial temperature would only apply for the first 2 hours. The suggested requirement will provide better protection against progressive collapse.

403.15.2 – 403.15.4 - The investigation into the cause of the World Trade Center collapse has raised questions regarding the robustness of the materials used for shaft enclosure walls. It was implied that if more impact resistant materials had been used to construct these enclosures, more people would have been able to escape from the floors above where the airplanes impacted. While the issue of robustness is difficult to address directly, it can be addressed indirectly by requiring additional fire resistance for exit passageways, exit stairs, and shafts enclosing key life-safety equipment. Proposed Section 403.15.2 requires that exit passageways and exit stair enclosures be 3-hour rated. Proposed Section 403.15.3 requires that areas of refuge be enclosed with 3-hour construction. If exit stairs are required to be in 3-hour enclosures, it seems logical to require an area of refuge to have the same protection, since people with disabilities may be the last to be evacuated from the building. Section 403.15.4 will require that elevators used as an accessible means of egress and elevators provided for fire department emergency access be in hoistway enclosures having a fire resistance rating of not less than 3 hours. In an emergency, the fire department elevator may be needed to evacuate people from the building and it deserves the same protection as exit stairs. This change, when combined with that in proposed Section 403.15.6, will result in enclosure walls that are more robust.

403.15.5 - The investigation into the cause of the World Trade Center collapse has also raised questions regarding remoteness of exit stairs. Building codes have attempted to address the remoteness issue in the recent past by requiring exit doors (i.e., entrances to exit stairs) be located no closer to each other than one-half the maximum overall diagonal dimension of the floor being served. However, this requirement has been diluted by exceptions that include 1) a sprinkler trade-off that permits the separation distance to be reduced from one-half to one-third and 2) a provision that allows the required separation distance to be measured along the path of travel through a one-hour fire resistance rated corridor. Each of these has the effect of allowing the shafts enclosing exit stairs to be closer together. Proposed Section 403.15.3 prohibits use of these two strategies to reduce the separation distance between exit stairs for buildings greater than 420 feet in height. The last sentence of proposed Section 403.15.5 has been extracted from the first exception to Section 1004.2.2.1 of the 2000 IBC.

403.15.6 - Since its inception over 80 years ago, the ASTM E119 fire endurance test has required that walls be subjected to the "impact, erosion and cooling effects of a hose stream." The ASTM fire test standard permits the hose steam test to be applied to 1) the wall at the conclusion of the fire test to determine its rating classification time period or to 2) a duplicate wall that has been subjected to the fire test for only one-half of the wall's hourly rating classification, not to exceed one hour. Over the past 15 or 20 years, there has been considerable debate within ASTM and in other venues regarding the purpose of the hose stream test. Some say that it is to demonstrate that the wall will withstand the impact of a stream of water from a firefighter's hose; whereas, others maintain that the hose stream test is merely a way of subjecting the wall to an out-of-plane impact load. Neither of the two camps has been successful in convincing the other of their position.

One thing that no one can refute, in order to pass the hose stream test conducted at the end of the ASTM E119 fire test used to determine the wall's fire resistance rating, the wall needs to be more robust than a wall tested according to the hose stream test conducted on a duplicate wall assembly fire tested for only one half the fire resistance rating. For this reason, proposed Section 403.15.6

requires that all shafts and areas of refuge be enclosed with walls that have demonstrated their ability to meet the more stringent hose stream test criteria which requires that it be applied at the conclusion of the fire endurance test.

Cost Impact: Will increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: No test data or other analysis was provided to show that additional exit time is needed. Not all of the tall buildings are at the same level of risk as that represented by the failure in the supporting statement. Where there are signature buildings at a higher level of risk, the ICC Performance Code can be utilized. Given that studies are incomplete on the performance of the WTC, we should be careful in making drastic code modifications.

Assembly Action: **Approved as Modified**

Modification: Modify the proposed change by retaining part 1 and deleting part 2 of the proposal.

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted and an assembly action was successful.

Public Comment 1:

David T. Biggs, Ryan-Biggs Associates, Inc., requests Approval as Modified by the Assembly Action as published in the ROH.

Commenter's Reason: I agree with the Assembly Action to retain Part 1 of the proposed code change G55-03/04. As will be mentioned by others, we should react to the World Trade Center (WTC) disaster of September 11, 2001 with some definite changes to our codes. While the on-going study of the disaster has not been completed, there are lessons we have already been learned and should be addressed. The study of the 1995 Murrah Federal Office bombing in Oklahoma City pointed to the vulnerability of transfer girder systems in building structures. It also indicated that modern seismic design would have limited the damage due to progressive collapse if the technology had been required to be used on that building. We have the technology and the codes should change.

Similarly, we have greater knowledge from September 11, 2001 during which we had three significant collapses at the WTC; the two towers and WTC 7. There is no doubt greater fire protection in the towers might have extended the life of the damaged towers. For WTC 7, a 47-story building that collapsed under fire, we know that the water lines feeding the sprinkler system were disabled by the collapse of the adjacent towers. In that case, the passive systems are the primary protection for the building and the fire fighters. Due to the massive destruction caused by the tower collapses, WTC 7 was left to burn; so, no fire fighters were injured but the collapse of WTC 7 led to significant additional damage to the surrounding buildings.

It is true that historically, fires do not usually cause a steel-framed building to collapse even if the sprinklers are disabled. However, it can and did happen at WTC 7.

The proposal to increase fire protection of the columns, girders and trusses as well as shaft enclosures on high-rise buildings is an important first step to greater safety for occupants, fire fighters and buildings and can be done now.

Public Comment 2:

Jim Burns, New York State Fire Administrator, representing National Association of Fire Marshals, requests Approval as Modified by Assembly Action as published in the ROH.

Commenter's Reason: The National Association of State Fire Marshals (NASFM) and its Partnership for Safer Buildings supports the Assembly Action to approve Part 1 of this code change proposal as it was submitted, with the modification of removing Part 2. We believe this is responsive to the concerns that our Partnership for Safer Buildings has raised about this issue. Our assessment of fire protection features provided for high-rise buildings has indicated that the IBC does not adequately incorporate both active and passive fire protection measures. Our Codes Assessment Subcommittee has stated: "If a sprinkler system were to fail, as it did in the case of the World Trade Center, then the occupants would stand little chance of reaching safety in the time allotted by the fire-resistance rating of these structural elements."

We are very concerned about the erosion of built-in passive fire protection, which has occurred over the last 20 years as a response to automatic sprinkler system trade-offs. We believe there should be an appropriate balancing of both active and passive fire protection systems, especially in very tall high-rise buildings greater than 420 feet in height. If approved, Part 1 of this code change would not allow a reduction in the type of construction from Type IA to Type IB for these very tall buildings which would otherwise result in a reduction in structural fire resistance, nor would it allow a reduction in the fire resistance ratings for shaft enclosures from 2 hours to 1 hour. We believe these fire resistance ratings are critical to such very tall buildings, especially for the challenges these buildings pose to fighting fires above 420 feet. The responding fire department will face many difficult challenges in not only fighting a fire at these great heights, but also in rescuing and/or evacuating the occupants that may be trapped above the fire floor. Additional fire resistance will greatly help to assure that the building's structural integrity will be maintained until all fire fighting efforts and evacuation measures have been taken to bring the building fire under control and to move the occupants to areas of refuge or out of the building completely. Should the sprinkler system not operate properly or should it be turned off because of areas being remodeled or for whatever reason, it is essential that the building's structural elements be able to resist an uncontrolled fire, especially one that can not be suppressed by fire department pumpers located on the street level.

When fires occur above 420 feet, the building must be able to support the water supply and provide adequate pressure and adequate volume for fire fighting purposes and for the automatic sprinkler system. This causes the building to rely upon internal systems such as fire pumps, emergency generators and on-site water supplies to assure that adequate water will be available to the upper floors of these very tall buildings.

Since these very tall buildings pose significant risks to the occupants, as well as to the responding fire department, NASFM strongly believes that it is essential to maintain a significant level of built in fire resistive protection in order to not only assure structural integrity, but to also prevent fire spread from floor to floor so that the fire department will have a better chance of containing the fire.

In conclusion, NASFM strongly urges the ICC voting membership to support the Assembly Action taken during the hearings in Nashville and approve Part 1 of this code change proposal as it was submitted, with the modification of removing Part 2. This will restore a reasonable degree of balance between active and passive fire protection systems for protecting the lives and property in very tall high-rise buildings. For more information about NASFM and the Partnership for Safer Buildings, go to our website at www.firemarshals.org.

Public Comment 3:

John LaTorra, City of Redwood City, representing Peninsula Chapter of ICC, requests Approval as Modified by the Assembly Action as Published in the ROH.

Commenter's Reason: The ICC Peninsula Chapter strongly agrees with the Assembly Action vote at the General Code Development Committee for "Approved as Modified", and opposed the "Disapproval" recommendation of the General Code Development Committee. The modification we support is to retain Part 1 and delete Part 2 of the proposal.

Our world is a different place following the events at the World Trade Center (WTC) in 1993 and 2001, and our codes should reflect that. The two revisions in Part 1 that will not permit a reduction in the type of construction from Type IA to a Type IB for buildings over 420 feet in height, and will not permit a reduction in the fire rating for shaft enclosures from 2 hours to 1 hour when sprinklers are provided for buildings over 420 feet in height. Buildings in this height range can not be supported by the fire department pumping into the standpipe and sprinkler systems, should a fire occur on a floor above 420 feet. That is the practical height limitation for fire department pumper operations. It is only logical that these very tall buildings should be provided with sufficient fire protection in order to prevent a total burn out on any floor located above 420 feet. Such buildings are approximately 35 stories or greater in height and represent a significant fire fighting problem should a fire get out of control. Not only is there considerable fire load in a building of such height, but there is also a large number of occupants who must be evacuated or relocated to safe areas of refuge within the building.

By adopting this modification, the IBC will be duly recognized as the standard for tall buildings. NFPA 5000 contains provisions that mirror those found in Part 1 of G55-03/04. These provisions were one of the reasons given by the California Building Standards Commission in consideration of adoption of NFPA 5000 over the IBC. The inclusion of this proposed modification, along with the other IBC fire safety provisions, will establish the IBC as the model building code for very tall buildings.

Following the September 11th attack on the WTC, a report by FEMA's Building Performance Study Team included the following two "Lessons for Building Design", 1) Consider redundancy in building design, and 2) Consider fire resistance in relation to importance of structural members. We believe that the small increase in fire protection for columns and shaft enclosures contained in Part 1 of G55-03/04 is an appropriate first step toward meeting these two goals.

Public Comment 4:

Sheila Lee, City of Santa Clara, California, representing California Building Officials, requests Approval as Modified by the Assembly Action as published in the ROH.

Commenter's Reason: California Building Officials (CALBO) urges "Approved as Modified" to adopt Part 1 of code change G55-03/04 which was the Assembly Action vote at the General Code Development Committee in Nashville, TN. Passage of Part 1 is important to building officials who are opposed to the adoption of NFPA 5000 in California. During California's adoption process, code requirements similar to Part 1 that are contained in the NFPA 5000 Building Code were heralded as proof that the NFPA building code provided better protection for firefighters. We believe that placement of similar high rise provisions in the IBC, in addition to its other fire safety provisions, will make the IBC an even more preferable building code for ultra-tall buildings. In additional to this political consideration, we also offer the following technical justification for our support of the Assembly Action.

The 420 feet upper height limit was chosen because it is the practical height at which the fire service can properly charge sprinkler and standpipe systems. Thus, for buildings higher than 420 feet, sprinkler systems are much less reliable and as such, fire ratings for structural members should not be reduced because of the installation of a sprinkler system, as is presently permitted in Section 403.3.1

of the IBC. Likewise, it is not appropriate to reduce the protection of shaft enclosures by 1 hour where sprinkler systems are installed in buildings over 420, as is permitted in Section 403.3.2.

It is important to note that an on-site water supply is only required for high rise buildings in locations that are required to comply with the structural design criteria for Seismic Design Categories C, D, E, or F. Thus, there are many areas outside of California that would not require an on-site water supply for any height of high rise buildings. It should also be noted that the minimum water supply duration for the required on-site water supply is only 30 minutes. Obviously, the building has to rely on the responding fire department to supplement its water supply. Fire pumps are also needed to supply the necessary flows and pressures to the standpipe system and sprinkler system on the upper floors of a high rise building. Wisely, the IBC does require such fire pumps be provided with standby power if the pumps are electrically driven, unless the pumps are powered by diesel drivers. In either case, there is a reliability issue as to whether the fire pump and/or the standby power supply system will be able to function when needed.

If, during a fire, the water supply to the building is interrupted or if there is a power failure to the building or an area wide blackout and the standby generator or the diesel drive fire pump fails to operate, the building must be able to withstand the fire until it burns out. Keeping the shaft fire resistance ratings at 2 hours will help to contain the fire to the floor of origin since the floors are also required to have 2 hour fire resistance ratings. Keeping the structural frame and bearing walls at a 3 hour fire resistance rating as required for Type IA construction will also provide a factor of safety to the overall structural stability of the building. This is important in order to prevent catastrophic structural collapse of the upper floors which could also trigger a “pancaking” failure similar to that which occurred to the World Trade Center towers.

As has become evident, very tall buildings are more vulnerable to fire and are also a more desirable target for terrorists. Not allowing a reduction in the basic fire resistance of the building is a prudent fire safety strategy, especially if the occupants become trapped above the fire as they did in the World Trade Center disaster.

Public Comment 5:

Jason J. Thompson, National Concrete Masonry, representing Masonry Alliance for Codes and Standards, requests Approval as Modified by Assembly Action as Published in the ROH.

Commenter’s Reason: The purpose of this Public Comment is to request that Code Change Proposal G55-03/04 be Approved as Modified by approving Part 1 only. This is consistent with the Assembly Action taken during the hearings in Nashville. Part 1 does not allow a reduction in the type of construction for high rise buildings from Type IA to Type IB for those buildings that are greater than 420 feet in height. It also does not allow a reduction in the fire resistance rating from 2 hours to 1 hour for shaft enclosures when sprinklers are installed in the shaft. These reductions would apply to high rise buildings containing any occupancy groups.

The impact of this Public Comment, if it is approved, would be to increase the required fire resistance ratings of various building construction elements in high rise buildings greater than 420 feet tall in accordance with the following:

Construction Element	IA	IB
Structural Frame	3	2
Roof only	2	1
Bearing Walls		
Exterior	3	2
Interior	3	2
Roof only	2	1
Shaft Enclosures	2	1
Floors	2	2
Roofs	1½	1

Basically, the difference in the required fire resistance ratings between Type IA and IB construction for the various structural elements is one hour.

It is important to note that buildings greater than 420 feet in height can not be supported by the fire department pumping into the standpipe and sprinkler systems should a fire occur on a floor above 420 feet. That is the practical height limitation for fire department pumper operations. Thus, such buildings must be able to support their fire protection systems on their own in order to prevent a total burn out on any floor located above 420 feet. Such buildings are approximately 35 stories or greater in height and represent a significant fire fighting problem should a fire get out of control. Not only is there considerable fire load in a building of such height, but there is also a large number of occupants who must be evacuated or relocated to safe areas of refuge within the building.

We feel very strongly that Code Change Proposal G55-03/04 should be Approved as Modified by accepting Part 1 only. This would provide greater assurance (factor of safety) that the fire resistance of the structural frame in very tall high rise buildings will be adequate to sustain a total burn out at a minimal increase in cost. This should also help to prevent the type of disaster that occurred at the World Trade Center. And it is consistent with the Assembly Action taken at the hearings in Nashville. Therefore, we urge the ICC Class A voting members to approve this Code Change Proposal as modified in accordance with this Public Comment.

Public Comment 6:

Rick Thornberry, PE, The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control, requests Approval as Modified by Assembly Action as published in the ROH.

Commenter's Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) believes in a balanced design approach to fire and life safety in buildings. This means that there should not be an over reliance on any single fire protection strategy or method incorporated to satisfy minimum code requirements for providing a reasonable level of fire and life safety. In this case, we believe this code change proposal attempts to achieve a better balance in the fire protection provisions for these super high rise buildings that exceed 420 feet in height. These buildings represent a very significant fire safety challenge, especially to the responding fire department. Basically, fire fighting efforts which occur on floors above 420 feet can not be adequately supported, if at al, by fire department pumpers located at the street level. So the building must be capable of supplying the necessary water pressure and flows to support not only the automatic sprinkler system, but also the fire fighters using the standpipes.

Under those conditions we believe that reliance on the automatic sprinkler system should be balanced against built-in passive protection such as fire resistance and compartmentation. Part 1 of this code change proposal attempts to do that by not permitting the reduction in types of construction from Type IA to IB for these very tall sprinklered high rise buildings. Currently, this section of the IBC will allow the structural frame to be reduced from a 3 hour fire resistance rating to 2 hours. It will also allow shaft enclosures to be reduced from 2 hour fire resistance ratings to 1 hour. We don't believe that these fire resistance ratings should be reduced, especially since we know that automatic sprinkler systems fail to operate in approximately 1 out of every 6 fires that occur in sprinklered buildings. This statistic has been verified by an NFPA study of a recent 10 year period of automatic sprinkler system performance in all types of buildings and all occupancies. In such very tall buildings it would not be unusual for the automatic sprinkler system to be shut down on several floors at any given time when tenant improvements or build-outs are underway. Also, diesel fire pumps may fail to start if not adequately maintained. During power outages the emergency generators powering the electric drive fire pumps may fail to start or may fail to continue to provide the necessary power after several hours of operation if not adequately maintained.

We believe that too much is at stake to allow such reductions in fire resistance ratings for these very tall buildings. We are especially concerned about occupants who may be located above the fire floor where they will be at much greater risk during a fire, especially if it occurs soon after a seismic event. Evacuation and rescue for those occupants is extremely difficult to accomplish in a reasonable time frame. We should not risk structural collapse or premature failure of shaft enclosures in these very tall buildings. Therefore, we firmly believe that the ICC voting membership should support the Assembly Action taken in Nashville and approve this code change proposal as modified by approving Part 1.

Public Comment 7:

Martin Von Raesfeld, City of Santa Clara, California Fire Department, requests Approval as Modified by Assembly Action as published in the ROH.

Commenter's Reason: The National Association of State Fire Marshals (NASFM) and its Partnership for Safer Buildings supports the Assembly Action to approve Part 1 of this code change proposal as it was submitted. We believe this is responsive to the concerns that our Partnership for Safer Buildings has raised about this issue. Our assessment of fire protection features provided for high-rise buildings has indicated that the IBC does not adequately incorporate both active and passive fire protection measures. Our Codes Assessment Subcommittee has stated: "If a sprinkler system were to fail, as it did in the case of the World Trade Center, then the occupants would stand little chance of reaching safety in the time allotted by the fire-resistance rating of these structural elements."

We are very concerned about the erosion of built-in passive fire protection, which has occurred over the last 20 years as a response to automatic sprinkler system trade-offs. We believe there should be an appropriate balancing of both active and passive fire protection systems, especially in these very tall high rise buildings which are greater than 420 feet in height. If approved, Part 1 of this code change would not allow a reduction in the type of construction from Type IA to Type IB for these very tall buildings which would otherwise result in a reduction in structural fire resistance, nor will it allow a reduction in the fire resistance ratings for shaft enclosures from 2 hours to 1 hour. We believe these fire resistance ratings are critical to such very tall buildings, especially for the challenges these buildings pose to fighting fires above 420 feet. The responding fire department will face many difficult challenges in not only fighting a fire at these great heights, but also in rescuing and/or evacuating the occupants that may be trapped above the fire floor. Additional fire resistance will greatly help to assure that the building's structural integrity will be maintained until all fire fighting efforts and evacuation measures have been taken to bring the building fire under control and to move the occupants to areas of refuge or out of the building completely. Should the sprinkler system not operate properly or should it be turned off because of areas being remodeled or for whatever reason, it is essential that the building structural elements be able to resist an uncontrolled fire, especially one that can not be supported by fire department engines located on the street level.

When fires occur above 420 feet, the building must be able to support the water supply and provide adequate pressure and adequate volume for fire fighting purposes and for the automatic sprinkler system. This causes the building to rely upon internal systems such as fire pumps and emergency generators and on-site water supplies to assure that adequate water will be available to the upper floors of these very tall buildings.

Since these very tall buildings pose significant risks to the occupants, as well as to the responding fire department, NASFM strongly believes that it is essential to maintain a significant level of built in fire resistive protection in order to not only assure structural integrity, but to also contain fire spread from floor to floor so that the fire department will have a better chance of preventing catastrophic fire spread.

In conclusion, NASFM strongly urges the ICC voting membership to support the Assembly Action taken during the hearings in Nashville and approve Part 1 of this code change as submitted. This will restore a reasonable degree of balance between active and passive fire protection systems for protecting the lives and property in very tall high-rise buildings. For more information about NASFM and the Partnership for Safer Buildings, go to our website at www.firemarshals.org.

Public Comment 8:

Gregory Nicholls, City of Mason, Ohio, representing Ohio Building Officials Association, requests Disapproval.

Commenter's Reason: There was no substantiation, test data, or scientific analysis to base this code change, as noted in the Report of the Public Hearing. The Committee recognized that code changes need to have basis in fact and cannot be knee-jerk reactions to single-case occurrences. Comparison to the World Trade Center event is not relevant, as it was a terrorist attack and not an accident. Comparison to NFPA 5000 is not relevant. Also, there is no evidence that this code change would have prevented its collapse. Code changes, code interpretation, and code enforcement must be based in fact and not emotion. Please disapprove this code change, in both parts.

G103-03/04
504.2

Proposed Change as Submitted:

Proponent: John Valiulis, President, Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

504.2 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 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story. These increases ~~are~~ shall not be 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 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four stories or 60 feet (18 288 mm), respectively.

Exceptions:
1. Group I-2 of Type IIB, III, IV or V construction.
2. Group H-1, H-2, H-3 or H-5.
3. Fire-resistance rating substitution in accordance with Table 601, Note d.

506.3 Automatic sprinkler system increase. Where a building is protected 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 (Is = 200 percent) for multistory buildings and an additional 300 percent (Is = 300 percent) for single-story buildings. These increases ~~are~~ shall not be permitted in addition to the height and story increases in accordance with Section 504.2.

Exceptions:
1. Buildings with an occupancy in Group H-1, H-2 or H-3.
2. Fire-resistance rating substitution in accordance with Table 601, Note d.

Reason: The purpose of this proposed code change is to eliminate the "double dipping" that is presently allowed in the International Building Code (IBC) where automatic sprinkler systems are provided in buildings. This "double dipping" is a result of allowing both area increases and height increases for the allowable heights and areas for buildings contained in Table 503. Such a practice results in excessive building volume for the minimum type of construction required which, in effect, increases the total fire load of a building, as well as its occupant load, while relying on the automatic sprinkler system to compensate for the significant increase in building size.

We believe that "double dipping" overly relies on the use of automatic sprinkler systems in lieu of providing minimum built-in fire resistant protection for buildings.

Allowing automatic sprinkler system increases for both height and area results in a lessened use of fire resistant and noncombustible construction. This condition also has a negative impact on fire fighter safety when fires occur in these buildings. Fire fighters will be faced with having to enter much larger buildings with less fire resistance, so their exposure to structural collapse becomes more probable. Both sprinklers and fire resistant construction play an important role in the overall level of fire and life safety provided in buildings. Therefore, there should not be an excessive reliance on one or the other at the expense of the other which will result in a lessening of the overall level of fire and life safety provided by the code.

Cost Impact: Will increase the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The increases for height and area together have long been in use in the previous legacy codes. This is not "double dipping". The entire philosophy for height and areas is based upon these tradeoffs. There is no reason to challenge this philosophy. The NFPA report cited regarding the reliability of sprinkler systems is still an open case that does not definitively mean that ICC should start to question existing provisions regarding trade-offs.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Thornberry, The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

504.2 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 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story. These increases shall not be 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 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four stories or 60 feet (18 288 mm), respectively.

(Portions of code change not shown remain as proposed)

Commenter's Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) strongly supports the concept of balanced design in building construction. This means that there should not be an over reliance on any single fire protection strategy or method used to provide the code required minimum level of fire and life safety. That is the reason we submitted this code change proposal. We believe the International Building Code (IBC) relies too heavily on automatic sprinkler systems to allow increases in the building allowable area and allowable height for a given type of construction based upon the occupancy classification of the building. We are even more concerned that the IBC generally allows significantly greater areas and heights than any of the predecessor legacy codes. Not only are the base floor areas and building heights greater, but also the total allowable building areas and heights when the allowable area and height increases for both frontage and automatic sprinkler system protection are taken advantage of. This is especially true for the higher types of construction, i.e. Types I, II, and III.

This code change proposal takes a simplistic approach to addressing this concern by simply not allowing both an area increase and a height increase to be taken at the same time for any given building where it is protected throughout with an automatic sprinkler system. This "double dipping" presently allowed by the IBC has a significant impact on buildings up to three stories in height and a lesser impact on taller buildings because of the maximum 3 x area limitation specified in Section 506.4.

We are concerned that under the IBC buildings are allowed to get bigger or, in other words, are allowed to have their required fire resistance and noncombustibility reduced with the installation of an automatic sprinkler system. We believe that consideration should be given to the fact that a recent NFPA study of sprinkler system performance over an 10 year period has shown that sprinkler systems fail to operate in approximately 1 out of every 6 fires in sprinklered buildings where it was judged that the sprinkler system should have operated. We believe that such a failure rate does not justify using automatic sprinkler systems to achieve both an area increase and a height increase which results in a larger volume building than would otherwise be the case if only one or the other increase were allowed. This is exactly what this code change proposal does. The proposed modification to delete the reference to Section 504.2 reflects the original intent of the proponent.

To give an example of how the IBC provides much greater building areas and heights than the legacy codes, we have developed a comparison of a Group B office building of Type IIB construction with the IBC allowable heights and areas to the allowable heights and areas of the 1999 BOCA National Building Code, 1997 ICBO Uniform Building Code, and 1999 SBCCI Standard Building Code.

G124-03/04 D
T 601

Proponent: Sam Francis, American Forest & Paper Association; representing AF&PA

Revise as follows:

TABLE 601

FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS

	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A[d]	B	A[d]	B	HT	A[d]	B
Structural Frame	3	2	1	0	1	0	HT	1	0
Bearing Ext Int	3 3	2 2	1 1	0 0	2 1	2 0	2 1/HT	1 1	0 0
Non bear Ext Int	See table 602 See Section 602								
Floor Const	2	2	1	0	1	0	HT	1	0
Roof Const	1-1/2	1	1	0	1	0	1/HT	1	0

(a) Unchanged
(b) Unchanged
(c) Unchanged
~~(d) An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.~~
(d) In buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or Section 903.3.1.2, assemblies required to be of 1 hour fire resistance rating shall be permitted to be of 3/4 hour fire resistance rating. Penetration protection and opening protectives shall be as for 1 hour assemblies.
(e) Unchanged
(f) Unchanged

706.4 Continuity of fire barrier walls. Fire barrier walls 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. These walls shall be continuous through concealed spaces such as the space above a suspended ceiling. The supporting construction for fire barrier walls shall be protected to afford the required fire-resistance rating of the fire barrier supported except for 1-hour fire-resistance-rated incidental use area separations as required by Table 302.1.1 in buildings of Type IIB, IIIB and VB construction. Hollow vertical spaces within the fire barrier wall shall be firestopped at every floor level.

Exceptions:
1. The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided for in Section 415.7.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type.
2. Shaft enclosure shall be permitted to terminate at a top enclosure complying with Section 707.12.
3. Building elements in Table 601 permitted to be reduced from 1 hour fire-resistance rating to 3/4 hour fire-resistance rating shall be permitted to support fire barrier construction of 1 hour fire-resistance rating. Penetration protection and opening protectives shall be as required for 1 hour assemblies.

708.3 Fire-resistance rating. The fire-resistance rating of the walls shall be 1 hour.

Exceptions:
1. Corridor walls as permitted by Table 1016.1.

2. Dwelling unit and sleeping unit separations in buildings of Type IIB, IIIB and VB construction shall have fire-resistance ratings of not less than 1/2 hour in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

3. Fire partitions shall have fire-resistance ratings of not less than 3/4 hour in buildings of Types II-A, III-A, and V-A construction protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or Section 903.3.1.2. Penetration protection and opening protectives shall be as required for 1 hour assemblies.

708.4 Continuity. Fire partitions shall extend from the top of the floor assembly below to the underside of the floor or roof slab or deck above or to the fire-resistance-rated floor/ceiling or roof/ceiling assembly above, and shall be securely attached thereto. If the partitions are not continuous to the deck, and where constructed of combustible construction, the space between the ceiling and the deck above shall be fireblocked or draftstopped in accordance with Sections 717.2.1 and 717.3.1 at the partition line. The supporting construction shall be protected to afford the required fire-resistance rating of the wall supported, except for tenant and sleeping unit separation walls and exit access corridor walls in buildings of Type IIB, IIIB and VB construction.

Exceptions:

1-6 (No change)

7. Building elements in Table 601 permitted to be reduced from 1 hour fire-resistance rating to 3/4 hour fire-resistance rating shall be permitted to support fire partition construction of 1 hour fire-resistance rating. Penetration protection and opening protectives shall be as required for 1 hour assemblies.

711.3 Fire-resistance rating. The fire-resistance rating of floor and roof assemblies shall not be less than that required by the building type of construction. Where the floor assembly separates mixed occupancies, the assembly shall have a fire-resistance rating of not less than that required by Section 302.3.2 based on the occupancies being separated. Where the floor assembly separates a single occupancy into different fire areas, the assembly shall have a fire-resistance rating of not less than that required by Section 706.3.7. Floor assemblies separating dwelling units in the same building or sleeping units in occupancies in Group R-1, hotel occupancies, R-2 and I-1 shall be a minimum of 1-hour fire-resistance-rated construction.

Exceptions:

1. Dwelling unit and sleeping unit separations in buildings of Type IIB, IIIB, and VB construction shall have fire-resistance ratings of not less than 1/2 hour in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

2. Floor and roof assemblies shall have fire-resistance ratings of not less than 3/4 hour in buildings of Types II-A, III-A, and V-A construction protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or Section 903.3.1.2. Penetration protection and opening protectives shall be as required for 1 hour assemblies.

Reason:

SUBSTANTIATION:

There are at least two existing provisions of the code that allow reductions in fire-resistance ratings when buildings are sprinklered. Footnote >d= in Table 601 was brought forward from the Uniform Building Code (UBC) into the International Building Code (IBC). This footnote permits a reduction in fire-resistance rating from one hour to zero hours for Types II, III and V protected construction when a sprinkler system is provided. Similarly, in Section 708, Fire Partitions, and Section 711, Horizontal Assemblies, exceptions to the fire-resistance rating of dwelling unit and sleeping unit separations are made. These exceptions permit dwelling-unit separation assemblies otherwise required to be of one hour fire-resistant construction to be reduced to 2 hour fire-resistance in Types II-B, III-B, and V-B construction when the building is sprinklered. This is a reasonable condition since the construction type itself has no required fire-resistance rating. Lowering the fire resistance requirement encourages the installation of a sprinkler system and provides a cost effective approach to reducing the likelihood of life lose from fire. When used, the various trade-offs result in construction with no fire-resistance rating.

Sections 708 and 711 both involve unprotected assemblies. But recently, the trend has been to require more and more broadly applied fire-resistance requirements. This code change takes that approach. It is intended to achieve the same goals as its

predecessor footnote and the exceptions in the sections of Chapter 7 cited above. But it does so by only slightly reducing the fire-resistance rating required of the assembly when the building is sprinklered. The performance and the reliability of the sprinkler system alone would justify this change. However, in an effort to determine that the package sprinklers and fire-resistance rated assemblies would result in improved fire performance of buildings, the American Forest & Paper Association retained a consultant to examine that concept. Based upon the consultant=s positive findings, Robidoux & Associates (R&A) and the National Research Council of Canada (NRC) were retained to examine typical buildings and to model the building performance for risk to life and risk to property under fire conditions. The results of the modeling were surprising.

R&A was provided plans for a typical 4 story apartment building of Type V-A construction. The plan was an actual plan used by a developer in the United States. Assumptions made in the modeling include 50/50 gender distribution, 4% special needs, and 33% seniors and children in the occupancy. The model assumed a smoke detector reliability of 0.7 and a sprinkler reliability of 0.9.

The modeling looked at an Aexpected risk to life@ factor (ERL). Among the models run were a property damage model, an economic model, a fire growth model, and an evacuation behavior model. The numerous subset of models created data that became input into the broader models. This culminated in the ERL factor for human risk given a specific fire scenario.

The ERL data were normalized to construction Type V-A, unsprinklered. The results show that risk drops to 1/3 the risk for Type unsprinklered V-A construction when sprinklers are installed. Herein lies the surprise: In the sprinklered V-A building there is no significant difference in the risk based on the actual fire-resistance rating of the protected assembly. A rating of 60 minutes or 45 minutes or 30 minutes produces about the same risk. The study also looked at NFPA 13R sprinkler systems and found that they support this reduction in ERL.

In their conclusions the authors say:

> *AA study of the relative risks from fires in a typical apartment building was performed using the computer model FiRECAM TM developed at the National Research Council of Canada. The model was assumed to be appropriate as is for this project and it was used as is without any modifications to its submodels or to its default data. The results indicate that the addition of sprinkler systems to a four-storey apartment building with 60 min rated construction reduces the Expected Risk to Life (ERL) to about one third of the ERL of the building without sprinklers. Reduction in the fire resistance rating from 60 min to 30 min, while maintaining the sprinkler system, does not cause any significant increase of the ERL. Overall, the addition of the sprinklers results in a safer building, even with a reduction of the fire resistance from 60 to 30 min. The results also show that the sprinkler system reduces the expected property losses significantly. The economic calculations do not consider the additional cost for the installation and maintenance of the sprinkler systems.*@

These data suggest the historic approach of trade-offs has merit. Encouraging sprinkler system installation is clearly of greater value than increasing the fire-resistance rating of protected assemblies within the context of this study. The study shows that NFPA 13R systems also effectively reduce risk. Unpublished studies by NIST were shared with the International Code Council Performance Code drafting committee which showed the same results and led to the same conclusions as the modeling above.

This proposal takes a more conservative approach and uses the 3/4 hour fire-resistance rating as its basis for reduced fire-resistance ratings, rather than the lower ratings of 2 hour in the study. It will result in a building of lower risk to occupants and potentially lower property loss resulting from the performance of the sprinkler system. The economies of installing the 3/4 hour assemblies versus the 1 hour assemblies greatly offset the costs of such installations and would likely result in developers choosing the sprinklered building with the assemblies of slightly reduced fire-resistance ratings. This choice clearly results in a safer building.

The changes in Chapter 7 are companion changes to the proposed change to Table 601. In crafting this proposal, it was decided that the conservative approach would be to prohibit the reductions to fire-resistance ratings for Fire Walls and Fire Barrier Walls. The proposed changes to Section 706.4 do that. However, the concept of continuity would require that when an assembly of 1 hour fire-resistive construction occurred, the supporting construction (walls and floors) would need to also be 1 hour fire-resistance rated. That would effectively negate the purpose of the change and revert the construction to 1 hour. Thus the sections requiring continuity were proposed for modification to the permit the structural elements to be reduced to 3/4 hour fire-resistance rated assemblies. This is accomplished in Sections 706.4 and 708.4.

On the other hand, the dwelling unit and sleeping unit reductions have existed and shown to perform as expected. Thus it made sense to correlate with those requirements and allow those assemblies to be reduced to the 3/4 hour fire-resistance rating as required of the structural elements. Therefore, Sections 708.3 and 711.3 are proposed to be modified to permit fire partitions and horizontal separations to be of 3/4 hour fire-resistance rating when it is mandated by Table 601. This maintains correlation between the chapters and eliminates the potential confusion about which, if any, assemblies in Chapter 7 are impacted by the requirement in Chapter 6.

Cost Impact: None

G124-03/04

Committee Action: **Disapproved**

Committee Reason: The proposed change would, in some instances, impose a higher required fire resistance rating in circumstances where a zero rating would presently be required, and, in other cases allow for a reduction in fire resistance rating in conjunction with height and area increases from sprinkler systems. This would be a significant technical change that needs more study.

Assembly Action: **None**

FS14-03/04 D
704.8.1

Proponent: William E. Koffel, PE, Koffel Associates, Inc., representing Door & Access Systems Manufacturing Association (DASMA)

Delete without substitution:

~~**704.8.1 Automatic sprinkler system.** In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the maximum allowable area of unprotected openings in occupancies other than Groups H-1, H-2 and H-3 shall be the same as the tabulated limitations for protected openings.~~

Reason: The presence of an automatic sprinkler system will reduce the likelihood that a fire within the building will present a risk of spreading to adjacent buildings. However, according to the Commentary for the IBC, opening protectives are intended to serve two purposes: prevent fire spread from a building to another and to prevent fire spread from a fire in an exposing building. Traditional automatic sprinkler system design, without outside sprinklers (see 704.12), does not include the consideration of a fire in an exposing building spreading into the sprinklered building. Section 7.7 of NFPA 13 specifically addresses the design of sprinkler systems to protect against exposure fires. However, one need not install sprinklers in accordance with Section 7.7 of NFPA 13 unless specifically required (see 704.12). Therefore the provisions of Section 704.8.1 do not adequately address the second purpose of opening protectives: to prevent fire spread from an exposing building.

NFPA 80A, Recommended Practice for Protection of Buildings from Exterior Fire Exposures, contains the following information.

Where the exposing building or structure is protected throughout by an approved, properly maintained automatic sprinkler system of adequate design for the hazard involved, no exposure hazard should be considered to exist. (Section 5.6.3)

Where the exposed building or structure is protected throughout by an approved, properly maintained automatic sprinkler system of adequate design for the hazard involved, the exposure hazard to the total exposed building and its contents should be considered to be substantially reduced. (Section 5.6.4)

An Annex note to Section 5.6.4 indicates that without exposure sprinklers protecting the exterior of the building, ignitions may occur within the exposed building. While NFPA 80A assumes that the sprinkler system will control such ignitions, the design criteria in NFPA 13 is not based upon the potential for multiple ignitions such as may occur from a fire in an exposing building.

Cost Impact: None

FS14-03/04 D

Committee Action: **Disapproved**

Committee Reason: The proposal lacks technical justification. In addition, the provision would conflict with Section 704.12.

Assembly Action: **None**

FS44-03/04 WP
707.14.1

Proponent: Ralph W. Jones, III, CBO, City of Lake Mary FL, representing ICC Fire Safety Code Action Committee

Revise as follows:

707.14.1 Elevator lobby. Elevators ~~opening into a fire-resistance-rated corridor as required by Section 1016.1~~ serving a Group R-1 or Group I occupancy having an occupant load of 30 or more, or serving other occupancies having an occupant load of 50 or more shall be provided with an elevator lobby at each floor ~~containing such a corridor~~. The lobby shall separate the elevators from the ~~corridor~~ remainder of the floor by 1-hour fire partitions and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. and 2. (No change to current text)

3. ~~Where additional doors are provided in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.~~ Where elevator doors have been tested in accordance with UL 1784.
4. ~~In other than Group I-3, and buildings more than four stories above the lowest level of fire department vehicle access, lobby separation is not required where the building, including the lobby and corridors leading to the lobby, is protected by an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Reason: Elevator hoist ways are the single largest floor-to-floor openings in buildings. Smoke and other products of combustion are known to migrate to areas not directly involved in a fire scene. This smoke and other products of combustion are not eliminated by the presence of a fire sprinkler system. Means of egress are sized only for exiting a single floor; therefore, products of combustion should be limited from migrating to other floors. A means to control the migration of these products of combustion from floor to floor is essential to providing safe egress to occupants in a building involved in a fire.

Exception 3 references section 3002.6. Section 3002.6 is a prohibition of doors other than hoist way doors leading into the elevator car. It does not provide equivalence to an elevator lobby, and therefore should not be included as an exception.

Exception 4 allows buildings that are less than six stories, equipped with a 13 or 13R sprinkler system to be exempt from the elevator lobby requirement. If you agree with the physics of fluid dynamics, migration of smoke is not a function of building height or the presence of sprinkler systems, but a function of moving from an area of higher concentration to areas of lesser concentrations. Therefore, exempting the requirement for elevator lobbies based on height or the presence of a sprinkler system would be a fallacy.

Cost Impact: None

FS44-03/04

Withdrawn by Proponent

FS48-03/04 AMPC1
707.14.1

Proposed Change as Submitted:

Proponent: Barry N. Gupton, PE, North Carolina Department of Insurance, representing North Carolina Office of State Fire Marshal

Revise as follows:

707.14.1 Elevator lobby. Elevators ~~opening into a fire-resistance-rated corridor as required by Section 1016.1~~ connecting four stories or more shall be provided with an elevator lobby at each floor ~~containing such a corridor~~. The lobby shall separate the elevators from ~~the corridor~~ each floor by fire partitions and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:
1. (No change to current text)
2. Elevators not required to be located in a shaft enclosure in accordance with Section 707.2.
3. (No change to current text)
4. ~~In other than Group I-3, and~~ Buildings having occupied floors located not more than ~~four stories~~ 75 feet above the lowest level of fire department vehicle access, lobby separation is not required where the building~~, including the lobby and corridors leading to the lobby,~~ is protected by an automatic sprinkler system installed ~~throughout~~ in accordance with Section 903.3.1.1 or 903.3.1.2.
5. Smoke partitions shall be permitted to separate the elevator lobby at each floor where the building equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
6. Elevator lobbies are not required provided that the elevator shaft enclosure is pressurized in accordance with Section 909.20.5.

Reason: The IBC is deficient in several areas of smoke control. Elevator doors do not adequately limit the migration of smoke from the floor of fire origin to other floors. Automatic sprinkler systems eliminate the requirement for fire-resistance-rated corridors in most occupancy groups. They do not eliminate smoke and they do not prevent the spread of smoke to other floors.

Smoke partitions are given as a trade-off for an automatic sprinkler system in exception 5.

The base requirement for elevator lobbies is modified from "more than four" to "four or more." This is consistent with the shaft rating change from 1 hour to 2 hours in Section 707.4. Exception 4 eliminates the requirement for elevator lobbies in sprinklered buildings other than high-rise. Exception 6 eliminates the requirement for elevator lobbies in buildings where the elevator shaft enclosures is pressurized. This is consistent with the stair pressurization requirement in Section 909.20.5.

I urge your support and approval of this proposal.

Cost Impact: None

Committee Action: **Disapproved**

Committee Reason: The proposed language in Exception No. 6 is vague. Requirements are uncertain.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Barry N. Gupton, PE, North Carolina Department of Insurance, representing Office of State Fire Marshal, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

707.14.1 Elevator lobby. An elevator~~s conneting four stories or more~~ lobby shall be provided ~~with an elevator lobby~~ at each floor where an elevator shaft enclosure connects more than three stories. The lobby shall separate the elevator~~s~~ shaft enclosure doors from each floor by fire partitions and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. (No change to current text)
2. Elevators not required to be located in a shaft enclosure in accordance with Section 707.2.
3. (No change to current text)
4. In other than Group I-3, and buildings having occupied floors located ~~not~~ more than ~~four stories~~ 75 feet above the lowest level of fire department vehicle access, lobby separation is not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

5. and 6. (As proposed)

Commenter's Reason: The IBC is deficient in several areas of smoke control. Elevator doors do not adequately limit the migration of smoke from the floor of fire origin to other floors. Automatic sprinkler systems eliminate the requirement for fire-resistance-rated corridors in most occupancy groups. They do not eliminate smoke and they do not prevent the spread of smoke to other floors, particularly in High-Rise buildings. The current Code language also does not address smoke migration from the elevator shaft to a floor where there are either no fire-resistance-rated corridors or no corridors at all.

The base requirement in this Public Comment for elevator lobbies is modified in scope to 4-stories or more. Exception 4 is modified to eliminate the requirement for elevator lobbies in sprinklered buildings other than High-Rise.

There is no major concern for smoke migration due to stack effect in buildings 3-stories or less as indicated by the current Exception 4. This proposal moves the scoping requirement from the Exception into the main paragraph. It also strengthens the requirement for High-Rise buildings.

I urge your support and approval of this proposal.

Cost Impact: Reduction for less than 4-story buildings with fire-resistance rated corridors. Reduction for sprinklered 4-story to High-Rise buildings with fire-resistance-rated corridors. Increase for buildings 4-story or more either without fire-resistance rated corridors or without corridors.

FS89-03/04 D
716.5.3.1

Proponent: Gene Boecker, Code Consultants, Inc.

Revise as follows:

716.5.3.1 Penetrations of shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with approved fire and smoke dampers installed in accordance with their listing.

Exceptions:

1. through 2.1 (No change to current text)

2.2 Ducts are used as part of an approved smoke control system, designed and installed in accordance with Section 909, and where the smoke damper will interfere with the operation of the smoke control system, ~~or~~

3. Smoke dampers are not required at penetration of exhaust or supply shafts in parking garages that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction, or.

4. Smoke dampers shall not be required where the building is equipped throughout with an automatic fire sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: Field experience with enforcement of the requirement for smoke dampers indicates that:

1) The installations are difficult to maintain, test and verify continued operability

2) Many times the installations are not maintained and tested, and frequently are rendered inoperable.

3) In addition to the initial installation costs, the labor required to test and maintain the smoke dampers is substantial, resulting in a low priority for continued operability.

Notwithstanding the above, substantial questions arise regarding the need for the smoke dampers in buildings protected by an automatic sprinkler system.

The fire record shows that fire sprinkler systems significantly reduce the risk to life safety, property protection and fire fighter safety. The deletion of smoke dampers at duct and air transfer openings in shafts does not measurably increase the level of products of combustion resulting from a fire in a building protected by an automatic fire sprinkler system and as a result, does not impede evacuation and life safety in areas remote from the fire.

Originally, smoke dampers were deemed necessary, even in sprinkler buildings, because hazards are still present after sprinkler activation. During sprinkler operation, studies speculated that the conditions may deteriorate. However, these studies were very limited and provided insufficient information to fully understand the effects of sprinkler activation on smoke development. Furthermore, the limited tests do not address the effect that sprinkler activation has on areas remote from the fire.

"The Effects of Sprinkler Activation on Smoke Characteristics," discusses the interaction of sprinklers and smoke in four full scale tests involving a residential bedroom.1 In each of these tests, upon sprinkler activation, the smoke layer was observed to quickly descend to the floor, and the visibility decreased to very low levels. However, these tests only observed the smoke characteristics in the room of origin. The smoke layer was pushed to the floor of the room of origin, but information regarding smoke characteristics remote from the room of origin after sprinkler activation, in these tests and in general, was not investigated.

The conditions in the room of origin may be adversely affected for an initial period of time. However, this is a result of the sprinkler interaction with the smoke, not an increase in smoke production. The smoke production is actually reduced. Sprinkler systems reduce the burning rate of the fire, thus reducing the production of smoke. Additionally, the sprinkler activation will have a cooling effect on the smoke. This will certainly have an effect on life safety in areas remote from the room of origin, such as the floors above the fire.

Another reason posed for requiring smoke dampers at shaft penetrations, even in sprinklered buildings, was the driving forces of smoke movement, such as stack effect, wind effect, and buoyancy. Under various conditions, such forces may become dominant, causing the movement of smoke to other areas of the building.

Stack effect generally occurs in the winter, when the outside air is colder than the air inside the building. The warmer inside air is less dense than the outside air, causing it to have a buoyant force and rise within building shafts. Reverse stack effect occurs when the outside air is warmer than the inside air. In this case, particularly in air-conditioned buildings in the summer, a downward flow of air in building shafts can occur.

Another driving force is the buoyancy of the smoke produced by a fire. This smoke has a higher temperature than the ambient air, and is therefore less dense. This causes the gases to have a buoyancy force and a tendency to rise.

These effects are likely to become less of a factor in a sprinklered building. The commentary to the International Building Code in Section 707.14.1, which discusses elevator lobbies, states, "The potential for smoke migration via the stack effect is reduced by a sprinkler system." As previously discussed, sprinkler activation will decrease the fire size and smoke production. Additionally, the sprinklers will cool the smoke, thus decreasing its buoyancy. These two effects will have an effect on areas remote from the fire. Basic fire dynamics and related smoke movement indicate that a sprinklered fire will not endanger life safety on floors remote from the room of origin.

Another stated reason posed for installing smoke dampers at duct penetrations of shafts is the possibility of complete failure of the sprinkler system. Sprinkler systems are highly reliable but they are not 100% reliable.

Sprinklered buildings are designed with the assumption that the sprinklers will operate. Many requirements and exceptions to these requirements throughout the International Building Code are based on the success rate of sprinklers system. These requirements and exceptions were developed with the knowledge that sprinkler systems are very effective. As with the many other exceptions located throughout the International Building Code, this proposed exception for smoke dampers must be considered with the knowledge that the high reliability and benefits of sprinklers far outweigh the small failure rates.

Intuitively, it is reasonable to assume that a sprinklered fire will have little or no effect on evacuation and life safety on other floors if smoke dampers are not present at shaft penetrations. This can be evaluated using modern fire modeling techniques. A typical building was modeled in an attempt to investigate the movement of smoke in a sprinklered building without smoke dampers at shaft penetrations. The effects of a fire in a three story building were modeled using the computer fire model Fire Dynamics Simulator (FDS) that was developed by the Building and Fire Research Laboratory at the National Institute of Standards and Technology (NIST). FDS is a Computational Fluid Dynamics (CFD) type model specifically developed for fire applications.

FDS solves a form of the fundamental equations of the fluid motion, the Navier-Stokes equations, in order to calculate conditions in a space due to a fire. The model works by dividing the space being modeled into many small regions or cells. In this case, the building was divided into over 300,000 cells. The equations describing the motion of fire gases are solved for each cell. Combining the results for all of the cells creates a solution that describes the motion of fire gases throughout the building.

Two simulations were run. For the first simulation, each floor is approximately 100 ft. x 65 ft. x 10 ft. high. A 5 ft. deep interstitial ceiling space is located above each floor. Four (4) air diffusers are provided in the ceiling of each floor, and a duct leading from the ceiling space to a shaft. This configuration represents the return side of an HVAC system, and is depicted in the first two graphics.

In many cases, smoke detectors are located in the return duct. When the building ventilation systems are operating, the smoke is drawn into the shaft and does not migrate to adjacent floors from the shaft. If the concentration is significant, the smoke detectors in the return air ducts will shut the fans down. FDS was used to model this situation, where the top of the shaft is closed.

A fire was simulated in an office cubicle located in the middle of the first floor. Heat release rate data for a three-panel workstation fire was used in the model, representing a typical office2. Sprinklers are located over the cubicle at the 10 ft. ceiling. The sprinklers are spaced 15 feet apart, with the cubicle located in the center of four sprinklers. The model was run initially to determine the time of sprinkler actuation. When the time of actuation is known, the effect of the sprinklers on the fire size can be incorporated into the model. Section A.3.2.2.1 of NFPA 92B includes an expression for the exponential decrease in the heat release rate of sprinklered fires. This expression is based on full scale fire tests for open plan offices, where the sprinklers gain control of the fire but have not completely extinguished it. In this case, this expression was applied for the duration of the FDS run after sprinkler activation.

The FDS model shows the movement of products of combustion rising up through the ceiling diffusers. The smoke then moves through the duct into the shaft. As smoke collects in the shaft, it eventually travels through the ducts and into the ceiling spaces above the second and third floors. The smoke begins to collect in these spaces, but at no point moves downward into the second or third floor spaces. This is attributed to the fact that smoke is still weakly buoyant. The smoke has a tendency to rise and does not move downward into the occupied space of the floor.

FDS also allows the user to measure conditions at various points in the space. These measurements are used to record values of specific quantities as a function of time. In this case, measurements were collected at several points approximately 8 feet above each floor to measure the visibility, temperature, and carbon monoxide concentration.

At approximately 6 minutes, the sprinklers activate. At this time, the smoke layer has descended in the room of origin to approximately 8 feet above the floor. At 9 minutes, the products of combustion have begun to move vertically upward through the ceiling vents. The smoke layer in the room of origin has descended to 5 feet above the floor.

Approximately 16 minutes after the fire starts, the products of combustion that have been collecting in the ceiling space begin to begin to spill out through the open penetration and into the vertical shaft. However, it is not until 24 minutes that these products begin to migrate into the ceiling spaces above the second and third floors. Visibility in the room of origin at this time has deteriorated, and the temperature and carbon monoxide concentration continues to increase within the space.

At the end of the FDS run, 30 minutes from the start of the fire, the room of origin and the vertical shaft are almost completely filled with products of combustion to some degree. Smoke continues to collect slowly in the ceiling spaces above the second and third floors, but has not filled the second or third floors. It is evident from the measurements taken on each floor, that while the conditions in the room of origin have deteriorated, the conditions on the floors above remain unchanged. Tenability and life safety is maintained on both floors, even though the smoke dampers were removed at the duct penetrations.

A second, more conservative model was run using FDS to obtain a more extensive representation of potential scenarios. In this case, the ceiling space has been removed. A penetration into the shaft is located near the ceiling of each floor. This will allow smoke to move directly from the room of origin into the shaft, and potentially into the rooms above. The remaining conditions, such as fire size and room dimensions, were left identical to the previous FDS run. The configuration of this space can be viewed in the third and fourth graphics.

The FDS model indicates sprinkler activation at approximately 6 minutes at the 10 ft. ceiling, off-set from the fire origin by approximately 10 feet. However, the model also shows the movement of products of combustion into the adjacent shaft, in this case, at approximately 6 minutes. At 8 minutes, the conditions in the room of origin continue to deteriorate, and the products of combustion begin to enter into the second and third floors. However, conditions on these upper floors do not become untenable at any point during the FDS run. Again, the smoke is weakly buoyant. The smoke has a tendency to rise and does not move downward on either floor more than a few feet below the ceiling. The conditions in the room of origin have deteriorated, but life safety on floors remote from the fire is unaffected.

These two FDS runs present a clear understanding of smoke movement to areas remote from the room of origin in the absence of smoke dampers. The scenarios are conservative in terms of the building's configuration. A high-rise scenario was not considered, as the products of combustion would become even more dilute within the taller vertical shaft.

Tables presenting the conditions (visibility, temperature, and carbon monoxide concentration) 8 feet above each floor for both FDS runs are presented below. In the first table, it is clear that conditions in areas remote from the room of origin did not deteriorate in any way. In the second run, conditions in the upper floors are slightly affected by the fire on the first floor. However, these affects are insignificant and do not compromise the life safety of occupants.

The National Institute for Occupational Safety and Health (NIOSH) sets limits for the exposure to toxic gases. The Immediately Dangerous to Life and Health (IDLH) level for carbon monoxide is 1,200 ppm as defined by NIOSH. Criteria for smoke temperature and visible distance has been taken from the [NFPA] Fire Protection Handbook, 18th Edition. Section 4 Chapter 2 of the handbook provides guidance as to acceptable limits for visibility and smoke temperature. The cooling effect of skin moisture is found to compensate for the heat imposed on the skin up to a temperature of 140˚F. A temperature of 150˚F has previously been used as a criterion for the study of school children exiting. Suggested visibility limits range from 6.6 ft (2 m) to 49.2 ft (15 m). The conditions on floors above the room of origin are well below these thresholds, even 30 minutes after the start of the fire.

FDS RUN 1

Time [s]	Visibility [ft]			Temperature [F]			CO Concentration [ppm]		
	Floor 1	Floor 2	Floor 3	Floor 1	Floor 2	Floor 3	Floor 1	Floor 2	Floor 3
0	2625	2625	2625	70	70	70	0	0	0
1	202	2625	2625	90	70	70	7	0	0
2	295	2625	2625	81	70	70	4	0	0
3	222	2625	2625	84	70	70	6	0	0
4	104	2625	2625	103	70	70	13	0	0
5	95	2625	2625	105	70	70	15	0	0
6	64	2625	2625	122	70	70	22	0	0

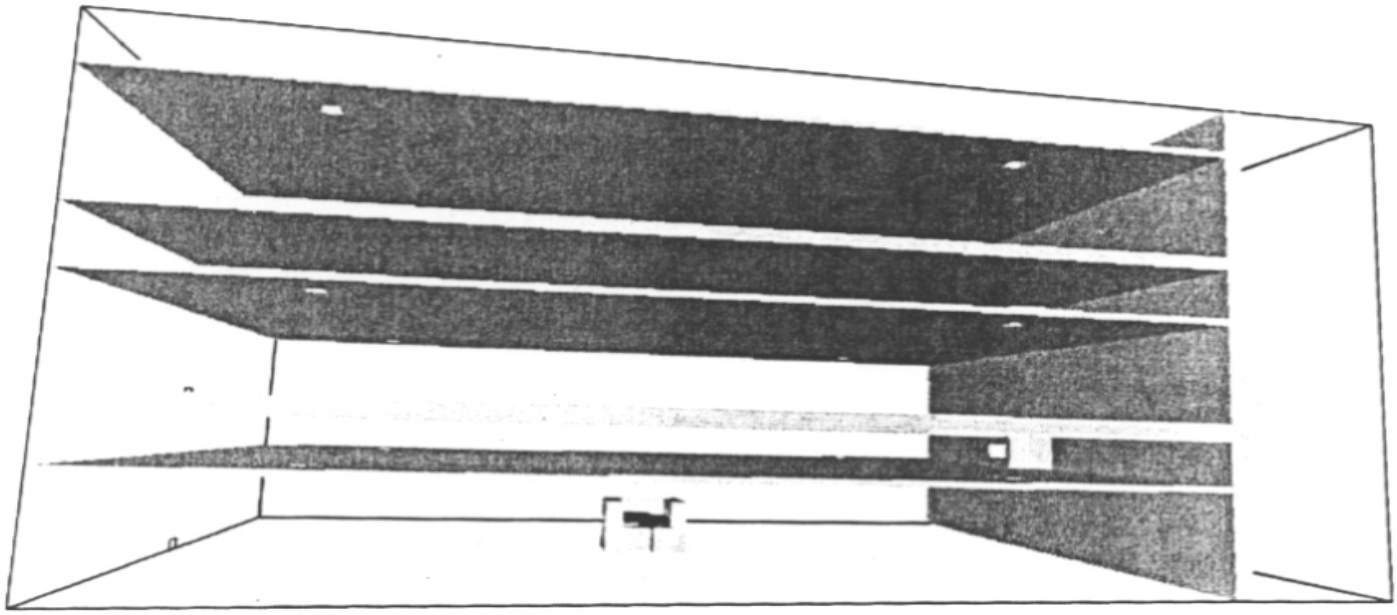
7	51	2625	2625	129	70	70	27	0	0
8	37	2625	2625	142	70	70	38	0	0
9	36	2625	2625	149	70	70	40	0	0
10	33	2625	2625	145	70	70	42	0	0
11	30	2625	2625	143	70	70	46	0	0
12	30	2625	2625	145	70	70	46	0	0
13	31	2625	2625	136	70	70	44	0	0
14	29	2625	2625	137	70	70	47	0	0
15	29	2625	2625	136	70	70	48	0	0
16	28	2625	2625	128	70	70	48	0	0
17	27	2625	2625	129	70	70	49	0	0
18	27	2625	2625	125	70	70	49	0	0
19	26	2625	2625	130	70	70	51	0	0
20	27	2625	2625	126	70	70	50	0	0
21	26	2625	2625	126	70	70	51	0	0
22	26	2625	2625	121	70	70	51	0	0
23	28	2625	2625	116	70	70	48	0	0
24	27	2625	2625	119	70	70	50	0	0
25	29	2625	2625	109	70	70	45	0	0
26	28	2625	2625	117	70	70	48	0	0
27	29	2625	2625	105	70	70	44	0	0
28	27	2625	2625	106	70	70	48	0	0
29	28	2625	2625	107	70	70	46	0	0
30	27	2625	2625	107	70	70	47	0	0

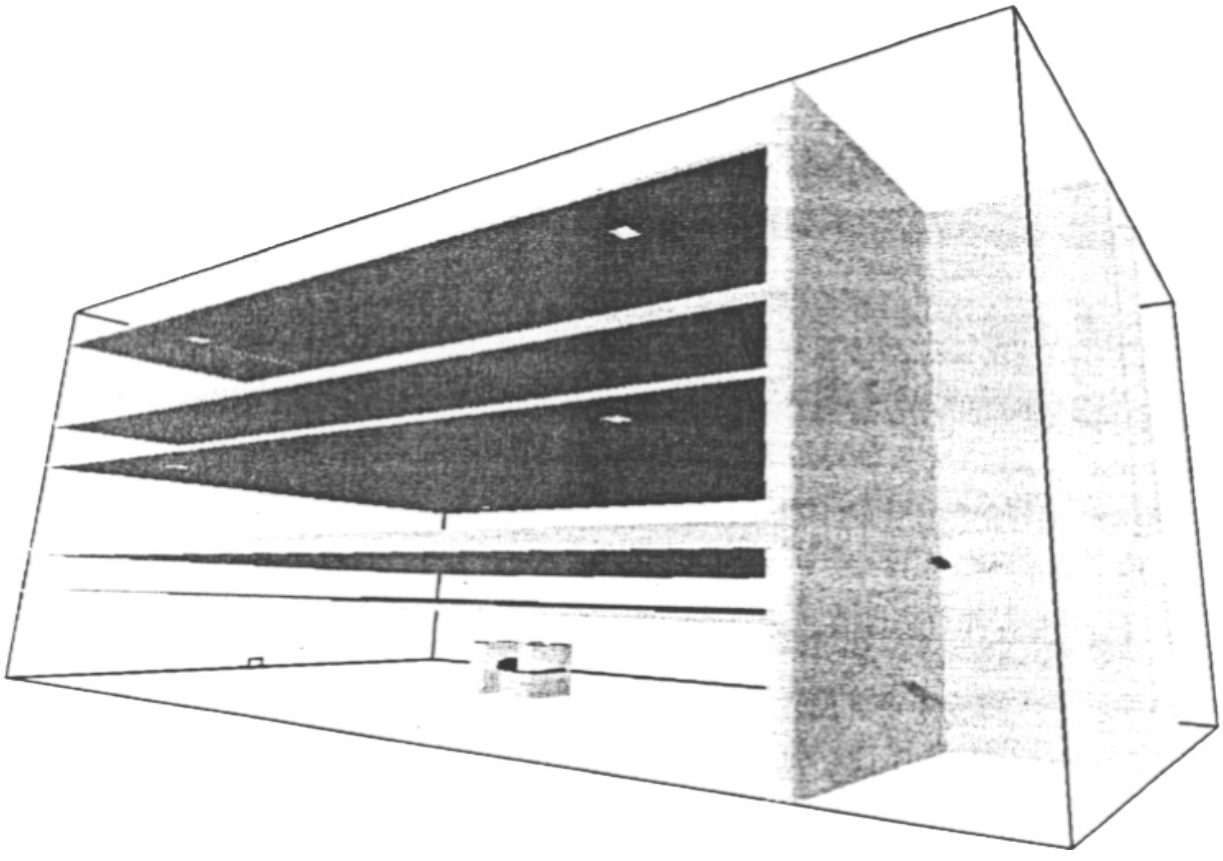
** MEASUREMENTS TAKEN 2.5 m (~8 ft) ABOVE THE FLOOR
ON EACH LEVEL, IN THE CENTER OF THE SPACE.

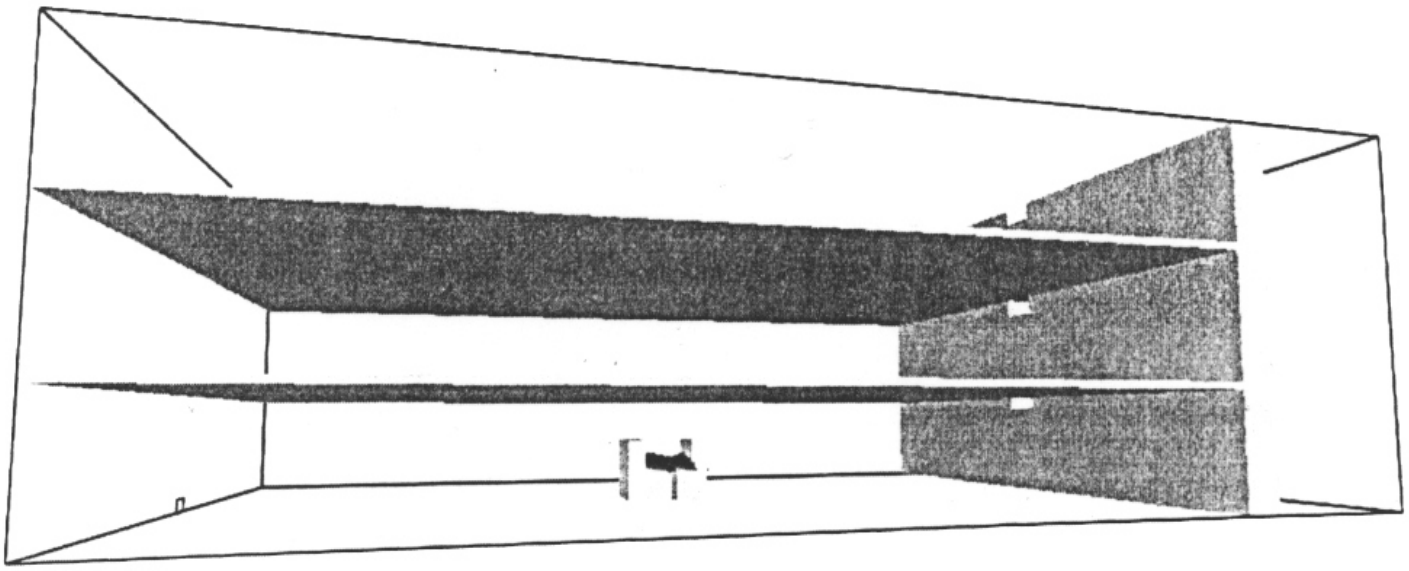
FDS RUN 2

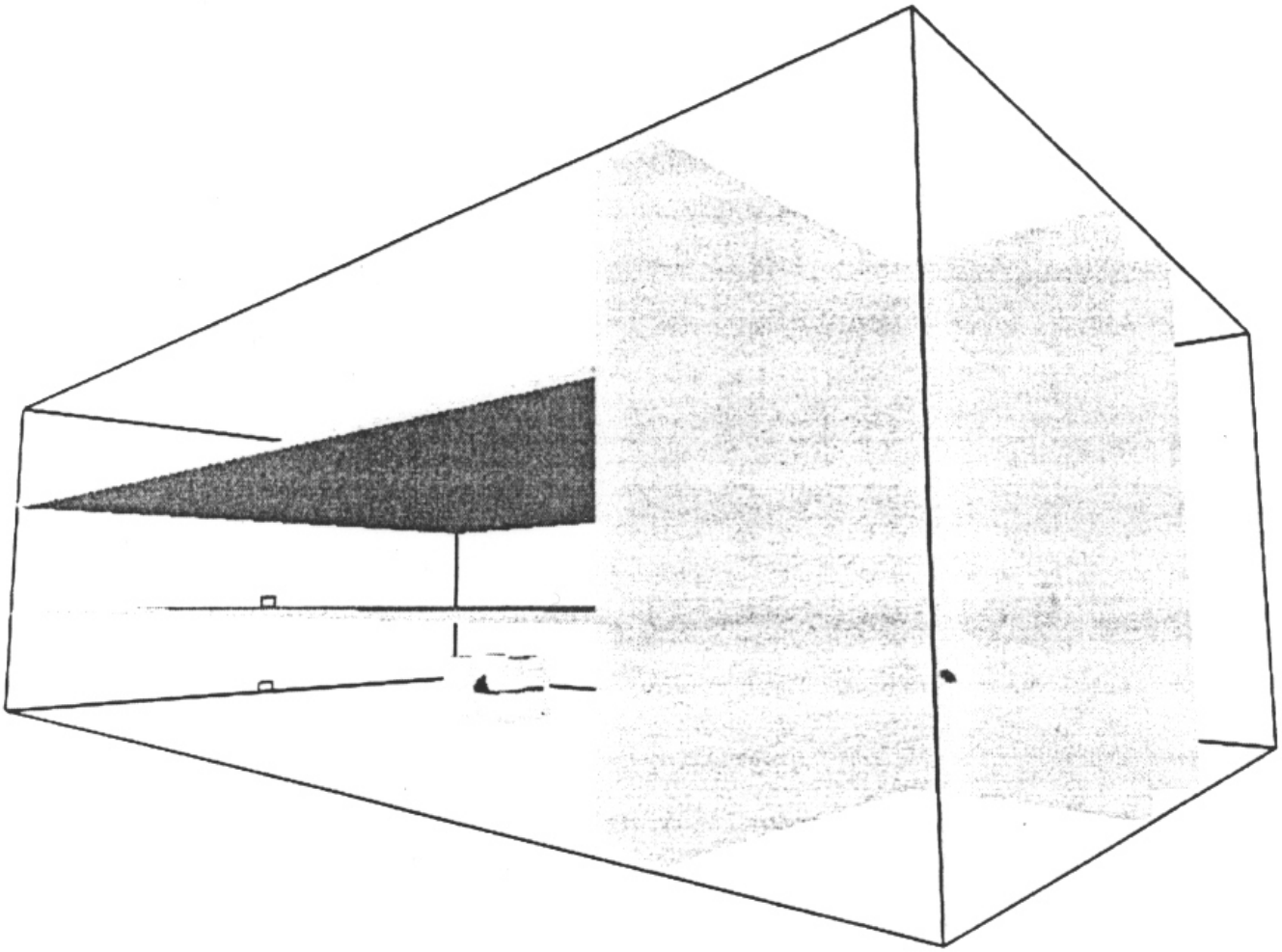
Time [s]	Visibility [ft]			Temperature [F]			CO Concentration [ppm]		
	Floor 1	Floor 2	Floor 3	Floor 1	Floor 2	Floor 3	Floor 1	Floor 2	Floor 3
1	2625	2625	2625	70	70	70	0	0	0
2	185	2625	2625	96	70	70	9	0	0
3	140	2625	2625	101	70	70	11	0	0
4	119	2625	2625	101	70	70	11	0	0
5	99	2625	2625	106	70	70	14	0	0
6	97	2625	2625	100	70	70	13	0	0
7	48	2625	2625	138	70	70	30	0	0
8	37	2625	2625	148	70	70	38	0	0
9	33	2625	2625	151	70	70	42	0	0
10	31	2625	1312	150	70	70	45	0	1
11	28	2625	1313	149	70	71	50	0	1
12	27	2625	657	153	70	71	52	0	2
13	25	1312	657	146	70	71	55	1	2
14	25	1312	439	150	70	72	57	1	3
15	25	1312	329	139	70	72	56	1	4
16	23	1312	263	145	70	72	59	1	5
17	22	1312	220	151	70	72	65	1	6
18	22	656	188	140	71	73	63	2	6
19	23	656	165	131	70	73	60	2	7
20	22	656	146	132	70	73	61	2	8
21	23	656	146	122	70	73	57	2	8
22	23	656	132	125	70	73	59	2	9
23	23	656	132	113	70	73	57	2	9
24	22	438	120	114	70	73	59	3	10
25	22	438	110	112	70	73	59	3	11
26	22	438	101	117	70	73	61	3	12
27	23	438	101	103	70	72	56	3	12
28	22	438	94	109	70	72	60	3	13
29	23	438	94	101	70	72	55	3	13
30	22	437	88	104	70	72	58	3	14

** MEASUREMENTS TAKEN 2.5 m (~8 ft) ABOVE THE FLOOR
ON EACH LEVEL, IN THE CENTER OF THE SPACE.









Bibliography:

1. Hang, Meadows, Mike, J.A., "The Effects of Sprinkler Activation on Smoke Characteristics," J. Of Applied Fire Science, Volume 10, No. 91, 2000-2001, pp 67-86.
2. Madryzkowski, D., "Office Work Station Heat Release Rate Study: Full Scale vs. Bench Scale," 7th International Interflam Conference Proceedings, Interscience Communications Ltd., March 26-28, 1996, pp 47-55.

Cost Impact: None

FS89-03/04

Committee Action: **Disapproved**

Committee Reason: The study used to support this proposed change is inappropriate for the technical proposal. The study is based upon the best possible scenario and therefore any modification to the code could be unconservative.

Assembly Action: **None**

E30-03/04 D
1008.1.8.7 (IFC 1008.1.8.7)

Proponent: Mike Bunnell City of Brooklyn Park, representing Association of Minnesota Building Officials

Add new text as follows:

1008.1.8.7 Special egress control devices. Where the clinical needs of the patients require specialized security measures, door locking arrangements approved by the building official shall be permitted in Group I-1, I-2 and R-4 occupancies provided that:

1. Staff carries keys or devices that function as keys at all times.
2. In at least one egress path, not more than one such arrangement is located.
3. The building or fire area is protected by an approved automatic sprinkler system in accordance with Section 903.3.1.1 and an approved fire alarm system having smoke detection, installed throughout the exit access corridor system and areas open to the exit access corridor.
4. Locking devices shall automatically unlock upon activation of any of the following:
   a. Automatic sprinkler system:
   b. Automatic smoke detection system;
   c. Automatic fire alarm system; or
   d. Loss of electrical power;
5. Locking devices shall have the ability to be remotely unlocked from an approved location within the secured area.
6. There is no public assembly space within the secured area.
7. 24-hour patient supervision is provided within the secured area.
8. Relocking of the locking device is by manual means from an approved location within the secured area.
9. Locking devices are designed to fail-safe.
10. Special egress control devices are not permitted in buildings of Type III-B or V-B construction, and shall not exceed one story in height when in Type III-A, IV, or Type V-A construction.
11. Floor levels within the building or portion thereof with the special egress control devices shall be divided into at least two compartments by smoke barriers in accordance with Section 709.
12. Substitution of the automatic sprinkler system for 1-hour fire-resistance rated construction (pursuant to Table 601, footnote d) shall be permitted.

Reason: Special locking arrangements are needed in facilities where the clinical needs of the patients require specialized security measures for their safety. The change recognizes the need to allow for special locking in dementia units, emergency rooms, nurseries, and other areas. The utilization of special egress control devices has been allowed for over five years in the state of Minnesota under Chapter 1305.1000, sub p.5 of Minnesota rules and has proven to be successful in protecting patients, and from them wandering away from care facilities.

Cost Impact: None

E30-03/04

Committee Action: **Disapproved**

Committee Reason: The terms 'special egress control devices' and 'specialized security measures' would be too ambiguous. Item 1 where staff are required to carry keys, does not defined as to which staff or how many staff must have keys. The term 'patients' would not cover all occupancies addressed. Item 9 does not specify requirements for the 'fail-safe' device. The text referencing the sprinkler system in Item 12 is already addressed elsewhere in the code.

Assembly Action: **None**

E83-03/04
Table 1016.1 (IFC 1016.1)

Proposed Change as Submitted:

Proponent: John, Valiulis, President, representing Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

TABLE 1016.1
CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system[c]
A, B, ~~E,~~ F, M, S, U	Greater than 30	1	0
E	Greater than 30	1	1

(Portions of table not shown do not change)

Reason: This proposal requires all corridors serving an occupant load greater than 30 to meet the requirement for 1-hour fire resistance rated corridors in Group E educational occupancies except as allowed by Exception No. 1 to Section 1016.1. Presently, the International Building Code (IBC) allows the 1-hour fire resistance rated corridor to be omitted where the building is protected by an automatic sprinkler system. We don't believe that such a trade-off is appropriate, especially in an educational occupancy where there are large numbers of children at relatively high density who are placed at risk in a fire situation. We believe that a balanced design approach to providing life safety in educational occupancies is prudent so that the 1-hour fire resistance rated corridors can work in conjunction with the automatic sprinkler system to assure the level of life safety for the building's occupants intended by the code.

Although sprinklers are a valuable fire protection tool, they are not infallible nor can they be assured of providing the necessary degree of protection to allow a 1-hour reduction in fire resistance for the corridors. A recent analysis of sprinkler system performance has indicated that sprinklers failed to operate in at least 1 out of every 6 fires that occur in sprinklered buildings. We believe that such a performance level does not justify deleting or trading-off the 1-hour fire resistance rating for corridors that provide a protected means of egress for school children in Group E educational occupancies.

A secondary benefit of 1-hour fire resistance rated corridors is that they also assist fire fighters in doing their job by providing a protected means of access to the interior of the building where they can perform their search and rescue missions, as well as fire fighting operations, in relative safety. Fire resistance rated corridors can provide fire fighters with additional time to do their jobs more effectively and safely.

It should also be pointed out that where 1-hour corridors are eliminated in the IBC, the separation of the elevator hoistway from the corridors is also eliminated, even in high-rise buildings. This is unacceptable since smoke can readily travel through the hoistway, contaminating corridors on floors remote form the fire floor.

We strongly believe that sprinkler trade-offs should not be allowed for means of egress components. At present, the IBC does not allow sprinkler trade-offs for the fire resistance ratings required for exit stair enclosures, horizontal exits, and exit passageways. So why should sprinkler trade-offs be allowed for the 1-hour fire resistance rating of corridors which provide a protected egress path giving access to these exit elements?

Furthermore, other sprinkler trade-offs related to the means of egress in buildings have already been provided for in the IBC. For example, travel distance is allowed to be increased where automatic sprinkler systems are provided. The separation of exits (remoteness) is also allowed to be reduced where automatic sprinkler systems are installed. Interior finish requirements are relaxed within corridors where

Class C interior finish can be used in lieu of Class B interior finish with the installation of automatic sprinklers.

We are concerned that the compounding effect of sprinkler trade-offs could lead to greater risk to the life safety of the building occupants, especially if combined with the elimination of the 1-hour fire resistance rating for corridors providing access to the exits or

the exit stairs. Too much reliance on automatic sprinkler systems may not be wise where life safety is a key consideration. We strongly believe that a balanced approach to fire and life safety in buildings should be provided to greatly enhance the probability that the intended level of fire and life safety prescribed by the building code will be provided when a fire occurs, even if something should go wrong.

We acknowledge that automatic sprinkler systems are an important fire protection tool, but they are not infallible. Like any mechanical system, they are subject to failure. As previously stated, automatic sprinkler systems fail to activate in at least 1 out of every 6 fires that occur in sprinklered buildings. In our opinion such a level of performance does not justify trading-off built-in fire resistant protection for the means of egress in buildings where the occupant's lives are at risk in a fire emergency. A balanced design approach of providing built-in fire resistive protection in conjunction with automatic sprinkler protection, in our opinion, will go a long way toward assuring that the level of fire and life safety intended by the building code will be delivered during a fire emergency.

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

Committee Action: **Disapproved**

Committee Reason: No substantiation was provided that a problem exists and needs to be addressed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jim Burns, State Fire Administrator, New York State Department of State; President, National Association of State Fire Marshals representing National Association of State Fire Marshals requests Approval as Submitted.

Commenter's Reason: The National Association of State Fire Marshals (NASFM) and its Partnership for Safer Buildings supports this code change proposal as it was originally submitted. This code change is consistent with Part VII of our Codes Assessments Subcommittee Report dated August 1, 2003 to the Partnership for Safer Buildings. We believe that a reasonable approach to providing adequate fire and life safety for buildings, in general, and Group E educational occupancies, in particular, is to take a balanced approach of both active and passive protection strategies so that there is not an over reliance on either one. This allows for an enhanced level of fire and life safety by increasing the probability that the failure of one aspect of the fire protection strategy will not cause catastrophic failure and jeopardize the lives and property in the building. We would also refer you to our Catastrophic Task Force Report on School Fires which can also be found on our website at www.firemarshals.org.

We are concerned about the excessive use of automatic sprinkler system trade-offs that reduce passive built-in fire protection, resulting in an over reliance on a single fire protection strategy. This is especially disturbing in Group E Educational Occupancies where school children are present, often in large numbers. Other sprinkler trade-offs currently allowed by the IBC that compound our concern relate to increases in travel distance from 200 feet to 250 feet and relaxations of interior finish flame spread requirements which allow a reduction from Class B to Class C. Thus, the maximum flame spread rating is allowed to increase from 75 to 200. On top of that, the IBC currently allows the one-hour fire resistance rating of the exit access corridors to be eliminated with the installation of an automatic sprinkler system.

This is also an issue of fire fighter safety. Increasing the travel distance means further lengths of fire hose must be laid from the exterior of the building to reach a fire located deep within the building, thus exposing fire fighters to longer evacuation distances if conditions become life threatening during fire fighting efforts. This also complicates search and rescue as well. By providing one-hour fire resistance rated corridors, this increased travel distance can be somewhat mitigated by providing reasonably safe areas in which the fire fighters can gain access to the building and perform their fire fighting functions, as well as search and rescue, without the concern of having to evacuate through unprotected areas of the building under severe fire conditions.

Also, we strongly believe in maintaining the level of fire and life safety that the legacy codes previously required prior to the development of the IBC. It should be noted that 2 of the 3 legacy codes did not allow an automatic sprinkler trade-off for the one-hour fire-resistance rating of exit access corridors in Group E Educational Occupancies.

In conclusion, NASFM strongly urges the ICC voting membership to overturn the Committee's recommendation for disapproval and vote for approval of Code Change Proposal E83-03/04 as submitted. This will restore a reasonable degree of balance between active and passive fire protection systems for the protection of the lives and property in Group E Educational Occupancies. Then all of our fire safety eggs will not be placed in the basket of automatic sprinklers.

F54-03/04 D
903.2 (IBC [F] 903.2)

Proponent: Greg Victor, Glendale AZ Fire Department

1. Delete current Sections 903.2 through 903.2.12.2 and substitute as follows:

903.2 Where required. An approved automatic sprinkler system shall be installed in accordance with Section 903.3 throughout all levels of all new buildings and structures.

Exceptions:

1. Group U Occupancies.
2. Detached gazebos and ramadas for residential and public use.
3. Independent buildings, such as restrooms or snack shops 500 square feet or less in area that are associated with golf courses, parks and similar uses.
4. Detached carports for residential developments.
5. Detached noncombustible shade structures.
4. Guardhouses less than 500 square feet without living or sleeping quarters used to control access to or within residential and/or commercial developments.
5. Detached equipment or storage buildings for commercial use not exceeding 500 square feet.
6. Detached residential storage buildings or garages that are non-inhabitable not exceeding 1,000 square feet.
7. Manufactured homes (Mobile) built on a permanent chassis designed and built as a dwelling unit and recreational vehicles that were not site-built and that are portable in nature.
8. Temporary tents, canopies and air-supported structures.
9. Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided those spaces or areas are equipped throughout with an automatic fire alarm system and are separated from the remainder of the building by a fire barrier wall with a fire-resistive rating of not less than 1 hour and a fire barrier floor/ceiling assembly with a fire-resistive rating of not less than 2 hours.

903.2.1 Group H-5 occupancies. The design of the sprinkler system for Group H-5 occupancies shall not be less than that required by the *International Building Code* for the occupancy hazard classification in accordance with Table 903.2.1.

Where the design area of the sprinkler system consists of a corridor protected by one row of sprinklers, the maximum number of sprinklers required to be calculated is 13.

TABLE 903.2.1
GROUP H-5 SPRINKLER DESIGN CRITERIA

Location	Occupancy Hazard Classification
Fabrication areas	Ordinary Hazard Group 2
Service corridors	Ordinary Hazard Group 2
Storage rooms without dispensing	Ordinary Hazard Group 2
Storage rooms with dispensing	Extra Hazard Group 2
Corridors	Ordinary Hazard Group 2

903.2.2 Rubbish and linen chutes. An automatic sprinkler system shall be installed at the top of rubbish and linen chutes and in their terminal rooms. Chutes extending through three or more floors shall have additional sprinkler heads installed without such chutes at alternate floors. Chute sprinklers shall be accessible for servicing.

903.2.3 During construction. Automatic sprinkler systems required during construction, alteration and demolition operations shall be provided in accordance with Section 1413.

903.2.4 Ducts conveying hazardous exhausts. Where required by the *International Mechanical Code*, automatic sprinklers shall be provided in ducts conveying hazardous exhaust and flammable or combustible materials.

Exception: Ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).

903.2.5 Commercial cooking operations. An automatic sprinkler system shall be installed in a commercial kitchen exhaust hood and duct system where an automatic system is used to comply with Section 904.

2. Revise as follows:

~~**903.2.13**~~ **903.2.6 Other required suppression systems.** In addition to the requirements of Section 903.2, the provisions indicated in Table 903.2.13 also require the installation of a suppression system for certain buildings and areas.

TABLE ~~903.2.13~~ 903.2.6
ADDITIONAL REQUIRED
FIRE-EXTINGUISHING SYSTEMS

(No change to table)

3. Delete and substitute as follows (IFC only):

~~**903.6 Existing buildings.** The provisions of this section are intended to provide a reasonable degree of safety in existing structures not complying with the minimum requirements of the International Building Code by requiring installation of an automatic fire-extinguishing system.~~

~~**903.6.1 Pyroxylin plastics.** All structures occupied for the manufacture or storage of articles of cellulose nitrate (pyroxylin) plastic shall be equipped with an approved automatic fire-extinguishing system. Vaults located within buildings for the storage of raw pyroxylin shall be protected with an approved automatic sprinkler system capable of discharging 1.66 gallons per minute per square foot (68 L/min/m2) over the area of the vault.~~

903.6 Existing buildings. Existing buildings are required to comply with the provisions of Section 903.2 when any of the following apply:

1. Building additions that equal 50% or more of the existing building floor area or exceed 5,000 square feet, whichever is less.
2. When the total building area exceeds the original building area by 5,000 square feet.
3. Any change in the use or occupancy of any building.

For the purposes of this section, the original building square footage shall be the square footage at the time of the adoption of this code.

4. Revise as follows:

4204.1.3 Storage of additional material. Raw material in excess of that allowed by Section 4204.1.2 shall be kept in vented vaults not exceeding 1,500-cubic-foot capacity (43 m^3) of total vault space, and with approved construction, venting and sprinkler protection. Vaults located within a building for the storage of raw pyroxylin shall be protected with an approved automatic sprinkler system capable of discharging 1.66 gallons per minute per square foot (68 L/m^2) over the area of the vault.

Reason: While it may seem that this proposal to sprinkler almost everything is a sweeping change, we must realize that local governments, fire district and jurisdictions across this nation are passing sprinkler amendments that are more stringent than this code's provisions because they see the value in fire sprinkler protection for buildings. We should look at this proposal as allowing this code to catch up with these innovative people who are tired of seeing their communities burn and are willing to do something about it. The intent of this proposal is to allow those who want to stay the same as they are when this code is adopted to do just that, stay the same. There are provisions for determining when existing buildings would be required to install a sprinkler system. These provisions are based on the sprinkler ordinances recently passed by the cities of Phoenix and Mesa, Arizona.

For the most part, the existing language was deleted. Certain provisions were relocated as indicated in the following table.

Old Section	Where It Went
903.2	New text
903.2, exception	903.2, exception 11
903.2.4.2	903.2.1
Table 903.2.4.2	Table 903.2.1

903.2.4.3	Deleted. This section is referenced in Table 903.2.5 (old Table 903.2.13)
903.2.10.2	903.2.2
903.2.11	903.2.3
903.2.12.1	903.2.4
903.2.12.2	903.2.5
903.2.13	903.2.6
903.6	New text
903.6.1	First sentence is deleted. It is handled by Table 903.2.13, now Table 903.2.6 and Chapter 42. The second sentence on sprinkler design moved to Section 4204.1.3 which addresses vaults.

Cost Impact: With respect to cost, it is unclear if this proposal will really increase the cost of construction. Certainly a sprinkler system will cost money, but the code provides for many trade-ups which could offset most, if not all, of these costs. The cost benefit to the community that uses this code will certainly be huge. Someone said or wrote that half of the businesses that burn never open again, and of the half that do, half of those will close within a year. This would mean a great deal to communities that depend on their businesses to generate jobs, entertainment and shopping opportunities that generate tax dollars that fund the community.

F54-03/04

Committee Action: **Disapproved**

Committee Reason: The impact of this proposal on rural areas would be substantial and unreasonable. The need for such a sweeping change has not been substantiated. Loss statistics do not generally support this change for many buildings and occupancies that would be affected by it. Proposed Section 903.2.5 would conflict with UL 300. The IFC is an international model code and a change of this magnitude would be inappropriate for inclusion in it. These types of change decisions should be made on the local level.

Assembly Action: **None**

G52-04/05 D
403.3.1

Proponent: Vickie Lovell, President, Intercode Inc., Delray Beach, FL, representing, Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

403.3.1 (Supp) Type of construction. The followingreductions in the minimum construction type allowed in Table 601 shall be allowed as provided in Section 403.3:1. For buildings not greater than 420 feet (128 m) in height, Type IA construction shall be allowed to be reduced to Type IB.

2. In other than Groups F-1, M and S-1, Type IB construction shall be allowed to be reduced to Type IIA.

Exceptions:

1. Group B buildings greater than 8 stories or 105 feet in height.
2. Group F-1, M or S-1 buildings of any height.
3. Group R buildings greater than 10 stories or 120 feet in height.

3. The height and area limitations of the reduced construction type shall be allowed to be the same as for the original construction type.

Reason: This code change proposal accomplishes two things. First, it reformats Item 2 to make its application clearer by using the exception format for the Groups F-1, M, and S-1 occupancies which are shown as a new Exception 2. Second, it adds two additional exceptions that limit the application of this section that allows a reduction in type of construction in these high rise buildings from Type IB to Type IIA for Group B office buildings that exceed 8 stories or 105 feet in height and Group R residential buildings that exceed 10 stories or 120 feet in height.

Based on our research of the three legacy model codes, we have determined that none of them had previously allowed this reduction in the high rise buildings that are listed in Exceptions 1 and 3 of this proposal. For example, the threshold limits in the 1999 BOCA National Building Code (NBC) were used to set the threshold limits for Exceptions 1 and 3 in this proposal for high rise buildings of Group B and Group R
occupancies, respectively. Those buildings were required to have two hour columns and two hour floors. The 1997 ICBO Uniform Building Code (UBC) required any high rise building to have a two hour structural frame and two hour floors which is the same as required for Type IB construction in the IBC. And, finally, the 1999 SBCCI Standard Building Code (SBC) required all high rise buildings to have at least three hour columns (when those columns supported more than one floor), as well
as two hour floors. Thus, it can be concluded that there was a significant technical change made during the drafting of the International Building Code (IBC) that allowed these buildings to be constructed of Type IIA construction which only requires one hour columns and one hour floors. To our knowledge, since we actively participated in the process of developing the IBC from the three legacy codes, there was no technical justification given for this reduction in fire resistance ratings.

Since none of the previous legacy codes allowed this reduction in fire resistance ratings, there is no actual fire experience with buildings of these heights having lesser fire resistance ratings that can be used to justify these reductions. Thus, high rise buildings under the proposed thresholds of 8 stories and 105 feet for Group B office buildings and 10 stories and 120 feet for Group R residential buildings should not be allowed until such time as adequate technical justification can be provided to warrant this reduction of at least one hour fire resistance for the structural frame (including the columns) as well as the floors. Therefore, we believe that the appropriate action for the Committee to take at this time is to recommend approval of this code change proposal as submitted in order to correct this problem.

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

G52-04/05

Committee Action: **Disapproved**

Committee Reason: This change in philosophy must be addressed comprehensively in the code and it is important to wait for the final NIST report to be issued. This proposal would be inconsistent with the committee action on G32-04/05.

Assembly Action: **None**

G54-04/05 D
403.3.1

Proponent: Richard Schulte, Schulte & Associates, Evanston, IL

Revise as follows:

403.3.1 (Supp) Type of construction. The following reductions in the minimum construction type allowed in Table 601 shall be allowed as provided in Section 403.3:

1. For buildings not greater than 420 feet in height. Type IA construction shall be allowed to be reduced to Type IB.
2. For buildings greater than 420 feet in height, Type IA construction shall be allowed to be reduced to Type IB construction in portions of the building classified as Group A, B or R Occupancies
3. In other than Groups F-1, M and S-1, Type IB construction shall be allowed to be reduced to Type IIA.
4. The height and area limitations of the reduced construction type shall be allowed to be the same as for the original construction type.

Reason: The purpose of this change is to permit portions of high rise buildings which are greater than 420 feet in height to comply with the requirements for Type IB construction in portions of the building where the average fire load does not exceed 10 pounds (wood equivalent) per square foot.

The National Bureau of Standards (NBS) determined that there is a correlation between fire loading (measured in pounds of wood equivalent per square foot) and fire severity (as measured by an exposure to ASTM E119) over 80 years ago. (One pound of wood is assumed to have a heat content of 8,000 Btu's. The fire load, measured in pounds of wood equivalent per square foot, is determined by dividing the heat content of the building contents (on a square foot basis) by 8,000 Btu per pound.) The NBS research determined the following correlation:

Fire Loading (Wood Equivalent)	Fire Severity (ASTM E119 Exposure)
5 psf	30 minutes
10 psf	1 hour
20 psf	2 hours

Later research conducted by the National Bureau of Standards determined that the fire loading of offices and residential occupancies averaged between 5 and 10 pounds per square foot of wood equivalent. Based upon this, the severity of a fire in a typical office or residential occupancy would be equivalent to a maximum 1 hour exposure to the ASTM E119 time-temperature curve.

Table 601 in the International Building Code indicates that the structural frame and floor construction in Type IB construction is required to develop a minimum 2 hour fire resistance rating. Given the correlation between fire loading and fire severity established by the National Bureau of Standards, providing Type IB construction in portions of high rise buildings which are classified as assembly, business or residential occupancies will provide a structural fire resistance which exceeds the maximum fire severity which can occur by one hour. Based upon this, providing Type IB construction in portions of high rise buildings classified as A, B or R occupancies will provide more than adequate structural fire resistance to prevent building collapse in the event of a typical fire which can occur in these occupancies. Sprinkler protection and manual firefighting provide additional factors of safety in preventing building collapse beyond that provided by Type IB construction.

Biography: Fire protection in Modern Building Codes, American Iron & Steel Institute (AISI)

Cost Impact: None

G54-04/05

Committee Action: **Disapproved**

Committee Reason: A concern would be when a Group B or R was located beneath another use group. The resulting lesser type of construction being the supporting construction is in conflict with Chapter 7. Group R has a delayed response time for the occupants. This
concept needs to be developed as part of a comprehensive package.

Assembly Action: **None**

G58-04/05 D
403.15 (New), 708.1

Proponent: Vickie Lovell, President, Intercode Inc., Delray Beach FL, representing, Alliance for Fire and Smoke Containment and Control (AFSCC)

1. Add new text as follows:
403.15 Corridors in Group B occupancies. For buildings greater than 420 feet in height, corridors serving more than one tenant space and providing direct access to at least one exit shall be enclosed by walls constructed as 1-hour fire-resistance rated fire partitions complying with Section 708.

2. Revise as follows:
708.1 (Supp) General. The following wall assemblies shall comply with this section.

1. Walls separating dwelling units in the same building.
2. Walls separating sleeping units in occupancies in Groups R-1, hotel occupancies, R-2 and I-1.
3. Walls separating tenant spaces in covered mall buildings as required by Section 402.7.2.
4. Corridor walls as required by Section 1016.1.
5. Elevator lobby separation.
6. Residential aircraft hangars.
7. Corridors in Group B occupants in high-rise buildings greater than 420 feet in height as required by Section 403.15.

Reason: This proposal is a follow up to Code Change G55-03/04 which was overwhelmingly approved by the Class A voting membership during the ICC Final Action Hearings held in Overland Park, KS this past May. That code change eliminated the automatic sprinkler trade-off for the reduction in required fire resistance ratings of the building construction type from Type IA to IB construction. One of the main reasons for approving that change was that such buildings must be able to withstand the impact of an uncontrolled fire which may completely burn out in the event that the water supply fails to the building, either internally or externally. This is because fire department apparatus is generally not capable of supplying adequate water in terms of pressure and flow to floors located above 420 feet in height. So if the water supply fails, there is no practical means for fighting a fire on those upper floors of such buildings, so the building must be able to stand on its own.

These “super high rise” buildings should also provide additional protection for the occupants of those buildings who may have to wait for long periods of time to evacuate or to be rescued, depending upon the severity of the fire and the demands on the responding fire department, as well as the exiting system in the building. One way of achieving a degree of protection for the building occupants is to provide one hour fire resistance rated corridors on multi-tenant floors where the tenants are required to navigate those corridors to reach the required exits as well as the elevators. Not only will these corridors provide a protected means of egress to reach the exits, but they can also serve as a “area of refuge” for occupants to queue in while waiting to evacuate the building or for rescue by the responding fire department or other emergency services. Such corridors should be maintained relatively smoke free because of the requirements that the doors be smoke and draft control type doors to prevent smoke from entering the corridor from a fire in an adjacent compartment. Protection of duct openings with smoke dampers is also required to minimize the spread of smoke into the means of egress route providing access to the exits. And any penetrations of the corridor walls and ceilings are required to be protected against the spread of fire and hot gages.

Currently, corridors in these Group B super high rise buildings are not required to have a one hour fire resistance rating based on Section 1016.1 and Table 1016.1 which allow the one hour fire resistance rating to be omitted where the building is protected with an NFPA 13 sprinkler system.

We do not believe that such a trade-off is appropriate where life safety is concerned. In such cases, it is advantageous and desirable to maintain the built-in passive fire resistant protection, as well as to provide the active automatic sprinkler system protection, where life safety is involved. In our opinion, trade-offs are entirely inappropriate where life safety is concerned. We believe that a balanced approach should be used to assure that the appropriate level of life safety will be provided to the occupants of the building who must rely upon the corridors to exit these super high rise buildings.

A secondary benefit of 1-hour fire resistance rated corridors is that they also assist fire fighters in doing their job by providing a protected means of access to the interior of the building where they can perform their search and rescue missions, as well as fire fighting operations, in relative safety. Fire resistance rated corridors can provide fire fighters with additional time to do their jobs more effectively and safely.

We strongly believe that sprinkler trade-offs should not be allowed for means of egress components. At present, the IBC does not allow sprinkler trade-offs for the fire resistance ratings required for exit stair enclosures, horizontal exits, and exit passageways. So why should sprinkler trade-offs be allowed for the 1-hour fire resistance rating of corridors which provide a protected egress path giving access to these exit elements?

Furthermore, other sprinkler trade-offs related to the means of egress in buildings have already been provided for in the IBC. For example, travel distance is allowed to be increased 50% from 200 feet to 300 feet where automatic sprinkler systems are provided. The separation of exits (remoteness) is also allowed to be reduced where automatic sprinkler systems are installed. Interior finish requirements are relaxed within corridors where Class C interior finish can be used in lieu of Class B interior finish and Class B interior finish can be used where Class A interior finish would otherwise be required if not for the installation of automatic sprinklers. And dead end corridors are allowed to be increased in length by 150%, i.e. from 20 feet to 50 feet, where automatic sprinkler systems are provided.

We are concerned that the compounding effect of sprinkler tradeoffs could lead to greater risk to the life safety of the building occupants, especially if combined with the elimination of the 1-hour fire resistance rating for corridors providing access to the exit stairs. Too much reliance on automatic sprinkler systems may not be wise where life safety is a key consideration. We strongly believe that a balanced approach to fire and life safety in buildings should be provided to greatly enhance the probability that the intended level of fire and life safety prescribed by the building code will be provided when a fire occurs, even if something should go wrong.

We acknowledge that automatic sprinkler systems are an important fire protection tool, but they are not infallible. Like any mechanical system, they are subject to failure. In fact, a recent statistical analysis of automatic sprinkler system performance conducted by the NFPA for the 10 year period form 1989 to 1998 has concluded that automatic sprinklers fail to activate in at least 1 out of every 6 fires that occur in sprinklered buildings. In our opinion such a level of performance does not justify trading-off built-in fire resistant protection for the means of egress in buildings where the occupant's lives are at risk in a fire emergency. A balanced design approach of providing built-in fire resistive protection in conjunction with automatic sprinkler protection, in our opinion, will go a long way toward assuring that the level of fire and life safety intended by the building code will be delivered during a fire emergency especially in these super high rise buildings.

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

G58-04/05

Errata: Section 708.1, new item 7 should read as follows:

7. Corridors in Group B occupancies in high-rise buildings greater than 420 feet in height as required by Section 403.15.

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved for consistency with G59-04/05. The title is not in the base requirement in the proposed Section 403.15. The committee believed that the logic of the proponent which relates requirements to multiple tenants was inappropriate. Technical justification was not provided for this substantial increase in Group B requirements.

Assembly Action: **None**

G92-04/05 D

Table 503

Proponent: James A. Burns, National Association of State Fire Marshals, Washington, D.C.

Revise table entries as follows:

TABLE 503 (Supp)
ALLOWABLE HEIGHT AND BUILDING AREAS
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building", per floor.

		TYPE OF CONSTRUCTION								
	Hgt(feet)	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
Group	Hst(S)	UL	160	65	55	65	55	65	50	40
A-1	S A	UL UL	~~5~~ 4 ~~UL~~ 29,900	~~3~~ 2 ~~15,500~~ 13,500	~~2~~ NP ~~8,500~~ NP	~~3~~ NP ~~14,000~~ NP	~~2~~ NP ~~8,500~~ NP	~~3~~ NP ~~15,000~~ NP	~~2~~ NP ~~11,500~~ NP	~~1~~ NP ~~5,500~~ NP
A-2	S A	UL UL	~~11~~ 4 ~~UL~~ 29,900	~~3~~ 2 ~~15,500~~ 13,500	~~2~~ NP ~~9,500~~ NP	~~3~~ 2 ~~14,000~~ 13,500	~~2~~ NP ~~9,500~~ NP	~~3~~ 2 ~~15,000~~ 13,500	2 ~~11,500~~ 10,500	~~1~~ NP ~~6,000~~ NP
A-3	S A	UL UL	~~11~~ 12 ~~UL~~ 29,900	~~3~~ 2 ~~15,500~~ 13,500	~~2~~ 1 ~~9,500~~ 9,000	~~3~~ 2 ~~14,000~~ 13,500	~~2~~ 1 ~~9,500~~ 9,000	~~3~~ 1 ~~15,000~~ 13,500	~~2~~ 2 ~~11,500~~ 10,500	1 6,000
A-4	S A	UL UL	~~11~~ 12 ~~UL~~ 29,900	2 ~~3~~ ~~15,500~~ 13,500	~~2~~ 1 ~~9,500~~ 9,000	~~3~~ 2 ~~14,000~~ 13,500	~~2~~ 1 ~~9,500~~ 9,000	~~3~~ 2 ~~15,000~~ 13,500	2 ~~11,500~~ 10,500	1 6,000
A-5	S A	UL UL	~~UL~~ 12 ~~UL~~ 29,900	~~UL~~ 2 ~~UL~~ 13,500	~~UL~~ 1 ~~UL~~ 9,000	~~UL~~ 2 ~~UL~~ 13,500	~~UL~~ NP ~~UL~~ NP	~~UL~~ 2 ~~UL~~ 13,500	~~UL~~ 2 ~~UL~~ 10,500	~~UL~~ NP ~~UL~~ NP
B	S A	UL UL	~~11~~ 12 ~~UL~~ 39,900	~~5~~ 4 ~~37,500~~ 18,000	~~4~~ 2 ~~23,000~~ 12,000	~~5~~ 4 ~~28,500~~ 18,000	~~4~~ 2 ~~19,000~~ 12,000	~~5~~ 4 ~~36,000~~ 18,000	3 ~~18,000~~ 14,000	2 ~~9,000~~ 8,000
E	S A	UL UL	~~5~~ 4 ~~UL~~ 45,200	~~3~~ 2 ~~26,500~~ 20,200	~~2~~ 1 ~~14,500~~ 13,500	~~3~~ 2 ~~23,500~~ 20,200	~~2~~ 1 ~~14,500~~ 13,500	~~3~~ 2 ~~25,500~~ 20,200	~~1~~ 2 1~~8,500~~ 15,700	1 ~~9,500~~ 9,000
F-1	S A	UL UL	~~11~~ 12 ~~UL~~ 39,500	4 ~~25,000~~ 18,000	2 ~~15,500~~ 12,000	~~3~~ 4 ~~19,000~~ 18,000	2 12,000	4 ~~33,500~~ 18,000	2 14,000	~~1~~ 2 ~~8,500~~ 8,000
F-2	S A	UL UL	~~11~~ 12 ~~UL~~ 59,900	~~5~~ 4 ~~37,500~~ 27,000	~~3~~ 2 ~~23,000~~ 18,000	4 ~~28,500~~ 27,000	~~3~~ 2 18,000	~~5~~ 4 ~~50,500~~ 27,000	3 21,000	2 ~~13,000~~ 12,000
H-1	S A	1 ~~21,000~~ 15,000	1 ~~16,500~~ 12,400	1 ~~11,000~~ 5,600	1 ~~7,000~~ 3,700	~~1~~ NP ~~9,500~~ NP	~~1~~ NP ~~7,000~~ NP	~~1~~ NP ~~10,500~~ NP	~~1~~ NP ~~7,500~~ NP	NP NP
H-2	S A	UL ~~21,000~~ 15,000	~~3~~ 2 ~~16,500~~ 12,400	~~2~~ 1 ~~11,000~~ 5,600	1 ~~7,000~~ 3,700	~~2~~ 1 ~~9,500~~ 5,600	1 ~~7,000~~ 3,700	~~2~~ 1 ~~10,500~~ 5,600	1 ~~7,500~~ 4,400	1 ~~3,000~~ 2,500
H-3	S A	UL UL	~~6~~ 5 ~~60,000~~ 24,800	~~4~~ 2 ~~26,500~~ 11,200	~~2~~ 1 ~~14,000~~ 7,500	~~4~~ 2 ~~17,500~~ 11,200	~~2~~ 1 ~~13,000~~ 7,500	~~4~~ 2 ~~25,500~~ 11,200	2 ~~18,000~~ 8,800	1 5,000
H-4	S A	UL UL	~~7~~ 5 ~~UL~~ 24,800	~~5~~ 2 ~~37,500~~ 11,200	~~3~~ 1 ~~17,500~~ 7,500	~~5~~ 2 ~~28,500~~ 11,200	~~3~~ 1 ~~17,500~~ 7,500	~~5~~ 1 ~~36,000~~ 11,200	~~3~~ 2 ~~18,000~~ 8,800	~~2~~ 1 ~~6,500~~ 5,000
H- 5	S A	~~3~~ 4 UL	~~4~~ 5 ~~UL~~ 24,800	~~3~~ 2 ~~37,500~~ 11,200	~~3~~ 1 ~~23,000~~ 7,500	~~3~~ 2 ~~28,500~~ 11,200	~~3~~ 1 ~~19,000~~ 7,500	~~3~~ 1 ~~36,000~~ 11,200	~~3~~ 2 ~~18,000~~ 8,800	~~2~~ 1 ~~9,000~~ 5,000
I-1	S A	UL UL	~~9~~ 3 ~~55,000~~ 15,100	~~4~~ 1 ~~19,000~~ 6,800	~~3~~ NP ~~10,000~~ NP	~~4~~ 1 ~~16,500~~ 6,800	~~3~~ NP ~~10,000~~ NP	~~4~~ 1 ~~18,000~~ 6,800	~~3~~ 1 ~~10,500~~ 5,200	~~2~~ NP ~~4,500~~ NP
I-2	S A	UL UL	~~4~~ 3 UL 15,100	~~2~~ 1 ~~15,000~~ 6,800	~~1~~ NP ~~11,000~~ NP	1 ~~12,000~~ 6,800	NP NP	1 ~~12,000~~ 6,800	1 ~~9,500~~ 5,200	NP NP
I-3	S A	UL UL	~~4~~ 2 ~~UL~~ 15,100	2 15,000	~~1~~ NP ~~11,000~~ NP	~~2~~ NP ~~10,500~~ NP	~~1~~ NP ~~7,500~~ NP	~~2~~ NP ~~12,000~~ NP	~~2~~ NP ~~7,500~~ NP	~~1~~ NP ~~5,000~~ NP

I-4	S A	UL UL	~~5~~ 4 60,500 45,200	~~3~~ 2 ~~26,500~~ 20,200	~~2~~ 1 13,000 13,500	~~3~~ 2 ~~23,500~~ 20,200	~~2~~ 1 ~~13,000~~ 13,500	~~3~~ 2 ~~25,500~~ 29,200	~~1~~ 2 ~~18,500~~ 15,700	1 9,000
M	S A	UL UL	~~11~~ 12 ~~UL~~ 39,900	4 ~~21,500~~ 18,000	~~1~~ 2 ~~12,500~~ 12,000	4 ~~18,500~~ 18,000	~~1~~ 2 ~~12,500~~ 12,000	4 ~~20,500~~ 18,000	3 14,000	~~1~~ 2 ~~9,000~~ 8,000
R-1	S A	UL UL	~~11~~ 12 ~~UL~~ 29,900	4 ~~24,000~~ 13,500	~~1~~ 2 ~~16,000~~ 9,100	4 ~~24,000~~ 13,500	~~1~~ 2 ~~16,000~~ 9,100	4 ~~20,500~~ 13,500	3 ~~12,000~~ 10,500	2 ~~7,000~~ 6,000
R-2[a]	S A	UL UL	~~11~~ 12 ~~UL~~ 29,900	4 ~~24,000~~ 13,500	~~1~~ 2 ~~16,000~~ 9,100	4 ~~24,000~~ 13,500	~~1~~ 2 ~~16,000~~ 9,100	4 ~~20,500~~ 13,500	3 ~~12,000~~ 10,500	2 ~~7,000~~ 6,000
R-3[a]	S A	UL UL	11 UL	~~1~~ 3 UL	~~1~~ 3 UL	~~1~~ 3 UL	~~1~~ 3 UL	~~1~~ 3 UL	3 UL	3 UL
R-4	S A	UL UL	~~11~~ 12 ~~UL~~ 29,900	4 ~~24,000~~ 13,500	~~1~~ 2 ~~16,000~~ 9,100	4 ~~24,000~~ 13,500	~~1~~ 2 ~~16,000~~ 9,100	4 ~~20,500~~ 13,500	3 ~~12,000~~ 10,500	2 ~~7,000~~ 6,000
S-1	S A	UL UL	~~11~~ 12 ~~48,000~~ 29,900	4 ~~26,000~~ 18,000	~~3~~ 2 ~~17,500~~ 12,000	~~3~~ 4 ~~26,000~~ 18,000	~~3~~ 2 ~~17,500~~ 12,000	4 ~~25,500~~ 18,000	3 14,000	~~1~~ 2 ~~9,000~~ 8,000
S-2[b, c]	S A	UL UL	~~11~~ 12 ~~79,000~~ 59,900	~~5~~ 4 ~~39,000~~ 27,000	~~1~~ 2 ~~26,000~~ 18,000	4 ~~39,000~~ 27,000	~~1~~ 2 ~~26,000~~ 18,000	~~5~~ 4 ~~38,500~~ 27,000	~~1~~ 2 21,000	2 ~~13,500~~ 12,000
U[c]	S A	UL UL	5 35,500	4 19,000	2 8,500	3 14,000	2 8,500	4 18,000	2 9,000	1 5,500

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.
UL = Unlimited, NP = Not permitted.
a. As applicable in Section 101.2.
b. For open parking structures, see Section 406.3.
c. For private garages, see Section406.1.

Reason: Table 503, as currently written, allows significantly greater areas and heights than those prescribed under previous model building codes. The National Association of State Fire Marshals (NASFM) finds it problematic that the base allowable heights and areas were developed using an arbitrary approach that used the least rigorous, i.e., the greatest allowable, heights and areas of any of the three regional model building codes for ICC Proposal Form Revised: May 15, 2004 each occupancy, as the base value for the table. This decision was based on the need for existing buildings in any part of the country to be in conformance with the IBC. However, the decision must have a technical basis.

NASFM, through its Partnership for Safer Buildings (the Partnership), has been investigating the adequacy of the fire safety provisions of the new model codes, and has concluded that in many instances the fire protectionrequirements in the new model building codes1 are significantly weaker than the requirements found in the older regional model building codes.[2] These changes were made without a technical basis,[3] at a time when the US was experiencing an increase in the rate of firefighter deaths attributed to structural collapse,[4] and after the National Institute of Occupational Safety and Health issued an alert regarding the "Prevention of Injuries and Deaths of Fire Fighters Due to Structural Collapse,"[5] which explicitly drew attention to the adequacy of passive fire protection.

It is NASFM's position that the height and area increases prescribed under table 503 may place occupants and first responders at risk. The proposed revisions to the values[6] in Table 503 acknowledge the importance of balanced fire protection within a building's environment.[7]

Ensuring that the Height and Area requirements are appropriate is crucial especially given the contents of today's buildings. For example, the National Institute of Standards and Technology (NIST) determined that the fuel load present in a typical office workstation is capable of producing a significant fire for an hour.[8] Yet, the model fire codes regard workstations as ordinary hazards and, accordingly, allow a relatively modest level of active protection. In 1996, NIST, at the request of the General Services Administration, conducted a study that determined that this level of active fire protection might not be sufficient to suppress a fire in a single workstation.[9]

These findings are particularly troubling when considering that buildings can be constructed much larger and taller without providing for levels of active and passive fire protection sufficient to suppress real-world fires in commercial and other occupancies.

Public policy places a high value on the safety and security of emergency responders. A person who intentionally endangers a law enforcement officer faces imprisonment and fines. The net effect of increasing the height and area tables is that firefighters may be at greater risk of death and injury from structural collapse.

NASFM is sympathetic to the notion of economic incentives to achieve higher levels of safety – which is the justification for trade-offs. However, NASFM sees no value in a system of incentives that allows reductions in the levels of safety, or encourages building owners to meet minimum levels of fire protection. Trade-offs between active and passive fire protection systems make no more sense than allowing stronger bumpers in exchange for less effective brakes on a car. While economic realities make the need for some tradeoffs inevitable, the pendulum has swung too far in favor of economics over safety. Trade-offs that allow for the significant increase in the height and area of buildings without accounting for real-world fire scenarios clearly do not serve the public interest.[10]

The height and area tables must be restored to the previous levels, and may, along with greater requirements for active protection, require further upward adjustments as more is known about the fuel load in these occupancies.

1 The Partnership's Codes Assessment Subcommittee examined the 2000 edition of the International Code Council's *International Building Code*™ (IBC) and the newly released building code from the National Fire Protection Association, NFPA 5000 ™, *Building Construction & Safety Code* (2003 edition).
2 The International Building Code (IBC) and the 1997 Edition of the Uniform Building Code (UBC) have a vastly different approach to fire-rated substitutions permitted with the use of an automatic sprinkler system.
3 Fact Sheet: "Key Findings of NIST's June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster," Available at http://www.nist.gov/public_affairs/factsheet/wtc_keyfindings.htm
4 "US Fire Service Fatalities in Structure Fire, 1977-2000," NFPA, 2000. See http://www.nfpa.org/PDF/FFFStructure.PDF?src=nfpa.
5 NIOSH Publication No. 99-146. See http://www.cdc.gov/niosh/99-146.html
6 The Uniform Building Code provides a conservative approach to public safety, property protection, and fire fighters' safety within the constructed environment.
7 NASFM has also submitted a proposal to require that all existing buildings that would require automatic fire sprinkler systems under the provisions of Section 903.2.1 through 903.2.10 are required to install said system in compliance with Sections 903.3.1 through 903.3.7. ICC Proposal Form Revised: May 15, 2004 . 8 Fact Sheet: "Key Findings of NIST's June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster," Available at http://www.nist.gov/public_affairs/factsheet/wtc_keyfindings.htm
9 This finding was based on the study *Office Work Station Heat Release Rate Study: Full Scale vs. Bench Scale*, in Interflam '96. 7th International Interflam Conference, March 26-28, 1996, Cambridge, England. Proceedings. Sponsored by Interscience Communications Ltd.; National Institute of Standards and Technology; Building Research Establishment; and Society of Fire Protection Engineers; Swedish National Testing and Research Institute. Interflam '96. International Interflam Conference, 7th Proceedings. March 26-28, 1996, Cambridge, England, Interscience Communications Ltd., London, England, Franks, C. A.; Grayson, S., Editors, 47-55 pp, 1996.
10 This position is also supported by the findings of the studies conducted by NIST and the City of New York. According to NIST's

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

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Errata: The proposed revision to the number of stories for Type IV/Group A-3 Occupancies should be "2", not "1."

Committee Action: **Disapproved**

Committee Reason: The current table was developed by using the maximum allowances from the three legacy codes. While the original numbers may have been established based on a level of comfort, technical justification was not provided to indicate that any of the three model codes had building heights and areas that were deficient. To incorporate this new table, any code change proposed would need to comprehensively review the code, comparing the impact on whole systems (e.g. means of egress, opening protectives, sprinkler thresholds) and not just the height and area tables alone. This proposal would have a dramatic cost increase.

Assembly Action: **None**

G93-04/05 D
503.1.1 (New), 504.2, 506

Proponent: Joe McElvaney, City of Phoenix, AZ, representing himself

1. Add new text as follows:

503.1.1 Basements. A single level basement need not be included in the total allowable area provided the basement does not exceed the area permitted for a one-story building.

2. Revise as follows:

504.2 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 for ~~maximum height is increased by 20 feet (6096 mm) and~~ the maximum number of stories is increased by one story. ~~These~~ This increase~~s are~~ shall not be permitted ~~in addition to~~ where the area increase in accordance with Section~~s 506.2 and~~ 506.3 is used. ~~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 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four stories or 60 feet (18 288 mm), respectively~~.

Exceptions:

1. Group I-2 of Type IIB, III, IV or V construction.
2. Group H-1, H-2, H-3 or H-5.
3. Fire-resistance rating substitution in accordance with Table 601, Note d.

3. Delete and substitute as follows:

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

~~Equation tag = (Equation 5-1)~~
~~where:~~
~~Aa = Allowable area per floor (square feet).~~
~~At = Tabular area per floor in accordance with Table 503 (square feet).~~
~~I^f = Area increase due to frontage (percent) as calculated in accordance with Section 506.2.~~
~~I^s = Area increase due to sprinkler protection (percent) as calculated in accordance with Section 506.3.~~

~~**506.1.1 Basements.** A single basement need not be included in the total allowable area provided such basement does not exceed the area permitted for a one-story building.~~

~~**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:~~

~~where: Equation 5-2)~~
~~If = Area increase due to frontage.~~
~~F = Building perimeter which 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 Width limits.** W must be at least 20 feet (6096 mm) and the quantity W divided by 30 shall not exceed 1.0. 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 between 20 and 30 feet (6096 and 9144 mm).~~

~~**Exception:** The quantity W divided by 30 shall be permitted to not exceed 2.0 when all of the following conditions exist:~~

~~1. The building is permitted to be unlimited in area by Section 507; and~~
~~2. The only provision preventing unlimited area is 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 Automatic sprinkler system increase.** Where a building is protected 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 (Is = 200 percent) for multistory buildings and an additional 300 percent (Is = 300 percent) for single-story buildings. These increases are permitted in addition to the height and story increases in accordance with Section 504.2.~~

~~**Exceptions:**~~

~~1. Buildings with an occupancy in Group H-1, H-2 or H-3.~~
~~2. Fire-resistance rating substitution in accordance with Table 601, Note d.~~

506.1 General. The building areas per floor allowed by Table 503 shall be permitted to be increased by the provisions of this section.

506.2 Frontage increase. Every building shall adjoin or have access to a public way to receive an area increase for fronting on public ways or yards in accordance with this section.

506.2.1 Separation on two sides. Where public ways or yards more than 20 feet (6096 mm) in width extend along and adjoin two sides of the building, floor areas shall be permitted to be increased at a rate of 1 ¼ percent for each foot (305 mm) by which the minimum width exceeds 20 feet (6096 mm). Such increase shall not exceed 50 percent.

506.2.2 Separation on three sides. Where public ways or yards more than 20 feet (6096 mm) in width extend along and adjoin three sides of the building, floor areas shall be permitted to be increased at a rate of 2 ½ percent for each foot (305 mm) by which the minimum width exceeds 20 feet (6096 mm). Such increase shall not exceed 100 percent.

506.2.3 Separation on all sides. Where public ways or yards more than 20 feet (6096 mm) in width extend on all sides of a building and adjoin the entire perimeter, floor areas shall be permitted to be increased at a rate of 5 percent for each foot (305 mm) by which the minimum width exceeds 20 feet (6096 mm). Such increase shall not exceed 100 percent.

506.3 Automatic sprinkler systems. The areas allowed in Table 503 as increased in accordance with Section 506.2 shall be permitted to be tripled in one-story buildings and doubled in buildings of more than one story where the building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. The area increase permitted in this section shall be compounded with that specified in Section 506.2.1, 506.2.2 or 506.2.3.

506.3.1 The area increase permitted in Section 506.3 shall not apply when automatic sprinkler systems are installed under the following provisions:

1. Section 504 for an increase in allowable number of stories.
2. Section 903.2.4.1 for Group H-1 or H-2 occupancies.

4. Revise as follows:

506.4 Area determination. The maximum area of a building with more than one story shall be determined by multiplying the allowable area of the first floor (A_a), as determined in Section 506.1, by two ~~the number of stories as listed below.~~

~~1. For two-story buildings, multiply by 2;~~
~~2. For three-story or higher buildings, multiply by 3; and,~~
~~3. No story shall exceed the allowable area per floor (Aa), as determined in Section 506.1 for the occupancies on that floor~~.

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 floor (Aa), as determined in Section 506.1 by the number of stories~~.

5. Delete Table 503 in its entirety and substitute the following table:

~~TABLE 503~~
~~ALLOWABLE HEIGHT AND BUILDING AREAS~~
~~Height Limitations shown as stories and feet above grade plane.~~
~~Area limitations are determined by the definition of "Area, Building," per floor.~~
TABLE 503

ALLOWABLE HEIGHT AND BUILDING AREAS
Height Limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building", per floor

(Underlining of table omitted for clarity)

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
Group	Height (ft) Height (S)	UL	160	65	55	65	55	65	50	40
A-1, A-2, A-3, A-4 > 1000 occupants	S A	UL UL	4 29,900	Not Permitted						
A-1, A-2, A-3, A-4 ≤ 1000 and < 300 occupants	S A	UL UL	4 29,900	2 13,500	NP	2 13,500	NP	2 13,500	2 10,500	NP
Any A ≤ 300 occupants	S A	UL UL	12 29,900	2 13,500	1 9,100	2 13,500	1 9,100	2 13,500	2 10,500	1 6,000
B, F-1, M, S-1	S A	UL UL	12 39,900	4 18,000	2 12,000	4 18,000	2 12,000	4 18,000	3 14,000	2 8,000
E, I-4	S A	UL UL	4 45,200	2 20,200	1 13,500	2 20,200	1 13,500	2 22,200	2 15,700	1 9,100
F-2, S-2	S A	UL UL	12 59,900	4 27,000	2 18,000	4 27,000	2 18,000	4 27,000	3 21,000	2 12,000
I-1	S A	UL UL	3 15,100	2 6,800	NP	2 6,800	NP	2 6,800	2 5,200	NP
I-2	S A	UL UL	3 15,100	1 6,800	NP	1 6,800	NP	1 6,800	1 5,200	NP
I-3	S A	UL UL	2 15,100	Not Permitted						
R-1, R-2, R-4[a]	S A	UL UL	12 29,900	4 13,500	2 9,100	4 13,500	2 9,100	4 13,500	3 10,500	2 6,000
R-3	S A	UL UL	3 UL	3 UL	3 UL	3 UL	3 UL	3 UL	3 UL	3 UL
H-1	S A	1 15,000	1 12,000	1 5,600	1 3,700	Not Permitted				
H-2	S A	UL 15,000	2 12,400	1 5,600	1 3,700	1 5,600	1 3,700	1 5,600	1 4,400	1 2,500
H-3	S A	UL UL	5 24,800	2 11,200	1 7,500	2 11,200	1 7,500	2 11,200	2 8,800	1 5,100
H-4, H-5	S A	3 UL	3 39,900	3 18,000	2 12,000	3 18,000	2 12,000	3 18,000	3 14,000	1 8,000

U	S A	UL UL	5 35,500	4 19,000	2 8,500	3 14,000	2 8,500	4 18,000	2 9,000	1 5,500

A - Floor area per story in square feet (x 0.093 for m^2)
H - Building height in number of stories.
UL - Unlimited
NP - Not permitted
a. Group R-4 occupancies shall not be greater than 2 stories in height and shall be of not less than 1 hour-resistive construction throughout where the second story exceeds 3,000 sq.ft.

Reason: This proposal is a package of changes that attempts to integrate the significant code requirements contained in the 1997 Uniform Building Code (UBC) regulating the allowable heights and areas of buildings as a substitute for the more liberal requirements currently in the International Building Code (IBC).

The revision to Section 503.1.1 Basements will only allow a single level basement to be excluded from the total allowable building area where that basement does not exceed the area permitted for a one story building. This prevents a multilevel basement from being constructed and not being included in the total allowable building area.

The revisions to Section 504.2 make this section consistent with Section 506 of the 1997 UBC. First, the UBC does not allow modifications to be made to the allowable heights of buildings of a Group R occupancy where a residential sprinkler system (NFPA 13 R/UBC Standard 9-3) is provided. Section 904.1.3 of the 1997 UBC states: "When residential sprinkler systems as set forth in UBC Standard 9-3 are provided, exceptions to, or reductions in, code requirements based on the installation of an automatic fire-extinguishing system are not allowed." However, IBC Section 504.2 allows a residential sprinkler system designed per NFPA 13R (Section 903.3.1.2) to be used to increase the allowable height of the building. Second, this amendment eliminates the allowable use of "double dipping" where a height increase for automatic sprinkler system protection is allowed in addition to an area increase. Presently, the 1997 UBC does not allow this practice and that is the purpose for deleting the last sentence of this section. See Item 2 of UBC Section 506.

This proposed revision is really an issue of "putting too many eggs in one basket" by allowing too many trade-offs for automatic sprinkler systems. We do not quarrel with the value of automatic sprinkler systems. It's just that we don't believe they are the "panacea" for all fire safety concerns. Although they are very reliable, they are not totally infallible and, as such, trade-offs allowed for automatic sprinkler systems should consider the possibility that the sprinkler system may not perform as intended.

It should also be noted that the height increase allowing a 20 ft. increase in the total building height has been deleted by this proposed revision. Again, the UBC does not allow for such an increase of building height but only an increase in the story height provided the building still meets the overall height limits for the type of construction. Regarding the residential sprinkler system trade-off allowing the additional increase in story height, as well as total building height by 20 ft., not to exceed a total height of 4 stories, we have serious concerns about allowing a residential sprinkler system to be used for a structural fire resistive trade-off. In effect, this would allow a Group R-1 hotel or Group R-2 apartment house to be constructed of Type VB (UBC Type V-N) construction to a height of 3 stories and 60 ft. It would also allow those occupancies to be constructed to a maximum height of 4 stories and 60 ft. in Type VA (UBC Type V-One hour) construction. In our opinion, this is unsupportable since the NFPA 13R automatic sprinkler system does not require the attic to be protected with automatic sprinklers. Thus, in effect, the present allowance in Section 504.2 would permit an unprotected attic at an increased height which is even more inaccessible to the fire department than what the present code allows in an unsprinklered building simply because the occupied portions of the building are sprinklered. This would pose an even greater fire fighting challenge for the responding fire department should a fire occur in a concealed space that spread into the attic or started in the attic itself.

The proposed revisions to Section 506.1 and 506.2 simply substitute Section 505 Allowable Area Increases of the UBC in order to incorporate that methodology for calculating allowable area increases based on open space surrounding the building. This results in area increases based on both the width of the open space as well as the amount of perimeter fronting on the open space. They can range from as much as 50% to 100% under the UBC as compared to 50% to 150% under the IBC. Furthermore, the IBC will allow a minimum open space of 20 feet to qualify for the minimum 50% increase as compared to 30 feet per the UBC.

The proposed revision to substitute new Section 506.4 for Section 506.4 of the IBC is based on the 1997 UBC for determining the allowable area of one-story buildings and buildings over one story in height. The significant difference is that for multistory buildings the total building floor area is limited to twice that allowed for a one-story building in the UBC as compared to three times that allowed for a building three or more stories in height in accordance with the IBC. The present text in the IBC would allow a multistory building greater than two stories in height to have a total building area of three times that allowed for a single story building. This is 50% more than allowed by the 1997 UBC.

This appears to be an excessive allowance without any technical justification. In fact, if viewed in context with the allowable areas in Table 503 of the IBC versus Table 5-B of the UBC, the resulting building areas allowed by the IBC are much greater than those allowed by the UBC.

Basically, the IBC will allow a two-story building to have an area up to 9 times greater than the basic allowable area in Table 503 and will allow a three-story or greater building to have an area up to 13.5 times greater. In comparison, the UBC will allow a building two or more stories in height to have a total floor area of up to 8 times that allowed in Table 503 for a one-story building. These multipliers are based on maximizing the allowable area increases for open space and automatic sprinklers. In effect, the liberal allowances in the IBC result in a reduction in the built-in fire resistive (passive) protection and an increase in combustible construction which, in turn, will eventually result in increased property damage due to fires over the long term.

The proposed revision to Table 503 simply takes Table 5-A out of the 1997 Uniform Building Code (UBC) and replaces Table 503 in the IBC. Table 5-A has also been modified using the appropriate IBC occupancy classifications substituted for the UBC use groups and the appropriate IBC types of construction designations substituted for the UBC types of construction. Thus, the height and area limits specified in the IBC are deleted and replaced with those specified in the 1997 UBC.

The reason for this significant proposed amendment to the IBC is to assure that the present level of fire and life safety being constructed into buildings under the 1997 UBC will be maintained when the IBC is adopted. Otherwise, the adoption of the 2003 IBC without the substituted height and area table and related amendments, in effect, will "lower the bar" for built-in fire resistive and

noncombustible construction that has been provided under the UBC. This lowering of the bar over time will result in greater property damage and the potential for more injuries and deaths caused by fires. This will also have an impact on fire fighter safety since buildings will be able to be built much larger without having to provide the same degree of fire resistance nor limit the use of combustible construction.

We can make this statement because we have conducted an analysis of the allowable heights and areas permitted by the IBC as compared to the 1997 UBC. The analysis clearly shows that for the vast majority of cases, especially for the higher types of construction, the IBC will allow substantially greater areas and taller buildings than the 1997 UBC. This has also been substantiated in two articles authored by Mark Kluver of the Portland Cement Association who made a comparison of the International Building Code (IBC) to the UBC for height and areas for certain occupancy classifications. It is also interesting to note the differences in the fire loss records for various regions of the country as compared to the western region where the UBC is the dominant code adopted. These comparisons are shown and discussed in the two articles referenced above.

The IBC allows significantly greater areas and heights than the UBC for several reasons. First, the base allowable heights and areas were developed using the "lowest common denominator" approach which, in essence, took the greatest allowable heights and areas of any of the three regional model building codes for each occupancy (use group) and put them in the table as the base value. The stated purpose for that was to not cause existing buildings in any part of the country to be nonconforming with the IBC. Furthermore, the IBC allows the practice of "double dipping". This is the case where the building allowable area, as well as the building allowable height, is permitted to be increased with the installation of an automatic sprinkler system. As stated above, the UBC does not permit both increases to be taken in the same building. So under the UBC the designer needs to decide whether to use the sprinkler system for an increase in allowable area or, as an alternative, for an increase in the allowable height of a building. Another factor involves the total building area limit for multistory buildings. The UBC places a limit of twice that allowed for a single story building, whereas the IBC allows a tripling of the single story building area for buildings that are three or more stories in height. This can result in a significantly greater allowable area as compared to the UBC.

We should point out that during preliminary studies of the adoption of the IBC by the state of California and Clark County, NV, their comparisons of the allowable heights and areas between the UBC and the IBC raised significant concerns. In fact, part of the reason for the State of California deciding to readopt the 1997 UBC instead of adopting the IBC was because the State Fire Marshal was concerned that the level of fire and life safety in the IBC would not be comparable to that being presently provided in the state, especially as it related to the allowable heights and area versus types of construction. So California decided to conduct a more detailed study of both the IBC and NFPA 5000 in comparison to the UBC to clearly determine the differences in the level of fire and life safety being provided by those codes.

Regarding Clark County, NV, the code enforcement officials have expressed concerns that they need to be able to maintain the level of fire and life safety they currently provide based on the adoption of the 1997 UBC which will require significant amendments to the IBC including the height and area tables to achieve that. We would refer you to a website where this process has been documented and made available for public review. It is www.co.clark.nv.us/development_services/bldg_codes/00ibc _amend.pdf.

Analysis: The only group that did not change height and area requirements is Group U. The proposal does not include requirements for Group A-5 except where ≤ 300 occupants

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

G93-04/05

Committee Action: **Disapproved**

Committee Reason: There is no need to rework this concept. This is just a piece of a whole system that must be considered together. The proposed text was disapproved for consistency with G92-04/05.

Assembly Action: **None**

G98-04/05 D

504.2, 506.3

Proponent: Vickie Lovell, President, Intercode Inc., Delray Beach, FL, representing, Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

504.2 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 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story. These increases ~~are~~ shall be 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 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four

stories or 60 feet (18 288 mm), respectively.

Exceptions: The maximum height and maximum number of stories increases shall not be permitted for the following conditions:

1. Group I-2 of Type IIB, III, IV or V construction.
2. Group H-1, H-2, H-3 or H-5.
3. Fire-resistance rating substitution in accordance with Table 601, Note d.
4. Buildings of Type IIB, IIIB, or VB construction where the area increase permitted by Section 506.3 is used.

506.3 Automatic sprinkler system increase. Where a building is protected 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 = 200 percent) for multistory buildings and an additional 300 percent (I_s = 300 percent) for single-story buildings. These increases ~~are~~ shall be permitted in addition to the height and story increases in accordance with Section 504.2.

Exceptions: The area limitation increases shall not be permitted for the following conditions:

1. Buildings with an occupancy in Group H-1, H-2 or H-3.
2. Fire-resistance rating substitution in accordance with Table 601, Note d.
3. Buildings of Type IIB, IIIB, or VB construction where the height and story increase permitted by Section 504.2 is used.

Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) strongly supports the concept of balanced design in building construction. This means that there should not be an over reliance on any single fire protection strategy or method used to provide the code required minimum level of fire and life safety. That is the reason we submitted this code change proposal. We believe the International Building Code (IBC) relies too heavily on automatic sprinkler systems to allow increases in the building allowable area and allowable height for the non-rated types of construction based upon the occupancy classification of the building. We are even more concerned that the IBC generally allows significantly greater areas and heights than any of the predecessor legacy codes. Not only are the base floor areas and building heights greater, but also the total allowable building areas and heights when the allowable area and height increases for both frontage and automatic sprinkler system protection are taken advantage of. This is especially true for the higher types of construction, i.e. Types I, II, and III.

The purpose of this code change proposal is to eliminate the current allowable use permitted by the International Building Code (IBC) for allowing both a building area increase and a height increase in the building's total height and story height in buildings of Type IIB, IIIB, or VB construction where the building is protected throughout with an approved automatic sprinkler system installed in accordance with NFPA 13. These are the buildings allowed to be constructed without built-in fire resistance. In our opinion, this compounds the current problem in the IBC that allows, for the most part, already larger areas and heights of these buildings than those previously allowed by the three legacy model building codes. In fact, the 1997 ICBO Uniform Building Code (UBC) never allowed both of these increases for automatic sprinkler systems. That code specifically stated that either increase could be used but they could not be used together for the same building. Thus, a building designer could take advantage of the sprinkler system to obtain an area increase or a height increase but not both. It should also be noted that the 1999 SBCCI Standard Building Code (SBC) only allowed both increases for an automatic sprinkler system for a limited number of conditions.

Our concern is that this double trade-off for automatic sprinkler systems will allow for larger non-rated buildings in terms of volume based on increased floor area and increased building height with lesser use of built-in fire resistive protection and greater use of combustible construction. This trade-off is basically one of being able to take a building construction type from a one hour fire resistance rated throughout to a non fire resistance rated building which could be as tall as 5 stories and 75 feet in height.

This proposal is a follow up to Code Change G103-03/04 which applied to all buildings in all types of construction. That code change was recommended for disapproval during the last code development cycle. As a result, we have focused this code change proposal to only apply to those types of construction that do not require built-in fire resistive protection, i.e., Types IIB, IIIB, and VB construction. These are typically known as non-rated types of construction.

This code change proposal takes a simplistic approach to addressing this concern by simply not allowing both an area increase and a height increase to be taken at the same time for any given building of Type IIB, IIIB, or VB construction where it is protected throughout with an automatic sprinkler system. This "double dipping" presently allowed by the IBC has a significant impact on buildings up to three stories in height and a lesser impact on taller buildings because of the maximum 3 x area limitation specified in Section 506.4.

To give an example of how the IBC provides much greater building areas and heights than the legacy codes, we have developed a comparison of a Group B office building of Type IIB construction with the IBC allowable heights and areas to the allowable heights and areas of the 1999 BOCA National Building Code, 1997 ICBO Uniform Building Code, and 1999 SBCCI Standard Building Code. Please refer to the following table:

Example: Group B Office Building
Type IIB Construction

	ICC IBC		BOCA NBC		ICBO UBC		SBCCI SBC	
	Area	Height	Area	Height	Area	Height	Area	Height
Base	23,000 s.f.	4 st. 55'	14,400 s.f.	3 st. 40'	12,000 s.f.	2 st. 55'	17,000 s.f.	2 st. 55'
Max.	86,250 s.f.	5 st. 75'	47,520 s.f.	4 st. 60'	48,000 s.f.	2 st. 55' or	51,000 s.f.	5 st. 55'
	As Revised by this Proposal							
					24,000 s.f.	3 st. 55'		
Max.	86,250 s.f.	4 st. 55' or						
Max.	40,250 s.f.	5 st. 75'						
Total	69,000 s.f.	4 st. 55'	43,200 s.f.	3 st. 40'	24,000 s.f.	2 st. 55'	34,000 s.f.	2 st. 55'
Max.	258,750 s.f.	5 st. 75'	190,080 s.f.	4 st. 60'	96,000 s.f.	2 st. 55' or	204,000 s.f.	4 st. 55' or
	As Revised by this Proposal							
					48,000 s.f.	3 st. 55'	255,000 s.f.	5 st. 55'
Max.	258,750 s.f.	4 st. 55' or						
Max.	120,750 s.f	5 st. 75'						

In those cases we do not believe that it is appropriate to allow significant increases in building volume based on both a height increase and an area increase for the installation of an NFPA 13 automatic sprinkler system. In essence, we are trading-off one hour fire resistive construction throughout for the installation of an automatic sprinkler system. Not only is this a reduction in built-in fire resistive protection, it is actually an elimination of built-in fire resistive protection. Certainly, it is one matter to reduce the amount of fire resistance by one hour, but to eliminate it entirely does not appear to be prudent. We believe that trade-offs of this nature should be based on a very high confidence that failure is not likely to occur in the system upon which the trade-off is based. Our question is this: Is the well documented successful performance rate of 5 out of 6 sprinklered building fires (approximately 85%) for automatic sprinklers sufficiently reliable to allow such a trade-off? In our opinion the answer is an unequivocal no. Therefore, we urge the Committee to approve this code change proposal which will then eliminate the use of an automatic sprinkler system increase for both height and area of buildings of non-rated types of construction: Types IIB, IIIB, and VB.

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

G98-04/05

Committee Action: Disapproved

Committee Reason: Technical justification was not provided for this change.

Assembly Action: None

G112-04/05 D
506.2, 506.2.1

Proponent: Stephen V. Skalko, P.E., Portland Cement Association, Macon, GA

Revise as follows:

506.2 (Supp) 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)~~ 30 feet (9144 mm), the frontage increase shall be determined in accordance with the following:

For MULTI-STORY BUILDINGS
(No changes to Equations 5-1 ms, 5-2 ms)

For SINGLE-STORY BUILDINGS
(No changes to Equations 5-1 ss, 5-2 ss)

where:

I_f	=	Area increase due to frontage.
F	=	Building perimeter which fronts on a public way or open space having ~~20 feet (6096 mm)~~ 30 feet (9144 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 Width limits. W must be at least ~~20 feet (6096 mm)~~ 30 feet (9144 mm) and the quantity W divided by 30 shall not exceed 1.0. ~~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 between 20 and 30 feet (6096 and 9144 mm).~~

Exception: The quantity W divided by 30 shall be permitted to not exceed 2.0 when all of the following conditions exist:

1. The building is permitted to be unlimited in area by Section 507; and
2. The only provision preventing unlimited area is compliance with the 60-foot (18 288 mm) public way or yard requirement, as applicable.

Reason: Further examination of the allowable area increases of the IBC show that for buildings where the area can be increased due to open space with a width between 20 and 30 feet, significantly larger areas are permitted than were allowed by any of the three legacy codes. This occurs because the IBC allows a 50% area increase at 20 feet, whereas the NBC and SBC allowed no increase at less than 30 feet, and the UBC only allowed a 5% area increase for each foot of width over 20 feet. All of this assumes that 100% of the building perimeter fronts on the minimum width space (i.e., 20 feet) to qualify for the area increase. Not until the width of the open space is 30 feet does the UBC grant an area increase of 50%.

The attached tables compare the relative allowable areas of several common building types under the IBC using Section 506.2 to the three legacy codes. In all cases considered, the allowable areas for the buildings considered under the IBC with an open space having a width between 20 feet and less than 30 feet exceed the allowable areas of the legacy codes. This is shown by the ratio of allowable IBC area to each of the legacy codes (NBC, SBC & UBC) being greater than one in every cell of the table except when the separation distances are 30 feet or more. To correct this and bring areas more in line with what was permitted by the legacy codes, the open space needs to be a minimum of 30 feet in width before an area increase for frontage is granted. Even with this change, allowable areas under the IBC where less than 30 feet of open space is provided will still equal or exceed those of the three legacy codes.

TABLE 1

Ratio of Allowable Area Permitted by IBC to that Permitted by NBC For Various Separation Distances and Select Occupancies

IBC		Type of Construction					
Occupancy	NBC	2B	2C	3A	3B	5A	5B
Group	IBC	2A	2B	3A	3B	5A	5B
	NBC AA[0]	22,500	14,400	19,800	14,400	15,300	7,200
	IBC AA[0]	37,500	23,000	28,500	19,000	18,000	9,000
	<20[1]	1.67	1.60	1.44	1.32	1.18	1.25
B	20[2]	2.50	2.40	2.16	1.98	1.76	1.88
	25[3]	2.71	2.60	2.34	2.14	1.91	2.03
	<30[4]	2.92	2.80	2.52	2.31	2.06	2.19
	30[5]	1.17	1.12	1.01	0.92	0.82	0.88
	NBC AA[0]	15,000	9,600	13,200	9,600	10,200	4,800
	IBC AA[0]	21,500	12,500	18,500	12,500	14,000	9,000
	<20[1]	1.43	1.30	1.40	1.30	1.37	1.88
M	20[2]	2.15	1.95	2.10	1.95	2.06	2.81
	25[3]	2.33	2.12	2.28	2.12	2.23	3.05
	<30[4]	2.51	2.28	2.45	2.28	2.40	3.28
	30[5]	1.00	0.91	0.98	0.91	0.96	1.31
	NBC AA[0]	13,125	8,400	11,550	8,400	8,925	4,200
	IBC AA[0]	26,000	17,500	26,000	17,500	14,000	9,000
	<20[1]	1.98	2.08	2.25	2.08	1.57	2.14
S1	20[2]	2.97	3.13	3.38	3.13	2.35	3.21
	25[3]	3.22	3.39	3.66	3.39	2.55	3.48
	<30[4]	3.47	3.65	3.94	3.65	2.75	3.75
	30[5]	1.39	1.46	1.58	1.46	1.10	1.50

0. AA - Allowable area from code's height and area table.
1. Fire separation distance less than 20 ft. - no area increase permitted by either code.
2. Fire separation distance 20 ft. - area increase permitted by IBC but not by NBC.
3. Fire separation distance 25 ft. - area increase permitted by IBC but not by NBC.
4. Fire separation distance slightly less than 30 ft. - area increase permitted by IBC but not by NBC.
5. Fire separation distance 30 ft. - area increase permitted by both codes.

TABLE 2

Ratio of Allowable Area Permitted by IBC to that Permitted by SBC For Various Separation Distances and Select Occupancies

IBC		Type of Construction					
Occupancy	SBC	IV - 1-HR.	IV UNP.	V - 1-HR.	V UNP.	VI - 1-HR.	VI UNP.
Group	IBC	2A	2B	3A	3B	5A	5B
	SBC AA[0]	25,500	17,000	21,000	14,000	13,500	9,000
	IBC AA[0]	37,500	23,000	28,500	19,000	18,000	9,000
	<20[1]	1.47	1.35	1.36	1.36	1.33	1.00
B	20[2]	2.21	2.03	2.04	2.04	2.00	1.50
	25[3]	2.39	2.20	2.21	2.21	2.17	1.63
	<30[4]	2.57	2.37	2.38	2.38	2.33	1.75
	30[5]	1.29	1.18	1.19	1.19	1.17	0.88
	SBC AA[0]	13,500	9,000	13,500	9,000	9,000	6,000
	IBC AA[0]	21,500	12,500	18,500	12,500	14,000	9,000
	<20[1]	1.59	1.39	1.37	1.39	1.56	1.50
M	20[2]	2.39	2.08	2.06	2.08	2.33	2.25
	25[3]	2.59	2.26	2.23	2.26	2.53	2.44
	<30[4]	2.79	2.43	2.40	2.43	2.72	2.63
	30[5]	1.39	1.22	1.20	1.22	1.36	1.31
	SBC AA[0]	24,000	16,000	24,000	16,000	9,000	6,000
	IBC AA[0]	26,000	17,500	26,000	17,500	14,000	9,000
	<20[1]	1.08	1.09	1.08	1.09	1.56	1.50
S1	20[2]	1.63	1.64	1.63	1.64	2.33	2.25
	25[3]	1.76	1.78	1.76	1.78	2.53	2.44
	<30[4]	1.90	1.91	1.90	1.91	2.72	2.63
	30[5]	0.95	0.96	0.95	0.96	1.36	1.31

0. AA - Allowable area from code's height and area table.
1. Fire separation distance less than 20 ft. - no area increase permitted by either code.
2. Fire separation distance 20 ft. - area increase permitted by IBC but not by SBC.
3. Fire separation distance 25 ft. - area increase permitted by IBC but not by SBC.
4. Fire separation distance slightly less than 30 ft. - area increase permitted by IBC but not by SBC.
5. Fire separation distance 30 ft. - area increase permitted by both codes.

TABLE 3

Ratio of Allowable Area Permitted by IBC to that Permitted by UBC For Various Separation Distances and Select Occupancies

IBC		Type of Construction					
Occupancy	UBC	II - 1 HR.	II - N	III -1 HR.	III - N	V - 1 HR.	V - N
Group	IBC	2A	2B	3A	3B	5A	5B
	UBC AA[0]	18,000	12,000	18,000	12,000	14,000	8,000
	IBC AA[0]	37,500	23,000	28,500	19,000	18,000	9,000
	<20[1]	2.08	1.92	1.58	1.58	1.29	1.13
B	20[2]	3.13	2.88	2.38	2.38	1.93	1.69
	25[3]	2.71	2.49	2.06	2.06	1.67	1.46
	30[4]	2.43	2.24	1.85	1.85	1.50	1.31
	40[5]	1.82	1.68	1.39	1.39	1.13	0.98
	UBC AA[0]	18,000	12,000	18,000	12,000	14,000	8,000
	IBC AA[0]	21,500	12,500	18,500	12,500	14,000	9,000
	<20[1]	1.19	1.04	1.03	1.04	1.00	1.13
M	20[2]	1.79	1.56	1.54	1.56	1.50	1.69
	25[3]	1.55	1.35	1.34	1.35	1.30	1.46
	30[4]	1.39	1.22	1.20	1.22	1.17	1.31
	40[5]	1.05	0.91	0.90	0.91	0.88	0.98
	UBC AA[0]	18,000	12,000	18,000	12,000	14,000	8,000
	IBC AA[0]	26,000	17,500	26,000	17,500	14,000	9,000
	<20[1]	1.44	1.46	1.44	1.46	1.00	1.13
S1	20[2]	2.17	2.19	2.17	2.19	1.50	1.69
	25[3]	1.88	1.90	1.88	1.90	1.30	1.46
	30[4]	1.69	1.70	1.69	1.70	1.17	1.31
	40[5]	1.26	1.28	1.26	1.28	0.88	0.98

0. AA - Allowable area from code's height and area table.
1. Fire separation distance less than 20 ft. - no area increase permitted by either code.
2. Fire separation distance 20 ft. - area increase permitted by IBC but not by UBC.
3. Fire separation distance 25 ft. - area increase permitted by both codes.
4. Fire separation distance 30 ft. - maximum area increase permitted by IBC but not by UBC.
5. Fire separation distance 40 ft. - minimum distance for maximum area increase permitted UBC.

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

G112-04/05

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as requested by the proponent.

Assembly Action: **None**

G118-04/05 D

506.4

Proponent: Vickie Lovell, Intercode Inc., Delray Beach, FL, representing Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

506.4 Area determination. The maximum area of a building with more than one story shall be determined by multiplying the allowable area of the first floor (A_a), as determined in Section 506.1, by 2. ~~the number of stories as listed below.~~

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

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 floor (A_a), as determined in Section 506.1 by the number of stories.~~

Reason: This code change proposal will result in the reduction of the total allowable building area from three times that allowed for a single floor area to two times that allowed based on the calculations of Aa (allowable area) per floor as determined in Section 506.1. There have been previous attempts to revise Table 503 Allowable Height and Building Areas using several different approaches, all of which have been unsuccessful. This proposal takes a somewhat different approach to address the same concerns relating to the allowable height and building areas in the International Building Code (IBC) which we believe to be significantly greater in terms of both allowable areas and allowable heights than the previous legacy model building codes. Our basic concern is that the overall volume of the building determined by the allowable area per floor and the allowable number of stories and height of the building is for many cases greater than that allowed by any of the previous legacy model building codes. By limiting the total building area to twice that allowed for a single floor, the volume of the building will be significantly reduced. Generally speaking, the increase in the volume of the building results, in effect, in lesser built-in fire resistive protection and greater use of combustible construction. Over time, this will result in an increased level of property loss from fire.

The proposed approach of limiting the total allowable building area to twice that allowed for a single floor area is the same as that used in the 1997 ICBO Uniform Building Code (UBC). It is also similar to that used in the 1999 BOCA National Building Code (NBC) which had allowable areas per floor allowed to be the same for one and two story buildings but which was reduced for buildings greater than two stories in area.

We have conducted a comparison of the total maximum allowable building areas for the three legacy model building codes as compared to that currently allowed by the IBC. This comparison shows that reducing the total allowable building area from a maximum of three times that allowed for a single floor area to twice that allowed will more closely align the maximum allowable building areas in the IBC with the previous legacy model building codes upon which the IBC is based. Taking this approach should maintain the current fire record of property loss that is the result of the enforcement of the previous three legacy model building codes, rather than taking the chance of increasing fire losses by allowing an overall increase in the total building areas constructed under the IBC.

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

G118-04/05

Committee Action: **Disapproved**

Committee Reason: This code change proposal contains no substantiation for reducing total allowable areas in a building and is entirely too restrictive as written.

Assembly Action: **None**

G139-04/05 D
Table 601, Table 602

Proponent: James A. Burns, National Association of State Fire Marshals, Washington, D.C.,

Revise as follows:

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A[d]	B	A[d]	B	HT	A[d]	B
Structural frame[a] Including columns, girders, trusses	3[b]	2[b]	1	0	1	0	~~HT~~ 1/HT	1	0
Bearing walls									
Exterior[f]	~~3~~ 4	~~2~~ 4	1	0	~~2~~ 4	~~2~~ 4	~~2~~ 4	1	0
Interior	3[b]	2[b]	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interiors[e]	~~0~~	~~0~~	~~0~~	0	~~0~~	0	~~See Section 602.4.6~~	~~0~~	0
Floor construction Including supporting beams and joists	2	2	1	0	1	0	HT	1	0
Roof construction Including supporting beams and joists	~~1~~ 1/2[c]	1[c]	1[c]	0	1[c]	0	HT	1[c]	0

For SI: 1 foot = 304.8 mm.

a. The structural frame shall be considered to be the columns and the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads. The members of floor or roof panels which have no connection to the columns shall be considered secondary members and not a part of the structural frame.

b. Roof supports: Fire-resistance ratings of structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

c. 1. Except in Factory-Industrial (F-1), Hazardous (H), Mercantile (M) and Moderate-Hazard Storage (S 1) occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

2. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire resistance rating is required.

3. In Type I and II construction, fire-retardant-treated wood shall be allowed in buildings including girders and trusses as part of the roof construction when the building is:

i. Two stories or less in height;

ii Type II construction over two stories; or

iii. Type I construction over two stories and the vertical distance from the upper floor to the roof is 20 feet or more.

d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1 hour fire-resistance- rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with

Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.

e. Not less than the fire-resistance rating required by other sections of this code.

f. Not less than the fire-resistance rating based on fire separation distance (see Table 602).

TABLE 602 (Supp)
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE[a]

FIRE SEPARATION DISTANCE (feet)	TYPE OF CONSTRUCTION	GROUP H	GROUP F-1, M, S-1	GROUP A, B, E,F- 2, I, R[b], S-2, U
x <5[c]	All	~~3~~ 4	~~2~~ 4	1
5 ≤ x < 10 10 ≤ x <30	IA Others	~~3~~ 4 ~~2~~ 4	~~2~~ 4 ~~1~~ 4	1 1
≥10 <30	IA, IB IIB, VB Others	~~2~~ 4 1 1	1 ~~0~~ 1 1	1 ~~0~~ 1 1
x ≥30	All	~~0~~ 1	~~0~~ 1	~~0~~ 1

For SI: 1 foot = 304.8 mm.

a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.

b. Group R-3 and Group U when used as accessory to Group R-3, as applicable in Section 101.2 shall not be required to have a fire-resistance rating where the fire separation distance is 3 feet or more.

c. See Section 503.2 for party walls.

Reason: Tables 601 and 602, as currently written, allow for a significant reduction in the fire-resistive construction requirements of critical areas where automatic sprinklers are installed. It is the position of the National Association of State Fire Marshals (NASFM) that such a significant reduction in fire-resistive construction requirements places too much of the fire burden on active fire suppression measures. The proposed revisions to the values[1] in Tables 601 and 602 acknowledge the importance of balanced fire protection within a building's environment.[2]

The stated benefit of amending Tables 601 and 602 in the 2003 International Building Code was to encourage greater use of automatic fire sprinklers. But the cost of these amendments resulted in a dangerous reduction to the fire ratings of structural elements. In addition, Table 601 was further reduced in some areas from 2000 to 2003.

NASFM, through its Partnership for Safer Buildings (the Partnership), has been investigating the adequacy of the fire safety provisions of the new model codes, and has concluded that in many instances the fire protection requirements in the new model building codes[3] are significantly weaker than the requirements found in the older regional model building codes.[4] These changes were made without a technical basis,[5] at a time when the US was experiencing an increase in the rate of firefighter deaths attributed to structural collapse,[6] and after the National Institute of Occupational Safety and Health issued an alert regarding the "Prevention of Injuries and Deaths of Fire Fighters Due to Structural Collapse,"[7] which explicitly drew attention to the adequacy of passive fire protection.

Fire-resistive construction requirements are crucial, especially given the contents of today's buildings. For example, the National Institute of Standards and Technology (NIST) determined that the fuel load present in a typical office workstation is capable of producing a significant fire for an hour.[8] Yet, the model fire codes regard workstations as ordinary hazards and, accordingly, allow a relatively modest level of active protection. In 1996, NIST, at the request of the General Services Administration, conducted a study that determined that this level of active fire protection might not be sufficient to suppress a fire in a single workstation.[9]

These findings are particularly troubling when considering that the trade-offs permitted under Tables 601and 602 substantially reduce passive fire protection without providing for levels of active fire protection sufficient to suppress real world fires in commercial and other occupancies.

Public policy places a high value on the safety and security of emergency responders. A person who intentionally endangers

a law enforcement officer faces imprisonment and fines. The net effect of reducing the hourly ratings of critical building elements is that firefighters may be at greater risk of death and injury from structural collapse.

The fire-resistive construction requirements of critical areas must be restored to the previous levels, and may, along with greater requirements for active protection, require further upward adjustments as more is known about the fuel load in these occupancies.

The absence of a proper technical basis for trade-offs is sufficient justification to call for fire-rating requirements to remain stringent.[10] NASFM is sympathetic to the notion of economic incentives to achieve higher levels of safety – which is the justification for trade-offs. However, NASFM sees no value in a system of incentives that allows reductions in the levels of safety, or encourages building owners to meet minimum levels of fire protection. Tradeoffs between active and passive technologies make no more sense than allowing stronger bumpers in exchange for less effective brakes on a car. While economic realities make the need for some tradeoffs inevitable, the pendulum has swung too far in favor of economics over safety. Trade-offs that allow for the significant reduction of passive fire protection materials in order to install sprinklers are not supported by the science and clearly do not serve the public interest.[11]

1 The Uniform Building Code provides a conservative approach to public safety, property protection, and fire fighters' safety within the constructed environment.
2 NASFM has also submitted a proposal to require that all existing buildings that would require automatic fire sprinkler systems under the provisions of Section 903.2.1 through 903.2.10 are required to install said system in compliance with Sections 903.3.1 through 903.3.7.
3 The Partnership's Codes Assessment Subcommittee examined the 2000 edition of the International Code Council's *International Building Code*™ (IBC) and the newly released building code from the National Fire Protection Association, NFPA 5000 ™, Building Construction & Safety Code (2003 edition).
4 The International Building Code (IBC) and the 1997 Edition of the Uniform Building Code (UBC) have a vastly different approach to fire-rated substitutions permitted with the use of an automatic sprinkler system.
5 Fact Sheet: "Key Findings of NIST's June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster," Available at http://www.nist.gov/public_affairs/factsheet/wtc_keyfindings.htm
6 "US Fire Service Fatalities in Structure Fire, 1977-2000," NFPA, 2000.
See http://www.nfpa.org/PDF/FFFStructure.PDF?src=nfpa
7 NIOSH Publication No. 99-146. See http://www.cdc.gov/niosh/99-146.html
8 Fact Sheet: "Key Findings of NIST's June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster," Available at http://www.nist.gov/public_affairs/factsheet/wtc_keyfindings.htm
9 This finding was based on the study *Office Work Station Heat Release Rate Study*: Full Scale vs. Bench Scale, in Interflam '96. 7th International Interflam Conference, March 26-28, 1996, Cambridge, England. Proceedings. Sponsored by Interscience Communications Ltd.; National Institute of Standards and Technology; Building Research Establishment; and Society of Fire Protection Engineers; Swedish National Testing and Research Institute. Interflam '96. International Interflam Conference, 7th Proceedings. March 26-28, 1996, Cambridge, England, Interscience Communications Ltd., London, England, Franks, C. A.; Grayson, S., Editors, 47-55 pp, 1996.
10 This position is also supported by the findings of the studies conducted by NIST and the City of New York. According to NIST's June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster, "While sprinklers improve safety in most common building fires and prevent them from becoming large fires, the technical basis is not available to establish the sprinkler trade-off in current codes which allows for a lower fire rating to be used for structural components in sprinklered buildings." Available at: http://www.nist.gov/public_affairs/factsheet/wtc_keyfindings.htm
11 A trade-off that creates an incentive for the installation of sprinklers, but also keeps passive requirements at an adequate level, is an appropriate compromise. This proposal allows for certain reductions when sprinklers are installed but does not reduce passive protection to the point where occupant and first responder safety may be in jeopardy should a sprinkler not activate.

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

G139-04/05

Errata: Replace Table 601 as follows:

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A[d]	B	A[d]	B	HT	A[d]	B
Structural frame[a] Including columns, girders, trusses	3[b]	2[b]	1	0	1	0	~~HT~~ 1/HT	1	0
Bearing walls Exterior[f]	~~3~~ 4	~~2~~ 4	1	0	~~2~~ 4	~~2~~ 4	~~2~~ 4	1	0
Interior	3[b]	2[b]	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[e]	~~0~~ 1	~~0~~ 1	~~0~~ 1	0	~~0~~ 1	0	~~See Section 602.4.6~~ 1/HT	~~0~~ 1	0

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A[d]	B	A[d]	B	HT	A[d]	B
Floor construction Including supporting beams and joists	2	2	1	0	1	0	HT	1	0
Roof construction Including supporting beams and joists	~~1 1/2[c]~~ 2	1[c]	1[c]	0	1[c]	0	HT	1[c]	0

Committee Action: **Disapproved**

Committee Reason: The proposed text appears to be from the 1997 UBC. The justification lacks technical substantiation and is therefore insufficient to warrant this change. For instance, some of the fire resistance ratings went from 1 hour rating to 4 hours. Further, a more comprehensive revision to the entire code would be necessary to ensure that the table is compatible with all of the provisions of this code.

Assembly Action: **None**

FS23-04/05 D
705.4

Proponent: James A. Burns, National Association of State Fire Marshals

1. Delete and substitute as follows:

~~**705.4 Fire-resistance rating.** Fire walls shall have a fire-resistance rating of not less than that required by Table 705.4.~~

705.4 Fire-resistance ratings. Fire walls shall have fire-resistance rating of not less than 4 hours.

Exception: Fire walls separating portions of a building in which both portions are protected by an automatic fire sprinkler system, in accordance with Section 903, are permitted to have the fire-resistance rating reduced by 1 hour except in groups H-1 and H-2 where no reduction is permitted.

2. Delete table without substitution:

~~**TABLE 705.4**~~
~~**FIRE WALL FIRE-RESISTANCE RATINGS**~~

Reason: The fire resistance ratings, as specified under **Table 705.4**, IBC, place a considerable burden on active fire suppression systems. It is the position of the National Association of State Fire Marshals (NASFM) that **both** active and passive fire protection must be in place at adequate levels to achieve a balanced fire protection environment for safety from fire for the occupants, fire fighters and other emergency responders.[1] Used together, they can provide a superior level of fire and life safety that neither can provide alone. NASFM finds it problematic that the built-in fire resistant protection of fire walls has, in many instances, been arbitrarily reduced.

NASFM, through its Partnership for Safer Buildings (the Partnership), has been investigating the adequacy of the fire safety provisions of the new model codes, and has concluded that in many instances the fire protection requirements in the new model building codes[2] are significantly weaker than the requirements found in the older regional model building codes.[3] These changes were made without a technical basis,[4] at a time when the US was experiencing an increase in the rate of firefighter deaths attributed to structural collapse,[5] and after the National Institute of Occupational Safety and Health issued an alert regarding the "Prevention of Injuries and Deaths of Fire Fighters Due to Structural Collapse,"[6] which explicitly drew attention to the adequacy of passive fire protection.

Fire-resistive construction requirements such as fire walls are crucial to life safety, especially given the contents of today's buildings. For example, the National Institute of Standards and Technology (NIST) determined that the fuel load present in a typical office workstation is capable of producing a significant fire for an hour.[7] Yet, the model fire codes regard workstations as ordinary hazards and, accordingly, allow a relatively modest level of active protection. In 1996, NIST, at the request of the General Services Administration, conducted a study that determined that this level of active fire protection might not be sufficient to suppress a fire in a single workstation.[8] These findings support the importance of redundancy in fire protection.

Public policy places a high value on the safety and security of emergency responders. A person who intentionally endangers a law enforcement officer faces imprisonment and fines. The net effect of reducing the hourly ratings of critical building elements such as fire walls is that firefighters may be at greater risk of death and injury from structural collapse.

The absence of a proper technical basis for trade-offs is sufficient justification to call for fire-rating requirements to remain stringent.[9] NASFM is sympathetic to the notion of economic incentives to achieve higher levels of safety -- which is the justification for trade-offs. However, NASFM sees no value in a system of incentives that allows reductions in the levels of safety, or encourages building owners to meet minimum levels of fire protection. Trade-offs between active and passive technologies make no more sense than allowing stronger bumpers in exchange for less effective brakes on a car. While economic realities make the need for *some* tradeoffs inevitable, the pendulum has swung too far in favor of economics over safety. Trade-offs that allow for the significant reduction of passive fire protection materials in order to install sprinklers are not supported by the science and clearly do not serve the public interest.

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1 NASFM has also submitted a proposal to require that all existing buildings that would require automatic fire sprinkler systems under the provisions of Section 903.2.1 through 903.2.10 are required to install said system in compliance with Sections 903.3.1 through 903.3.7.

2 The Partnership's Codes Assessment Subcommittee examined the 2000 edition of the International Code Council's *International Building Code*™ (IBC) and the newly released building code from the National Fire Protection Association, NFPA 5000 ™, *Building Construction & Safety Code* (2003 edition).

3The International Building Code (IBC) and the 1997 Edition of the *Uniform Building Code* (UBC) have a vastly different approach to fire-rated substitutions permitted with the use of an automatic sprinkler system.

4 Fact Sheet: "Key Findings of NIST's June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster," Available at http://www.nist.gov/public_affairs/factsheet/wtc_keyfindings.htm

5 "US Fire Service Fatalities in Structure Fire, 1977-2000," NFPA, 2000.
See http://www.nfpa.org/PDF/FFFStructure.PDF?src=nfpa

6 NIOSH Publication No. 99-146. See http://www.cdc.gov/niosh/99-146.html

7 Fact Sheet: "Key Findings of NIST's June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster," Available at http://www.nist.gov/public_affairs/factsheet/wtc_keyfindings.htm

8 This finding was based on the study *Office Work Station Heat Release Rate Study: Full Scale vs. Bench Scale*, in Interflam '96. 7th International Interflam Conference, March 26-28, 1996, Cambridge, England. Proceedings. Sponsored by Interscience Communications Ltd.; National Institute of Standards and Technology; Building Research Establishment; and Society of Fire Protection Engineers; Swedish National Testing and Research Institute. Interflam '96. International Interflam Conference, 7th Proceedings. March 26-28, 1996, Cambridge, England, Interscience Communications Ltd., London, England, Franks, C. A.; Grayson, S., Editors, 47-55 pp, 1996.

9 This position is also supported by the findings of the studies conducted by NIST and the City of New York. According to NIST's June 2004 Progress Report on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster, "While sprinklers improve safety in most common building fires and prevent them from becoming large fires, the technical basis is not available to establish the sprinkler trade-off in current codes which allows for a lower fire rating to be used for structural components in sprinklered buildings." Available at: http://www.nist.gov/public_affairs/factsheet/wtc_keyfindings.htm

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

FS23-04/05

Committee Action: **Disapproved**

Committee Reason: The committee felt that the current code requirements for variable fire resistance ratings of fire walls based upon the adjacent occupancies is an acceptable, viable, proven risk assessment based upon anticipated fuel loads in the adjacent compartments. This increase in required fire resistance rating has no technical justification.

Assembly Action: **None**

FS43-04/05 D
707.14.1

Proponent: Dave Frable, US General Services Administration, Chicago, IL

Revise as follows:

707.14.1 (Supp) Elevator lobby. An elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby shall separate the elevator shaft enclosure doors from each floor by fire partitions and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. through 6. (No change to current text)
7. In Group B occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.1.1, enclosed elevator lobbies are not required.

Reason: The purpose of this code change is to acknowledge that office buildings protected by an operational automatic fire sprinkler system provide an acceptable level of safety for building occupants and therefore does not warrant the need for an enclosed elevator lobby. Research has shown that sprinklered fires in office buildings do not represent any hazards to occupants away the fire origin[1]. This is because the sprinkler system activates and extinguishes the fire typically before it releases significant energy. Therefore, little or no smoke or gases enter the elevator hoistway and therefore no smoke or gases reach remote locations regardless the height of the office building.

It is also widely accepted that operating fire sprinklers will prevent room flashover and full floor fires, and will limit the size of room fires[2].

Therefore one can conclude that enclosed elevator lobbies are not necessary in office buildings protected throughout by an operational automatic fire sprinkler system. This conclusion can also be substantiated from a paper presented by Dr. John Klote at the Elevator Symposium on Emergency Use of Elevators in March 2004[1]. Past studies also indicate that the operational reliability for a typical commercial automatic fire sprinkler system is about 95%[3].

The purpose of the *International Building Code* is to provide minimum requirements to safeguard occupants of buildings from fire and other hazards attributed to the built environment that are based on sound technical documentation. Also keep in mind that deaths are very rare in office buildings, even rarer in high-rise office buildings, and surpassingly rare in sprinklered high-rise office buildings.

Therefore, we believe the current requirement for enclosing elevator lobbies in office building protected throughout by an operational automatic fire sprinkler system has not been based on sound technical documentation and will significantly increase building construction and maintenance costs without increasing the overall safety to the building occupants. In conclusion:

1. No sound technical justification has been provided to justify the installation of elevator lobby enclosures when an office building is protected throughout by an operational automatic fire sprinkler system.
2. No technical substantiation has been provided that demonstrates how effective elevator lobby enclosures are in limiting smoke spread in a sprinklered office building.
3. No life loss statistics have been provided to support the rationale that the lack of elevator lobby separation in sprinklered office buildings impacts the safety of the building occupants.
4. Available research has shown that sprinklers typically reduce the energy or driving force produced by the fire which serves to limit smoke spread and therefore does not result in any significant threat away from region of the fire."

References:

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[1] Klote, J.H., Analysis of the Consequences of Smoke Migration through Elevator Shafts, Use of Elevators in Fires and Other Emergencies Workshop. Proceedings. Co-Sponsored by American Society of Mechanical Engineers (ASME International); National Institute of Standards and Technology (NIST); International Code Council (ICC); National Fire Protection Association (NFPA); U.S. Access Board and International Association of Fire Fighters (IAFF). March 2-4, 2004, Atlanta, GA,

[2] Guide on Methods for Evaluating Potential for Room Flashover, NFPA 555 2000 ed., Nat Fire Prot Assn, Quincy, MA

[3] Bukowski, R. W.; Budnick, E. K.; Schemel, C. F., Estimates of the Operational Reliability of Fire Protection Systems, International Conference on Fire Research and Engineering (ICFRE3), Third (3rd). Proceedings. October 4-8, 1999, Chicago, IL, Society of Fire Protection Engineers, Boston, MA, 87-98 pp, 1999.

Cost Impact: None

FS43-04/05

Committee Action: **Disapproved**

Committee Reason: The committee agreed with opponents that sprinklers were not a rational alternative to elevator lobbies, given that the purpose is prevention of smoke spread. Sprinklers are not necessarily an effective method of slowing or stopping spread of smoke.

Assembly Action: **None**

E17-04/05 AM
Table 1005.1; IFC [B] Table 1005.1

Proponent: Dave Frable, U.S. General Services Administration, Chicago, IL

Delete table and substitute as follows:

~~**TABLE 1005.1**~~
~~**EGRESS WIDTH PER OCCUPANT SERVED**~~

(Delete table and footnotes in their entirety)

TABLE 1005.1

EGRESS WIDTH PER OCCUPANT SERVED

OCCUPANCY	STAIRWAYS (inches per occupant)	OTHER EGRESS COMPONENTS (inches per occupant)
Occupancies other than those listed below	0.3	0.2
Hazardous: H-1, H-2, H-3 and H-4	0.7	0.4

For SI: 1 inch = 25.4 mm.

Reason: The intent of this code change is to revise the egress capacity factors in Table 1005.1 such that the concept of determining egress capacity for the components of the means of egress within a building is not a function of whether or not a building is protected by an automatic fire sprinkler system. Not all building emergencies that necessitate occupant egress either out of the building or within a building to a safe area are dependent on a fire sprinkler system. The egress capacity factors were unchanged since H occupancies are required to be sprinklered and typically always have a low occupant loads.

Cost Impact: None

E17-04/05

Committee Action: **Approved as Modified**

Revise the current text as follows:

Delete current Table 1005.1 and replace with the following:

TABLE 1005.1
EGRESS WIDTH PER OCCUPANT SERVED

OCCUPANCY	STAIRWAYS (inches per occupant)	OTHER EGRESS COMPONENTS (inches per occupant)
All occupancies	0.3	0.2

For SI: 1 inch = 25.4 meters

Committee Reason: There are other reasons for evacuation than fire emergencies, therefore the required clear width per occupant should not be tied to sprinkler systems being provided. The committee felt that in most cases, the number of exits required would result in more than adequate clear width so this new table would not significantly effect the width of stairways or other egress components.

Assembly Action: **None**

E22-04/05 D
1007.2, 1007.3, 1007.4; IFC [B] 1007.2, [B] 1007.3, [B] 1007.4

Proponent: Brian Black, United Spinal Association, Buffalo, NY

Revise as follows:

1007.2 (Supp) Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with Section 1104.
2. Accessible routes complying with Section 1104.. Stairways within exit enclosures complying with Sections 1007.3 and 1019.1.
3. Elevators complying with Section 1007.4.
4. Platform lifts complying with Section 1007.5.
5. Horizontal exits.
6. ~~Smoke barriers.~~ Areas of refuge.
7. Ramps complying with Section 1010.

Exceptions:

1. Where the exit discharge is not accessible, an exterior area for assisted rescue must be provided in accordance with Section 1007.8.
2. Where the exit stairway is open to the exterior, the accessible means of egress shall include either an area of refuge in accordance with Section 1007.6 or an exterior area for assisted rescue in accordance with Section 1007.8.

1007.3 Enclosed exit stairways. An enclosed exit stairway, to be considered part of an accessible means of egress, shall have a clear width of 48 inches (1219 mm) minimum between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or shall be accessed from either an area of refuge complying with Section 1007.6 or a horizontal exit.

Exceptions:

1. Open exit stairways as permitted by Section 1019.1 are permitted to be considered part of an accessible means of egress.
2. ~~The area of refuge is not required at open stairways that are permitted by Section 1019.1 in buildings or facilities that are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.~~
2. ~~3.~~ The clear width of 48 inches (1219 mm) between handrails ~~and the area of refuge~~ is not required at exit stairways in buildings or facilities equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. ~~4.~~ The clear width of 48 inches (1219 mm) between handrails is not required for enclosed exit stairways accessed from a horizontal exit.
4. ~~5.~~ Areas of refuge are not required at exit stairways serving open parking garages.

1007.4 Elevators. An elevator to be considered part of an accessible means of egress shall comply with the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1. Standby power shall be provided in accordance with Sections 2702 and 3003. The elevator shall be accessed from either an area of refuge complying with Section 1007.6 or a horizontal exit.

Exceptions:

1. ~~1.~~ Elevators are not required to be accessed from an area of refuge or horizontal exit in open parking garages.
2. ~~Elevators are not required to be accessed from an area of refuge or horizontal exit in buildings and facilities equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Reason: There are two critical conditions in which areas of refuge are required in buildings without automatic sprinkler systems but not required where such sprinkler systems are provided: where areas of refuge are required adjacent to accessible means of egress (AMOE) enclosed exit stairs, and where they are required at AMOE elevators.

The problem is that while everyone on a fire floor may be protected from the immediate dangers of the fire (because it is extinguished by the sprinkler system) ambulatory persons also quickly leave the dangers of smoke and toxic fumes as they proceed

to enclosed exit stairs and descend toward the level of exit discharge.

Persons who cannot use stairs cannot do this. The area of refuge that is required in a non-sprinkled building provides a smoke barrier to minimize the intrusion of smoke (section 1007.6.2), but no similar protection occurs when someone may be left in the corridor of a sprinkled building that is nonetheless quickly filling with smoke and fumes. Statistics on fire fatalities in sprinklered buildings reflect the effect of smoke on a fire floor on persons who have moved down the exit stairs and out of the building. What of the person in a wheelchair who must sit in that smoke-filled corridor for ten or twenty minutes until help arrives?

The same is true for areas of refuge at AMOE elevators, typically created by enclosing the elevator lobby in a smoke barrier. Arguably, someone who cannot use stairs would be better off in a building with an AMOE elevator that is not sprinkled, at least having an area of refuge protected from smoke while waiting for the fire service to use the elevator to evacuate him to the accessible level of exit discharge.

Deleting these exceptions in the IBC resolves these problems.

The change to Section 1007.2 is a clarification. While smoke barriers do define an area of refuge, the requirements for that space include many other requirements that need to be included for it to be considered a safe place to wait for assistance.

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

E22-04/05

Committee Action: **Disapproved**

Committee Reason: The change to the list of elements in Section 1007.2 to include “areas of refuge” is appropriate, however, the deletion of the sprinkler exception for areas of refuge is premature at this time.

While the committee understood the need for providing considerations for both persons with disabilities as well as everyone else who could not utilize the stairways for evacuation, the committee requested additional information for justification to remove this sprinkler trade-off. At this time, there is not technical data or historic information to indicate that there is a need for areas of refuge in fully sprinklered buildings. While technical data from a preliminary NIST report was provided, the committee felt that a final report was necessary for a complete understanding of the associated issues. Additional information on testing for the amount of smoke and fumes present during a fire event in a sprinklered building mentioned in testimony would also be beneficial for determining requirements. An additional concern would be if an area of refuge at the top of an open exit stairway (as currently permitted in Section 1019.1) would provide an appropriate level of safety and/or if a protected path for assisted rescue was needed.

Assembly Action: **None**

E84-04/05 AM

1014.2.2; IFC [B] 1014.2.2

Proponent: Gregory R. Keith, Professional heuristic Development, Seattle, WA, representing The Boeing Company

Revise as follows:

1014.2.2 Three or more exits or exit access doorways. Where access to three or more exits is required, at least two exit doors or exit access doorways shall be arranged in accordance with the provisions of Section 1014.2.1. ~~placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the area served measured in a straight line between such exit doors or exit access doorways.~~ Additional exits or exit access doorways shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.

~~**Exception:** Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of at least two of the exit doors or exit access doorways shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.~~

Reason: The purpose of this proposal is to provide for continuity in exit or exit access doorway separation requirements. The current language contained in Section 1014.2.2 restates the fundamental separation requirements contained in Section 1014.2.1; however, the permitted exceptions have been omitted. It only stands to reason that if these specific exit separation requirements are appropriate for a building requiring two exits, they should also be acceptable as a base requirement for a building requiring three or more exits. If access to three or more exits is required, the space under consideration is becoming larger and the likelihood of

multiple exits becoming blocked by the same event is inherently lessened. The protection features required in the referenced exceptions enhance occupant safety and should be recognized in the design of a means of egress system where three or more exits or exit access doorways are required.

Cost Impact: None

E84-04/05

Committee Action: **Approved as Modified**

Modify the proposal as follows:

1014.2.2 Three or more exits or exit access doorways. Where access to three or more exits is required, at least two exit doors or exit access doorways shall be arranged in accordance with the provisions of Section 1014.2.1. ~~Additional exits or exit access doorways shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.~~

Committee Reason: The text deleted by the proposal is redundant text. The last sentence was deleted for consistency with E82-04/05.

Assembly Action: **None**

F164-04/05 D

910.2; IBC [F] 415.6, [F] 910.2

Proponent: Richard Schulte, Schulte & Associates, Evanston, IL

Revise as follows:

910.2 (Supp) Where required. Smoke and heat vents shall be installed in the roofs of one-story buildings or portions thereof occupied for the uses set forth in Sections 910.2.1 ~~through 910.2.4.~~

~~**910.2.1 Groups F-1 and S1.** Buildings and portions thereof used as a Group F-1 or S-1 occupancy having more than 50,000 square feet (4645 m2) of undivided area.~~

~~**Exception:** Group S-1 aircraft repair hangars.~~

~~**910.2.2**~~ **910.2.1 (Supp) Group H-2 or H-3.** Buildings and portions thereof used as a Group H-2 or H-3 occupancy having more than 15,000 square feet (1394 m^2) in single floor area.

~~**Exception:** Buildings of noncombustible construction containing only noncombustible materials.~~

~~**910.2.3 High-piled combustible storage.** Buildings and portions thereof containing high-piled combustible stock or rack storage in any occupancy group when required by Section 2306.7.~~

~~**910.2.4 Exit access travel distance increase.** Buildings and portions thereof used as a Group F-1 or S-1 occupancy where the maximum exit access travel distance is increased with Section 1015.2.~~

Reason: The purpose of this proposal is to eliminate the requirement for roof vents in F-1 and S-1 occupancies and in buildings which contain high piled combustible storage.

In a memorandum dated September 10, 1999, the American Architectural Manufacturers Association (AAMA) announced the commencement of AAMA Smoke Vent Task Group's research project on the use of smoke/heat vents. The announcement states that the purpose of this research project is to "study the interaction between sprinklers, smoke/heat vents and draft curtains" and "to develop scientifically based engineering design criteria for the installation of draft curtains and vents."

The AAMA memorandum is essentially an admission by the AAMA Smoke Vent Task Group in 1999 that we do not presently have sufficient information on the interaction between sprinklers, smoke/heat vents and draft curtains to utilize smoke/heat and

draft curtains in buildings which are protected by sprinklers. Given this admission by the AAMA, it would seem questionable that the *International Building Code* and *International Fire Code* should mandate the use of smoke/heat vents and draft curtains in buildings which are protected throughout by a sprinkler system.

To date, the AAMA Smoke Vent Task Group has yet to complete the research project announced in September, 1999.

Chapter 10 in Section 5 of the 15th Edition of the Fire Protection Handbook published by the National Fire Protection Association in 1981 states the following:

"Even though there is no universally accepted conclusion from either fire experience or research, concern has been raised by a recent series of model studies that indicate the following trends when the present Smoke and Heat Venting Guide [NFPA 204M] is implemented:

1. Venting delays loss of visibility;

2. Venting results in increased fuel consumption; and

3. Depending on the location of the fire relative to the vents, the necessary water demand to achieve control is either increased or decreased over an unvented condition. With the fire directly under the vent, water demand is decreased. With the fire equidistant from the vents, water demand is increased."

Chapter 6 in the 1991 edition of NFPA 204M, the Guide for Smoke and Heat Venting, specifically addresses the use of smoke/heat vents in sprinklered buildings. Section 6-1 in this edition of NFPA 204M states the following:

"A broadly accepted equivalent design basis for using both sprinklers and vents together for hazard control (e.g. property protection, life safety, water usage, obscuration, etc.) has not been universally recognized."

Section 6-2 in the 1991 edition of NFPA 204M further states the following:

"For occupancies that present a high challenge to sprinkler systems, concern has been raised that inclusion of automatic roof venting may be detrimental to the performance of automatic sprinklers.

In addition to this statement, Chapter 6 in the 1991 edition of NFPA 204M contains the exact same statement quoted above from the 15th edition on the NFPA Fire Protection Handbook.

Chapter 8 in the 1998 edition of NFPA 204 contains the same statements regarding the use of smoke/heat vents in sprinklered buildings as contained in the 1991 edition of NFPA 204M and also the 15th edition of the Fire Protection Handbook. In addition, the 1998 edition of NFPA 204 states the following regarding the use of curtain boards:

"Large-sale fire tests [Troup 1994] indicates that the presence of curtain boards can cause increases in sprinkler operation, smoke production, and fire damage (i.e. sprinklers opened will away from the fire).

The issue of the use of roof vents in sprinklered buildings is also addressed in Chapter 11 of the 2002 edition of NFPA 204. Section 11.1 in the 2002 edition of NFPA 204 reads as follows:

“Where provided, the design of the venting for sprinklered buildings shall be based on a performance analysis acceptable to the authority having jurisdiction, demonstrating that the established objectives are met. (See Annex F.3.)”

The provisions for roof vents contained in both the International Building Code and the International Fire Code are specification-oriented and do not require a “performance analysis” required by NFPA 204-2002.

Annex F.3 in the 2002 edition of NFPA 204 contains similar statements regarding the use of roof vents in sprinklered buildings as those contained in previous editions of NFPA 204 (and NFPA 204M). In addition, Annex F.3 of the 2002 edition of NFPA 204 includes the following statements:

“Vents that are open prior to sprinkler operation in a region surrounding the ignition point, within a radius of 1-1/2 sprinkler spacings, can interfere with the opening of sprinklers capable of delivering water to the fire.”

“Draft curtains can delay or prevent operation and can interfere with the discharge of sprinklers capable of delivering water to the fire.”

The above is an indication that, from the early 1980's to the present day, questions still persist about whether it is appropriate to use of smoke/heat vents and draft curtains in buildings which are protected by sprinklers.

The installation of roof vents in sprinklered buildings which contain high-piled storage is also specifically addressed in NFPA 13. Section 7.4.1.3.1 in the 1999 edition of NFPA 13 reads as follows:

“Sprinkler protection criteria is based on the assumption that roof vents and draft curtains are not being used.”

Section C-7.4.1.3.1 in the 1999 edition of NFPA 13 also addresses this issue as follows:

“. . . The design curves are based upon the absence of roof vents or draft curtains in the building.”

Section 2-6.1 in the 1995 edition of NFPA 13E, the Guide for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems states the following with regard to routine ventilation in sprinklered storage buildings:

"Occupancies with a wide variety of configurations and a wide range of storage commodities might need special procedures, particularly where storage heights are in excess of 15 feet. In some cases, routine ventilation procedures in the early stages of a fire can hinder effective sprinkler operation. It is desirable for the fire department to discuss its pre-fire plan for warehouse occupancies with the occupant, sprinkler designer, and insurance carrier to determine if a modification in procedures is appropriate."

Section 2-6.2 in NFPA 13E (1995 edition) further states the following:

"For those cases where search and rescue operations have been completed prior to ventilation work being performed by the fire department, it might be appropriate to allow the automatic sprinklers to continue to operate without further ventilation to enable them to achieve full control of the fire. This might take 20 to 30 min[utes] or more."

The information from NFPA 13E regarding the use of ventilation in storage buildings is further supported by information contained in NFPA 231 and NFPA 231C.

Section 3-2 in the 1998 edition of NFPA 231, the Standard for General Storage, states the following with the respect to the use of smoke/heat vents and draft curtains in sprinklered storage buildings:

"The protection outlined in the standard shall apply to buildings with or without roof vents and draft curtains."

The exception to this section in NFPA 231 states the following:

"Where local codes require heat and smoke vents in buildings that are protected by ESFR sprinklers, the vents shall be manually operated or shall have an operating mechanism with a standard response fusible element that is rated no less that 360F. Drop out vents shall not be permitted."

Section A-3-2 in NFPA 231 provides additional information regarding the use of smoke/ heat vents in sprinklered buildings to which NFPA 231 is applicable. This section states the following:

"Smoke removal is important to manual fire fighting and overhaul. Since most fire tests were conducted without smoke and heat venting, the protection specified in Sections 5-1, 6-1 and 7-1 was developed without the use of such venting. However, venting through eaveline windows, doors, monitors, or gravity or mechanical exhaust systems is essential to smoke removal after control of the fire is achieved. (See NFPA 204, Guide for Smoke and Heat Venting.)"

While section 3-2 in NFPA 231 states that the use of smoke/heat vents is acceptable in buildings where NFPA 231 is applicable, the explanatory material contained in Appendix A of NFPA 231 clearly indicates that the use of manually operated roof vents or some other method of ventilation is preferred. The fact that this exception regarding the use of vents with ESFR sprinklers is included in NFPA 231 is an admission that heat/roof vents can affect the operation of ESFR sprinklers. Given the exception to section 3-2 in NFPA 231, along with the information on venting in sprinklered buildings provided in NFPA 204, certainly the wisdom of providing automatic smoke/heat vents in buildings protected by standard sprinklers should be questioned.

NFPA 231C, the Standard for Rack Storage of Materials, also addresses the use of smoke/heat vents in sprinklered buildings. Section 3-3 in the 1998 edition of NFPA 231C reads as follows:

"Design curves are based on the assumption that roof vents and draft curtains are not being used."

Explanatory material provided in section B-3-3 in NFPA 231 provides further information on the use of smoke/heat vents in sprinklered storage buildings which contain storage racks. This section reads as follows:

"Tests were conducted as a part of this program with eave line windows and louvers open to simulate smoke and heat venting. These tests opened 87.5 percent and 91 percent more sprinklers that did comparative tests without windows and louvers open. Venting tests that have been conducted in other programs were without the benefit of sprinkler protection and, as such, are not considered in this report, which covers only buildings protected by sprinklers. The design curves are based upon the absence of roof vents or draft curtains in the building. During mop-up operations, ventilating systems, were installed, should be capable of manual exhaust operations."

NFPA 231C also contains information on fire department operations for buildings protected by sprinkler systems designed to comply with NFPA 231C. Section A-12-6 in NFPA 231C reads as follows:

"Sprinkler protection installed as required in this standard is expected to protect the building occupancy without supplemental fire department activity. Fires that occur in rack storage occupancies are likely to be controlled within the limits outlined in B-1.1, since no significant building damage is expected. The first fire department pumper arriving at a rack storage-type fire should connect immediately to the sprinkler siamese fire department connection and start pumping operations.

In the test series for storage up to 25 ft [feet], the average time from ignition to smoke obscuration in the test building was about 13 minutes. The first sprinkler operating time in these same fires averaged about 3 minutes. Considering response time for the waterflow device to transmit a waterflow signal, approximately 9 minutes remains between the time of receipt

of a waterflow alarm signal at fire department headquarters and the time of smoke obscuration with the building as an overall average.

In the test series for storage over 25 ft [feet], the visibility time was extended. If the fire department or plant protection department arrives at the building in time to have sufficient visibility to locate the fire, suppression activities with small hose lines should be started. . . . . .Manual fire-fighting operations in such a warehouse should not be considered a substitute for sprinkler operation.

Smoke removal capability should be provided. Examples of smoke removal equipment include:

(a) Mechanical air-handling systems
(b) Powered exhaust fans
(c) Roof-mounted gravity vents
(d) Perimeter gravity vents

Whichever system is selected, it should be designed for manual actuation by the fire department, thus allowing personnel to coordinate the smoke removal (ventilation) with mop-up operations."

During the testing program, the installed automatic extinguishing system was capable of controlling the fire and reducing all temperatures to ambient within 30 minutes of ignition. Ventilation operations and mop-up were not started until this point. The use of smoke removal equipment is important."

While it has been stated by proponents of heat/smoke vents that the use of eave line windows is different from the operation of automatic smoke/heat vents, the explanatory materials contained in NFPA 231C clearly states that automatic venting should not be provided. Given the explanatory material cited above, it can be concluded that providing automatic smoke/heat vents in a building which is required to comply with NFPA 231C is, in fact, a violation of NFPA 231C.

The purpose of providing heat/smoke vents in a storage building is to vent both heat and smoke to improve visibility within the building and prevent structural damage to the roof of the building. Venting heat and smoke from the building will more safely permit the fire department to enter the building and attack the fire. Given the information provided in both NFPA 13E and in NFPA 231C, the question is why should the fire department enter the building to attack the fire. NFPA 231C clearly indicates that a sprinkler system designed per NFPA 231C is "capable of controlling the fire and reducing all temperature to ambient within 30 minutes of ignition." If the sprinkler system is capable of achieving this level of control, why should the fire department enter the building and put its personnel at risk? Providing smoke/heat vents in the building encourages fire department personnel to enter the building and puts firefighters at risk

Factory Mutual's opinion of the use of automatic smoke/heat vents is expressed by the following excerpt from FM Data Sheet 8-33 dated January, 1984:

"Factory Mutual recommended protection is based on roof vents and draft curtains not being provided. Fire tests have not shown automatic vents to be cost effective and they may even increase sprinkler water demand. Hence, permanent heat and smoke vents, if any, should be arranged for manual operation. Smoke removal during mop-up operations can frequently be achieved through eave-line windows, doors, monitors, non-automatic exhaust systems (gravity or mechanical), or manually operated heat and smoke vents. Fire departments can cut holes in steel or wood roofs and also use their smoke exhausters."

If the premier property insurer in the United States is on record as stating that the installation of smoke/heat vents is not cost effective (as early as 1984), then the question should be asked-why should the membership of the International Code Council mandate this fire protection technology?

Prior to the development of the International Fire Code, two of the three model fire prevention codes used in the United States, the Uniform Fire Code and the Standard Fire Prevention Code, required the installation of the smoke/heat vents in large storage buildings, while the third model fire prevention code, the BOCA National Fire Prevention Code, did not include requirements for smoke/heat vents. Given this, it should be a relatively easy research task to compare the property losses from fires in storage buildings in jurisdictions using the BOCA National Fire Prevention Code and the losses from fire in storage buildings located in jurisdictions using the two other model fire prevention codes. If the fire loss statistics for storage buildings in BOCA jurisdictions is not significantly higher than the fire loss statistics in ICBO and SBCCI jurisdictions, this would be an indication that the installation of smoke/heat vents is simply not effective. Prior to commencing the AAMA study of smoke/heat vents, the AAMA should concentrate on providing statistics which demonstrate the effectiveness of vents.

Given the technical information presented above, along with the fact that the manufacturers of smoke/heat vents have presented no statistics that their products are, in fact, effective at reducing property losses, the membership of the ICC should remove the requirements for smoke/heat vents (until such time as the industry provides conclusive proof that vents actually work as represented).

The fire protection field has wrestled with this issue for more that 30 years. There is absolutely no reason why the vent industry couldn't have conducted its proposed research 25 years ago. Eliminating the requirement for vents in the code should be an incentive for the vent manufacturers to quickly complete its testing program and provide conclusive proof one way or the other on the need for vents.

It should be noted that a similar proposal to delete the requirements for roof vents was submitted to the ICC in 2000 (Birmingham, Alabama). The committee hearing this proposal voted to deny the proposal given that the vent industry was involved in a testing program announced in September 1999. Since the committee's denial of this proposal, the vent industry has not published any results from their research program. This fact is a tantamount admission by the vent industry that the proposal to eliminate the requirement for roof vents in sprinklered buildings has merit.

It is my opinion that the installation of roof vents and draft curtains in sprinklered buildings is in the realm of “junk science”. In the absence of the independent research which conclusively demonstrates that the installation of roof vents and draft curtains is not only not detrimental to the operation of sprinklers, but is also effective, the requirements for the installation of roof vents and draft curtains should be removed from both the IBC and the IFC.

Bibliography:
Fire Protection Handbook-15th Edition (1981)
FM Data Sheet 8-33, January, 1984
NFPA 13, 1999 edition
NFPA 13E, 1995 edition
NFPA 204M, 1991 edition
NFPA 204, 1998 edition.
NFPA 204, 2002 edition.
NFPA 231, 1998 edition
NFPA 231C, 1998 edition

Cost Impact: None

F164-04/05

Committee Action: **Disapproved**

Committee Reason: Roof vents are a critical item in the fire suppression operation. The proposal, which has been disapproved in several previous code development cycles, would be detrimental to firefighter safety because eliminating the vents would require that firefighters go to the roof to ventilate rather than being able to open the vents. The reason statement implies that because there is research going on, there must be a problem, which is not an accurate assumption and should not form the basis for approving the proposal. Sprinklers and vents can co-exist as has been shown by testing. There is insufficient data to support this proposal. Research on this topic is on-going and it would be premature to approve the proposal before that research is concluded.

Assembly Action: **None**