INTERNATIONAL RESIDENTIAL CODE

REVISIONS TO TENTATIVE ORDER OF DISCUSSION:

Note: This document has been provided with Adobe Acrobat Bookmarks. Turn on Bookmarks to skip quickly to individual proposals.

Add RB184-09110 to IRC BIE Hearing Order following RB18-09/10
Add RB185-09110 to IRC BIE Hearing Order following RB21-09110
Add RB186-09110 to IRC BIE Hearing Order following E150-09110
Add RB187-09/10 to IRC BIE Hearing Order following RB58-09/10
Add S226-09/10 to IRC B/E Hearing Order following RB161-09/10
Add FS144-09/10 to IRC B/E Hearing Order following FS151-09/10

TENTATIVE ORDER OF DISCUSSION

Revised 9/02/09

2009/2010 PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE BUILDING & ENERGY

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does **not** necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair.

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Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code or shall comply with the *International Residential Code* provided the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.2.8.

Reason: Boarding houses and congregate living facilities as defined in Section 310 are very similar and should be classified the same. Current code language found under the R-1 and R-2 classifications indicates when congregate living facilities shall comply with the construction requirements for R-3, but this leaves the question of how they shall be classified. This proposal clarifies how congregate living facilities and boarding houses shall be classified, based on the transient and nontransient occupant load thresholds.

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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: TRAXLER-G3-310.1.doc

G28–09/10
310.1(IFC [B] 202), 310.2; IRC R101.2, R202

Proponent: Maureen Traxler, City of Seattle, Seattle Dept of Planning & Development

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC GENERAL COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IBC GENERAL

1. Revise as follows:

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

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

Boarding houses (transient)
Hotels (transient)
<u>Lodging houses with more than 5 guest rooms</u>
Motels (transient)

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

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

Apartment houses
Boarding houses (nontransient)
Convents
Dormitories
Fraternities and sororities
Hotels (nontransient)
Live/work units
Monasteries
Motels (nontransient)
Vacation timeshare properties

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

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

Buildings that do not contain more than two *dwelling units*.
Adult care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.
Child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.
Congregate living facilities with 16 or fewer persons.
Lodging houses with 5 or fewer guest rooms

Adult care and child care facilities that are within a single-family home are permitted to comply with the *International Residential Code*.
Lodging houses with five or fewer guest rooms are permitted to comply with the *International Residential Code*.

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

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code or shall comply with the *International Residential Code* provided the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.2.7.

2. Add new definitions as follows:

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

GUEST ROOM. Any room or rooms used or intended to be used by one or more guests for living or sleeping purposes.

LODGING HOUSE. A dwelling occupied as a single-family unit where rent is paid for guest rooms.

PART II – IRC BUILDING AND ENERGY

1. Revise as follows:

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

Exceptions:

1. Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family *dwellings* or townhouses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section 903.3.1.3 of the *International Building Code*.
2. Lodging houses with five or fewer guest rooms shall be permitted to be constructed in accordance with the *International Residential Code for One- and Two-family Dwellings.*

2. Add new definitions as follows:

SECTION R202
DEFINITIONS

GUEST ROOM is any room or rooms used or intended to be used by one or more guests for living or sleeping purposes.

LODGING HOUSE is a one-family dwelling where one or more occupants are primarily permanent in nature, and rent is paid for guest rooms.

Reason: This proposal allows small bed and breakfasts to be constructed according to the International Residential Code. Currently, the IRC does not address whether nightly rentals are allowed, so jurisdictions across the country are applying the code differently. We chose to add a definition of "lodging house" to generally encompass rental lodging within dwelling units, distinct from hotels and boarding houses which are "not occupied as a single-family unit." We are proposing a general term rather than the more common term "bed and breakfast" partly because that term would imply that the building official would monitor what meals were served at the lodging.

RB8–09/10

R301.1.4 (New), R301.1.4.1 (New), R301.1.4.2 (New), R301.1.4.3 (New), Figure R301.1.4 (New)

Proponent: Larry Wainright, Qualtim, Inc., representing the Structural Building components Industry

Add new text as follows:

R301.1.4 Building information sign. New buildings shall have a building information sign that shall comply with Sections R301.1.4.1 through R301.1.4.3.

R301.1.4.1 Sign location. The building information sign shall be required to be placed on each outside electrical meter box serving the structure. The sign shall be 3 ½ inches by 2 ½ inches and be made of reflective material.

R301.1.4.2 Sign shape. The sign shall consist of a symbol identifying three sections in a gable roof home. The top area shall indicate the construction type of the attic space while the bottom area shall indicate ceiling construction of the basement area. Multiple designations may be placed in each building information sign area, if applicable. Other designations may be used provided they are defined on the sign. See Figure R301.1.4.

R301.1.4.3 Sign designations. Designations shall be made based upon the construction type, and installed fire protection systems. The fire protection system installed in a building shall be designated in the center section of the sign as follows:

AS – Automated Fire Sprinkler System installed throughout
PS – Partial Automatic Fire Sprinkler System, and designate floor
NS – No system installed

T= Truss construction
E= Engineered lumber
C=Conventional Framing

FIGURE R301.1.4.
EXAMPLE OF BUILDING INFORMATION SIGN. (Labels may vary).

Reason: The purpose of this code change is to provide first responders with the information necessary to help facilitate fighting a residential fire. Information gleaned from this structural identification symbol will help first responders evaluate the construction of the building to determine how best to approach it. It is important that any labeling requirement assigned to residential structures be addressed in a manner that treats all construction methods equally, giving the firefighters the best information available.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: WAINRIGHT-RB-7-R301.1.4

RB9–09/10

R301.1.4 (New), R301.1.4.1 (New), R301.1.4.2 (New), Figure R301.1.4.2 (New); IFC 316.6 (New), 316.6.1 (New), 316.6.2 (New), Figure 316.6.2 (New)

Proponent: Sean DeCrane, Cleveland, OH Fire Department, representing the Cleveland Fire Department and the International Association of Fire Fighters

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. PART II WILL BE HEARD BY THE IFC COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IRC BUILDING/ENERGY

Add new text as follows:

R301.1.4 Structural identification marking. One and two-family homes utilizing light-frame construction, in structural components, shall be required to place an identification label on each outside electrical meter box serving the structure, or other conspicuous location as approved by the building official.

R301.1.4.1 Label form and content. The label shall be 3 ½ inches by 2 ½ inches and be made of reflective material. Each label shall include the following abbreviations, as applicable:

1. T to indicate Truss Construction
2. E to indicate Engineered Components
3. P to indicate the structural components are protected with a fire-resistant products
4. U to indicate the structural components are not protected by fire resistant products

R301.1.4.2 Label symbol and content. The label shall consist of a symbol identifying three sections in a gable roof home. The top shall indicate an attic space while the bottom third shall indicate basement area.

The abbreviations required by Section R301.1.4.1 indicating construction components shall be placed in the designated floor plan area, (i.e. T in the attic for Truss Roof, E in the basement to indicate Engineered Floors). Utilization of the middle area shall be approved by the local building official. See Figure R301.1.4.2.

FIGURE R301.1.4.2
EXAMPLE STRUCTURAL IDENTIFICATION LABEL

PART II – IFC

Add new text as follows:

316.6 Structural identification marking. One and two-family homes utilizing light-frame construction in structural components shall be required to place an identification label on each outside electrical meter box serving the structure, or other conspicuous location as approved by the fire chief.

316.6.1 Label form and content. The label shall be 3 ½ inches by 2 ½ inches and be made of reflective material. Each label shall include the following abbreviations, as applicable:

1. T to indicate Truss Construction
2. E to indicate Engineered Components
3. P to indicate the structural components are protected with a fire-resistant products
4. U to indicate the structural components are not protected by fire resistant products

316.6.2 Label symbol and content. The label shall consist of a symbol identifying three sections in a gable roof home. The top shall indicate an attic space while the bottom third shall indicate basement area

The abbreviations required by Section 316.6.1 indicating construction components shall be placed in the designated floor plan area, (i.e. T in the attic for Truss Roof, E in the basement to indicate Engineered Floors). Utilization of the middle area shall be approved by the fire code official. See Figure 316.6.2.

FIGURE 316.6.2
EXAMPLE STRUCTURAL IDENTIFICATION LABEL

Reason: On August 13, 2006 a Wisconsin fire fighter was killed, and a second fire fighter injured, when the floor they were operating on collapsed sending them into the basement. One fire fighter fell directly into the room of origin and was killed, the second fire fighter landed on the opposite side of a block wall and survived by shielding herself and making an escape through a rear window. They checked the floor to ensure it was safe and solid, just prior to collapse they heard a loud crack.

The floor they were operating on was unprotected lightweight construction that collapsed without warning. In the ensuing investigation, the National Institute for Occupational Safety and Health released report F2006-26[1]. One of the recommendations is to "modify current building codes to require that lightweight trusses be protected with a fire barrier". This should not only pertain to truss construction. There are additional forms of construction that can be determined to be lightweight, cold form steel, bar joists, wooden engineered I-beam, etc., the recent trend in residential construction is to use products that are financially beneficial. It is the belief of many of us in the fire service that as the industry engineers products to a more finite point we are losing our safety factors.

In their report 2007-12 released May 16, 2008, NIOSH[2] recommended "Ensure fire fighters are trained for extreme conditions such as high winds and rapid fire progression associated with lightweight construction". They further stated, "In this era of new lightweight construction, training procedures covering strategy and tactics in extreme operations conditions, such as high winds and lightweight building construction (i.e. materials and design) are needed for all levels of fire fighters. Lightweight constructed buildings fail rapidly with little warning, complicating rescue efforts. The potential for fire fighters to become trapped or involved in a collapse may be increased. There are twenty-nine actions for fire fighters can take to protect themselves when confronted with buildings utilizing lightweight building components as structural members. They range from looking for signs or indicators that these materials are used in buildings (such as, newer structures, large unsupported spans, and heavy black smoke being generated) to getting involved in newer building code development".

On September 27, 2007 NIOSH released report 2006-24[3]. The first recommendation of the report read "Ensure that fire fighters and incident commanders are aware unprotected pre-engineered I-joist floor systems may fail at a faster rate than solid wood joists when exposed to direct fire impingement, and they should plan interior operations accordingly". The discussion of the recommendation is quite lengthy but identifies the advantages of the construction industry using this type of construction but also relates the dangers to fire fighters, "The Illinois Fire Service Institute, at the University of Illinois, conducted tests to help determine the structural stability of sample floor systems. These studies suggest that engineered wooden I-beams can fail in as little as 4 minutes and 40 seconds under controlled test conditions". The report also states that weakened floors are difficult to detect from above as the floor surface may appear intact.

On November 16, 2007, NIOSH released report F2007-07[4]. In this Fire Fighter Death in the Line-of-Duty report, NIOSH recommends "building code officials and local authorities having jurisdiction should consider modifying the current codes to require that lightweight trusses are protected with a fire barrier on both the top and the bottom". The report further states "In this incident, the floor trusses for the first floor did not have any protection on the bottom cord, which immediately exposed the trusses to fire in the basement. Unfinished basements are very common throughout the country. Basements typically house additional fire exposures such as alternative heating sources, hot water heaters, clothes dryers, etc.. It is critical for trusses and lightweight engineered wood I-beams that are used in a load-bearing assembly to be protected with a thermal barrier such as gypsum wallboard. The function of the thermal barrier is a critical factor in the fire performance of the assembly".

In April, 2005, NIOSH released their report "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures"[5]. In their release they recommended the placement of a labeling system on buildings to indicate the type of construction. While this recommendation will probably not be acceptable to residents of a one or two family home, we can mandate that they increase the protection of the construction type to provide increased safety to the residents and the responding fire fighters.

In fact, NIOSH has been concerned enough with the performance of lightweight floors in fire conditions they released a Workplace Solutions report in February, 2009, *Preventing Deaths and Injuries of Fire Fighters Working Above Fire-Damaged Floors*[6]. Authors of the report recommend; "Builders, contractors, and owners should consider protecting all floor systems, including engineered wood I-joists, by covering the underside with fire-resistant materials".

Many of the opponents of this requirement have made claims that the fire service has failed to provide technical data to support our real world experiences with the lightweight products. Since the previous ICC code cycle there have been three specific reports released by three separate test groups performing tests for different reasons. I have included their results below.

The National Research Council Canada performed a series of tests in creating their report Fire Performance of Houses, Phase I: Study of Unprotected Floor Assemblies in Basement Fire Scenarios, released December 18, 2008. The goal of the report was "With the advent of new materials and innovative construction products and systems for use in construction of houses, there is a need to understand what impacts these materials and products will have on occupant life safety under fire conditions and a need to develop a technical basis for the evaluation of their fire performance"[7]. These tests were not intentionally conducted for fire fighter safety but rather to identify the dangers to the civilian occupants and their ability to self evacuate. The report states "With the relatively severe fire scenarios used in the experiments, the times to reach structural failure for the wood I-joist, steel C-joist, metal plate and metal wood truss assemblies were 35-60% shorter than that for the solid wood joist assembly". Additionally, "For the solid wood joist assemblies, the structural failure occurred after deflection of the floor, mainly in the form of OSB subfloor failure (burn through). For all other floor assemblies, after deflection of the floor, the structural failure occurred either in the form of complete collapse into the basement or in the form of a "V" shaped collapse due to joist or truss failure". In keeping with the intent of occupant safety the report also found "One engineered floor assembly, which gave the shortest time to reach structural failure in the open basement scenario, failed structurally in the closed basement doorway scenario before the tenability limits were reached for healthy adults of average susceptibility". This calls into question, if it can not give the occupant time to self evacuate how will it perform when a fire fighter is performing Search and Rescue for that specific occupant. In summarizing the various test results the report found "The time gap between the onset of untenable conditions and the structural failure of the floor assembly was smaller for the engineered floor assemblies than for the solid wood joist assembly used in the experiments". This is very serious for the responding fire fighter performing life saving Search and Rescue for occupants who have lost consciousness due to the untenable conditions. These victims may still be savable but, the performances of the lightweight assemblies indicate that, savable victims may not be reached due to floor compromise.

In 2008 Tyco Fire Suppression & Building Products performed a series of fire tests. The intent of these tests was to demonstrate the impact residential sprinklers will have in improving fire safety in one and two-family occupancies when lightweight construction is present. The results of these tests were released in 2008 as A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions[8]. In the introduction of the report the author states, "One example of the difference in fire performance of a lightweight structural member compared to solid sawn lumber is the behavior of composite wood joists. When a composite wood joist is exposed to fire, the thin oriented strand board used as the web in the joist is quickly consumed, which results in an inability of the joist to carry the load and ultimately a failure of the supported floor assembly". Later in the introduction the report continues "Due to the greater mass per unit of surface area of the solid wood joist, it will support the floor assembly for much longer than its lightweight alternative when exposed to equivalent fire conditions". The first test involving an unsprinklered room fire led to flashover in 7:09 from ignition and floor assembly collapse at the 11:30 mark from ignition. That is roughly four minutes from flashover we had a collapse of almost the entire 16' x 16' floor area. The second test results reached flashover in only 5:15 from ignition, collapse in this test occurred at 8:34 from ignition, a stunning three minutes after flashover. This would be the time the fire fighters are entering the structure for suppression and Search and Rescue efforts.

These reports are still not enough for some critics so I am referencing a third report. Underwriters Laboratories, The Chicago Fire Department and the International Association of Fire Chiefs received a grant from the Department of Homeland Security to conduct a number of tests on various topics but the main issue was to conduct tests, and report the findings, to evaluate the performance of lightweight structural components when exposed to fire and if the components can be protected. They recently issued the subsequent report *Structural Stability of Engineered Lumber in Fire Conditions*[9]. Tests assemblies were subjected to the standards of the ASTM E119 Test Standard. Two assemblies did not include a ceiling, six of the assemblies included a ceiling consisting of ½ inch thick gypsum board and one assembly included a ¾ inch plaster ceiling. A load of 40 psf was placed along two of the four edges and two 300 lb fire fighter mannequins were applied to the floor assembly. Results from the tests indicated that unprotected 12" wooden I-joist reached structural failure at the 5:58 mark in the tests. The resulting failure covered a large area of the floor. The unprotected 2" x 10" wooden I-beams reached structural collapse at the 18:45 mark in the test, a difference of over twelve minutes. These twelve minutes are critical in Search and Rescue. Further tests demonstrated that when ½ inch gypsum was placed on the 12" I-joists the collapse did not occur until the 26:45 mark in the test. Just a simple ½ covering extended the collapse time approximately twenty minutes. When the ½ inch covering was applied to the wooden I-beams the collapse time was extended to 44:45 mark in the test. One important factor to point out regarding these tests is that the fire fighters are a dead load and not a live load. Would a simulated live load of fire fighters transferring additional psi with each step or crawl have contributed to an earlier collapse? When we review the Wisconsin fire where Engineer Arnie Wolf was killed, the fire fighters stated the floor felt solid but suffered a catastrophic collapse when they began their search pattern. These tests clearly outline the performances of the various construction practices and the dangers these performances present to fire fighters. Underwriters Laboratories and the Chicago Fire Department followed these tests with an online educational program, to view go to http://www.uluniversity.us/home.aspx, in an attempt to educate the nation's fire service on the hazards of operating in these environments.

This code change proposal is an attempt to provide a responsible means on residential construction. I have provided examples of fire fighters being killed in occupancies utilizing lightweight construction practices and the subsequent reports detailing the need to protect lightweight construction. I have also provided two reports generated by a neutral governmental agency recommending protection requirements for lightweight construction. These incidents, and others like them, have produced great hardships on the people involved, they have created widows, fatherless children, injured fire fighters and many who bear the pain of fatalities that could have been prevented. I strongly urge your support for this proposed code change.

While we are attempting to protect the structural elements of lightweight construction information is still critical to the Incident Commander and responding fire fighters. Identifying potential life threatening situations in a non-invading manner is a big step forward and can provide valuable and potentially lifesaving information.

1. National Institute for Occupational Safety and Health Report F206-26. July, 2007.
2. National Institute for Occupational Safety and Health Report F2007-12, May, 2008.
3. National Institute for Occupational Safety and Health Report F206-24, September, 2007.
4. National Institute for Occupational Safety and Health Report F2007-07, November, 2007.
5. National Institute for Occupational Safety and Health Alert, "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures".
6. National Institute for Occupational Safety and Health Workplace Solutions, *Preventing Deaths and Injuries of Fire Fighters Working Above Fire-Damaged Floors*, February, 2009.
7. National Research of Canada, Institute for Research in Construction; Fire performance of Houses, Phase I, Study of Unprotected Floor Assemblies in Basement Fire Scenarios, December, 2008.
8. Tyco Industries, *A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions*, September 2008.
9. Underwriters Laboratories, *Structural Stability of Engineered Lumber in Fire Conditions*, September 30, 2008

Floor assembly where Fire Engineer Arnie Wolf was killed

Residential use of cold form steel with penetrations and 24" on center

Even lighterweight materials – Georgia Pacific XJ-85

Cost Impact: The code change proposal will minimally increase construction costs.

PART I – IRC BUILDING/ENERGY

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IFC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: DECRANE-RB-2-R301.1.4-F2-316.6

RB10–09/10
R301.1.4 (New)

Proponent: Daniel J. Walker, PE, Thomas Associates, Inc., representing the National Sunroom Association

Add new text as follows:

R301.1.4 Patio covers. Patio covers shall be designed and constructed to sustain, within the stress limits of this code, all dead loads plus a minimum vertical live load of 10 pounds per square foot (0.48 kN/m^2) except that snow loads shall be used where such snow loads exceed this minimum. Such covers shall be designed to resist the minimum wind loads set forth in Section R301.2.1.

RB30–09/10
Table R302.6

Proponent: Joe Holland and Dave Bueche, Hoover Treated Wood Products

Revise table as follows:

TABLE R302.6
DWELLING/GARAGE SEPARATION

SEPARATION	MATERIAL
From the residence and attics.	Not less than ½ inch gypsum board or 5/8-inch fire-retardant-treated plywood or equivalent applied to the garage side.
From all habitable rooms above the garage.	Not less than 5/8-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section.	Not less than ½ inch gypsum board or 5/8-inch fire-retardant-treated plywood or equivalent applied to the garage side.
Garages located less than 3 feet from a dwelling unit on the same lot.	Not less than ½ inch gypsum board or 5/8-inch fire-retardant-treated plywood or equivalent applied to the ~~interior side of exterior walls that are within this area~~ garage side.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Reason: The building code does not give any indication as to why the gypsum board is necessary. One could assume that fire protection is an area of concern. The code currently states one can use an equivalent material. Table 721.6.2(1) contains the time in minutes that a material will contribute to the fire resistance of a floor/ceiling, roof/ceiling, and wall assembly. Listed are both ½ inch gypsum board and 5/8 inch wood structural panel. Their contribution to the fire resistance rating is identical: 15 minutes. Therefore from a fire rating perspective they are equivalent. Another reason for the requirement could be structural. Structurally, FRTW has the ability to resist a larger load than gypsum board. By providing a provision for FRTW it gives a user the ability to use another material.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: HOLLAND-BUECHE-RB-3-T. R302.6

RB31–09/10
R302.7 (New), R502.14 (New), Table R502.14 (New)

Proponent: Dennis Pitts, American Forest and Paper Association

Add new text and table as follows:

R302.7 Floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch (12.7 mm) gypsum wallboard ceiling membrane.

Exception:

1. Floor assemblies protected by an automatic sprinkler system in accordance with NFPA13, NFPA 13R, NFPA13D, or Section R313.
2. Floor assemblies having a minimum fire resistance of 15 minutes, supporting at least 50% of the full design load, and complying with one of the following:
   - 2.1. Tested in accordance with ASTM E119 or UL 263, or;
   - 2.2. Determined in accordance with *International Building Code* Section 721.
3. Floor assemblies located directly over a crawl space.
4. Floor assemblies complying with Section R502.14.
5. A portion of a floor assembly area not greater than 100 square feet per story.

R502.14 Fire resistant assemblies. Wood floor assemblies shall comply with the provisions of Section R302.7 or any one of the following:

1. Wood floor assemblies using dimension lumber equal to or greater than 2 inches in thickness by 8 inches in width, nominal.
2. Wood floor assemblies using structural composite lumber, complying with ASTM D5456, equal to or greater than 1 ½" in thickness by 7 ¼" in width.
3. Wood floor assemblies having a minimum fire resistance time of 15 minutes determined from any of the following options or the sum of the times from any combination thereof:
   - 3.1. Time assigned to a ceiling membrane or membranes in Table 502.14.
   - 3.2. Finish rating time for a ceiling membrane not listed in 502.14.
   - 3.3. Time to structural failure of framing members, supporting at least 50% of the full design load, and complying with one of the following:
     - 3.3.1. Tested in accordance with ASTM E119 or UL 263, or;
     - 3.3.2. Determined in accordance with *International Building Code* Section 721.

TABLE R502.14
TIME ASSIGNED TO CEILING MEMBRANES

DESCRIPTION OF FINISH	TIME (MINUTES)[A]
3/8" gypsum *board*	*10*
½" gypsum board	*15*
5/8" gypsum board	20
½" Type X gypsum board	25
5/8" Type X gypsum board	40
Double 3/8" gypsum board	25
3/8" wood structural panel	5
½" wood structural panel	10
5/8" wood structural panel	15

a. Times for individual membranes are additive.

Reason: The fire service has asked for minimum fire resistance of floor/ceiling systems equivalent to 2x lumber floor construction. The basis of the requirements assume that a floor/ceiling assembly constructed using 2x lumber and loaded to 50% of full design load will provide 15 minutes of structural fire resistance as confirmed by recent UL testing reported in *Structural Stability of Engineered Lumber in Fire Conditions*.

The proposed R302.7 provides a simple method of meeting this 15 minute requirement for all floor assemblies by requiring ½" gypsum wallboard as a protective ceiling membrane. Exceptions to this requirement are provided.

The proposed R502.14 provides additional methods of meeting this 15 minute requirement for wood floor framing, including different options for ceiling membrane protection recognized in IBC 721.6, finish ratings from approved ASTM E119 test reports, fire test results from ASTM E119 tests, structural fire resistance calculations per IBC 721.1, or any combination of these provisions.

The proposed Table R502.14 is taken from IBC Table 721.6.2(1).

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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: PITTS-RB-3-R302.7-R502.14

RB32–09/10
R302.9, R302.9.1

Proponent: Joe Holland and Dave Bueche, Hoover Treated Wood Products

Revise as follows:

R302.9 Flame spread index and smoke-developed index for wall and ceiling finishes. Flame spread and smoke-developed index for wall and ceiling finishes shall be in accordance with Sections 302.9.1 through 302.9.4.

R302.9.1 Wall and ceiling finishes shall have a flame-spread index of not greater than 200. For new construction reduction of the flame-spread index shall not be permitted after installation of the material. For existing construction wall and ceiling finish shall be permitted to be treated with an approved fire-retardant coating in accordance with the manufacturer's instructions.

Exception: Flame spread index requirements for finishes shall not apply to trim defined as picture molds, chair rails, baseboards and handrails; to doors and windows or their frames; or to materials that are less than 1/28 inch (0.91 mm) in thickness cemented to the surface of walls or ceilings if these materials exhibit flame spread index values no greater than those of paper of this thickness cemented to a noncombustible backing.

RB84–09/10
R501.3 (New), Chapter 44 (New)

Proponent: Jeff Hugo, CBO, National Fire Sprinkler Association

1. Add new text as follows:

R501.3 Fire Protection. All new one and two family dwellings using floor framing components or systems composed of prefabricated I joists, trusses, and cold formed steel shall be fire sprinklered throughout according to NFPA 13, NFPA 13R, NFPA 13D or Section P2904.1.

2. Add new standard to Chapter 44 as follows:

NFPA
13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height

Reason: Lightweight construction consisting of prefabricated I joists, trusses, and cold formed steel are excellent materials in many ways. They save labor, time, natural resources, and call backs. However, widespread fire experience shows that floors framed out of these materials do not have the same durability in the event of a fire as solid sawn lumber and are not only hazardous to the occupants evacuating the home, but especially to responding emergency personnel, such as fire fighters.

Several research studies have been performed showing the potential failures of these flooring assemblies during fires and the potential for floor collapse during fire fighter operations. Additional research has shown the ability of fire sprinklers to prevent the fire from reaching the point where it could cause the same kind of damage. This research shows that with fire sprinkler systems in the home, the prefabricated I joists, trusses and cold formed steel materials are safe to use. But without fire sprinklers, these materials could fail catastrophically during a fire.

This requirement is important to put into the IRC even if the requirement for sprinklers is maintained because there are many jurisdictions that will not accept the blanket requirement for sprinklers, but will maintain this option for using sprinklers with this specific type of construction.

Bibliography:
Tyco Fire Suppression & Building Products. A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions. 2008

Su, J.Z., N.; Bawaly, A.C.; Lougheed, G.D.; Taber, B.C.; Leroux, P.; Proulx, G.; Kashef, A.; McCarthey, C.; Thomas, J.R. Fire Performance of Houses, Phase I. Study of Unprotected Floor Assemblies in Basement Fire Scenarios, Summary Report. 12/15/2008

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

Analysis: The proposed new standard, NFPA 13R, is currently referenced in the *International Building Code*.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: HUGO-RB-1-R501.3

RB85–09/10
R501.3 (New), Chapter 44 (New)

Proponent: Larry Wainright, Qualtim, Inc., representing the Structural Building Components Association

1. Add new text as follows:

R501.3 Fire Protection of Floors: Floors within dwelling units shall be protected on the underside by a minimum of 1/2" gypsum board applied in accordance with Section R702.3.

Exceptions:

1. Crawl spaces where the maximum clear height from the underside of the subfloor to the void space floor is 3 feet or less and is not intended for mechanical equipment use or storage.
2. The building is protected with an automatic sprinkler system designed to NFPA 13, 13D, 13R, or Section P2904 of this code.
3. Floors of any material or combination of materials achieving a 30-minute fire-resistance rating in accordance with ASTM E 119 or UL 263.
4. Floors that are protected by a material or combination of materials in accordance with the test procedures of ASTM E 84 or UL 723 that exhibits a flame spread index not exceeding 25, no evidence of progressive combustion and a flame front that does not progress more than 10 ½ feet (3200 mm) beyond the centerline of the burner at any time during an extended 30 minute test.

2. Add new standard to Chapter 44 as follows:

NFPA

13R—07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in height

Reason: This proposal would require the underside of floors to be protected, providing a greater level of fire protection than unprotected floors. This would apply to all construction types, thereby creating no competitive advantage for specific building types.

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

Analysis: The proposed new standard, NFPA 13R, is currently referenced in the *International Building Code*.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: WAINRIGHT-RB-8-R501.3

RB86–09/10
R501.3 (New)

Proponent: Sal DiCristina, representing Code Solutions, Inc.

Add new text as follows:

R501.3 Fire floor protection: Floors within dwelling units utilizing light-frame construction shall be protected on the underside by a minimum of 5/8" gypsum board applied in accordance with Section R702.3.

Exceptions:

1. Crawl spaces where the maximum clear height from the underside of the subfloor to the void space floor is 3 feet or less and is not intended for mechanical equipment use or storage.
2. The building is protected with an automatic sprinkler system designed to NFPA 13D or Section P2904 of this code.
3. Floors in which the exposed materials are protected by materials achieving a 30-minute fire-resistance rating in accordance with ASTM E 119 or UL 263.
4. Floors in which the exposed materials on the underside are protected by a fire-retardant coating that shall have, when tested in accordance with ASTM E 84 or UL 723 in the form in which it is applied, a listed flame spread index of 25 with no evidence of significant progressive combustion when the test is continued for an additional 20 minute period. In addition, the flame front shall not progress more than 10 ½ feet (3200 mm) beyond the centerline of the burners at any time the test.

Reason: This proposal is essentially the same as a proposal submitted by Battalion Chief Sean DeCrane of the Cleveland Fire Department with the addition of an exception number 4. We support Chief DeCrane's objectives, however, we believe additional flexibility is needed to provide the required level of protection in the vast array of construction configurations that may be encountered in the field.

The purpose of this additional method of protection is to provide an economical method to protect the underside of a floor without the need to apply a covering membrane that would restrict access. This would be important for unfinished basement and lower levels, or crawl spaces that do not meet exception 1.

It is important to note that the parameters required in proposed Exception 4 prevents the underside of the floor from ignited for a period of at least 30 minutes which matches the level of protection Mr. DeCrane seeks in Section R501.3.

ASTM 84 and UL 723 are already utilized in the IRC in Section R302 Fire Resistant Construction, however, the parameters above exceed those in R302 to ensure that a minimum of 30 minutes of protection is provided to the underside of the floors.

Of greater note is that material meeting the requirements of exception 4 meet or exceed the level of protection provided by fire-retardant treated wood (FRTW) that is permitted by Sections R802.1 and R802.1.3 of the IRC for protected roof framing.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: DICRISTINA-RB-1-R501.3

RB87–09/10
R501.3 (New)

Proponent: Sean DeCrane, Cleveland, OH Fire Department, representing the International Association of Fire Fighters

Add new text as follows:

R501.3 Fire floor protection. Floors within dwelling units utilizing light-frame construction shall be protected on the underside by a minimum of 5/8" gypsum board applied in accordance with Section R702.3.

Exceptions:

1. Crawl spaces where the maximum clear height from the underside of the subfloor to the void space floor is 3 feet or less and is not intended for mechanical equipment use or storage.
2. The building is protected with an automatic sprinkler system designed to NFPA 13D or Section P2904 of this code.
3. Floors in which the exposed materials are protected by materials achieving a 30-minute fire-resistance rating in accordance with ASTM E 119 or UL 263.

Reason: On August 13, 2006 a Wisconsin fire fighter was killed, and a second fire fighter injured, when the floor they were operating on collapsed sending them into the basement. One fire fighter fell directly into the room of origin and was killed, the second fire fighter landed on the opposite side of a block wall and survived by shielding herself and making an escape through a rear window. They checked the floor to ensure it was safe and solid, just prior to collapse they heard a loud crack. T

The floor they were operating on was unprotected lightweight construction that collapsed without warning. In the ensuing investigation, the National Institute for Occupational Safety and Health released report F2006-26[1]. One of the recommendations is to "modify current building codes to require that lightweight trusses be protected with a fire barrier". This should not only pertain to truss construction. There are additional forms of construction that can be determined to be lightweight, cold form steel, bar joists, wooden engineered I-beam, etc., the recent trend in residential construction is to use products that are financially beneficial. It is the belief of many of us in the fire service that as the industry engineers products to a more finite point we are losing our safety factors.

In their report 2007-12 released May 16, 2008, NIOSH[2] recommended "Ensure fire fighters are trained for extreme conditions such as high winds and rapid fire progression associated with lightweight construction". They further stated, "In this era of new lightweight construction, training procedures covering strategy and tactics in extreme operations conditions, such as high winds and lightweight building construction (i.e. materials and design) are needed for all levels of fire fighters. Lightweight constructed buildings fail rapidly with little warning, complicating rescue efforts. The potential for fire fighters to become trapped or involved in a collapse may be increased. There are twenty-nine actions for fire fighters can take to protect themselves when confronted with buildings utilizing lightweight building components as structural members. They range from looking for signs or indicators that these materials are used in buildings (such as, newer structures, large unsupported spans, and heavy black smoke being generated) to getting involved in newer building code development".

On September 27, 2007 NIOSH released report 2006-24[3] The first recommendation of the report read "Ensure that fire fighters and incident commanders are aware unprotected pre-engineered I-joist floor systems may fail at a faster rate than solid wood joists when exposed to direct fire impingement, and they should plan interior operations accordingly". The discussion of the recommendation is quite lengthy but identifies the advantages of the construction industry using this type of construction but also relates the dangers to fire fighters, "The Illinois Fire Service Institute, at the University of Illinois, conducted tests to help determine the structural stability of sample floor systems. These studies suggest that engineered wooden I-beams can fail in as little as 4 minutes and 40 seconds under controlled test conditions". The report also states that weakened floors are difficult to detect from above as the floor surface may appear intact.

On November 16, 2007, NIOSH released report F2007-07[4]. In this Fire Fighter Death in the Line-of-Duty report, NIOSH recommends "building code officials and local authorities having jurisdiction should consider modifying the current codes to require that lightweight trusses are protected with a fire barrier on both the top and the bottom". The report further states "In this incident, the floor trusses for the first floor did not have any protection on the bottom cord, which immediately exposed the trusses to fire in the basement. Unfinished basements are very common throughout the country. Basements typically house additional fire exposures such as alternative heating sources, hot water heaters, clothes dryers, etc.. It is critical for trusses and lightweight engineered wood I-beams that are used in a load-bearing assembly to be protected with a thermal barrier such as gypsum wallboard. The function of the thermal barrier is a critical factor in the fire performance of the assembly".

In April, 2005, NIOSH released their report "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures"[5.] In their release they recommended the placement of a labeling system on buildings to indicate the type of construction. While this recommendation will probably not be acceptable to residents of a one or two family home, we can mandate that they increase the protection of the construction type to provide increased safety to the residents and the responding fire fighters.

In fact, NIOSH has been concerned enough with the performance of lightweight floors in fire conditions they released a Workplace Solutions report in February, 2009, *Preventing Deaths and Injuries of Fire Fighters Working Above Fire-Damaged Floor*[6]. Authors of the report recommend; "Builders, contractors, and owners should consider protecting all floor systems, including engineered wood I-joists, by covering the underside with fire-resistant materials".

Many of the opponents of this requirement have made claims that the fire service has failed to provide technical data to support our real world experiences with the lightweight products. Since the previous ICC code cycle there have been three specific reports released by three separate test groups performing tests for different reasons. I have included their results below.

The National Research Council Canada performed a series of tests in creating their report Fire Performance of Houses, Phase I: Study of Unprotected Floor Assemblies in Basement Fire Scenarios, released December 18, 2008. The goal of the report was "With the advent of new materials and innovative construction products and systems for use in construction of houses, there is a need to understand what impacts these materials and products will have on occupant life safety under fire conditions and a need to develop a technical basis for the evaluation of their fire performance".[7] These tests were not intentionally conducted for fire fighter safety but rather to identify the dangers to the civilian occupants and their ability to self evacuate. The report states "With the relatively severe fire scenarios used in the experiments, the times to reach structural failure for the wood I-joist, steel C-joist, metal plate and metal wood truss assemblies were 35-60% shorter than that for the solid wood joist assembly".

Additionally, “For the solid wood joist assemblies, the structural failure occurred after deflection of the floor, mainly in the form of OSB subfloor failure (burn through). For all other floor assemblies, after deflection of the floor, the structural failure occurred either in the form of complete collapse into the basement or in the form of a “V” shaped collapse due to joist or truss failure”. In keeping with the intent of occupant safety the report also found “One engineered floor assembly, which gave the shortest time to reach structural failure in the open basement scenario, failed structurally in the closed basement doorway scenario before the tenability limits were reached for healthy adults of average susceptibility”. This calls into question, if it can not give the occupant time to self evacuate how will it perform when a fire fighter is performing Search and Rescue for that specific occupant. In summarizing the various test results the report found “The time gap between the onset of untenable conditions and the structural failure of the floor assembly was smaller for the engineered floor assemblies than for the solid wood joist assembly used in the experiments”. This is very serious for the responding fire fighter performing life saving Search and Rescue for occupants who have lost consciousness due to the untenable conditions. These victims may still be savable but, the performances of the lightweight assemblies indicate that, savable victims may not be reached due to floor compromise.

In 2008 Tyco Fire Suppression & Building Products performed a series of fire tests. The intent of these tests was to demonstrate the impact residential sprinklers will have in improving fire safety in one and two-family occupancies when lightweight construction is present. The results of these tests were released in 2008 as A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions.[8] In the introduction of the report the author states, “One example of the difference in fire performance of a lightweight structural member compared to solid sawn lumber is the behavior of composite wood joists. When a composite wood joist is exposed to fire, the thin oriented strand board used as the web in the joist is quickly consumed, which results in an inability of the joist to carry the load and ultimately a failure of the supported floor assembly”. Later in the introduction the report continues “Due to the greater mass per unit of surface area of the solid wood joist, it will support the floor assembly for much longer than its lightweight alternative when exposed to equivalent fire conditions”. The first test involving an unsprinklered room fire led to flashover in 7:09 from ignition and floor assembly collapse at the 11:30 mark from ignition. That is roughly four minutes from flashover we had a collapse of almost the entire 16’ x 16’ floor area. The second test results reached flashover in only 5:15 from ignition, collapse in this test occurred at 8:34 from ignition, a stunning three minutes after flashover. This would be the time the fire fighters are entering the structure for suppression and Search and Rescue efforts.

These reports are still not enough for some critics so I am referencing a third report. Underwriters Laboratories, The Chicago Fire Department and the International Association of Fire Chiefs received a grant from the Department of Homeland Security to conduct a number of tests on various topics but the main issue was to conduct tests, and report the findings, to evaluate the performance of lightweight structural components when exposed to fire and if the components can be protected. They recently issued the subsequent report *Structural Stability of Engineered Lumber in Fire Conditions*.[9] Tests assemblies were subjected to the standards of the ASTM E119 Test Standard. Two assemblies did not include a ceiling, six of the assemblies included a ceiling consisting of ½ inch thick gypsum board and one assembly included a ¾ inch plaster ceiling. A load of 40 psf was placed along two of the four edges and two 300 lb fire fighter mannequins were applied to the floor assembly. Results from the tests indicated that unprotected 12” wooden I-joist reached structural failure at the 5:58 mark in the tests. The resulting failure covered a large area of the floor. The unprotected 2” x 10” wooden I-beams reached structural collapse at the 18:45 mark in the test, a difference of over twelve minutes. These twelve minutes are critical in Search and Rescue. Further tests demonstrated that when ½ inch gypsum was placed on the 12” I-joists the collapse did not occur until the 26:45 mark in the test. Just a simple ½ covering extended the collapse time approximately twenty minutes. When the ½ inch covering was applied to the wooden I-beams the collapse time was extended to 44:45 mark in the test. One important factor to point out regarding these tests is that the fire fighters are a dead load and not a live load. Would a simulated live load of fire fighters transferring additional psi with each step or crawl have contributed to an earlier collapse? When we review the Wisconsin fire where Engineer Arnie Wolf was killed, the fire fighters stated the floor felt solid but suffered a catastrophic collapse when they began their search pattern. These tests clearly outline the performances of the various construction practices and the dangers these performances present to fire fighters. Underwriters Laboratories and the Chicago Fire Department followed these tests with an online educational program, to view go to http://www.uluniversity.us/home.aspx, in an attempt to educate the nation’s fire service on the hazards of operating in these environments.

This code change proposal is an attempt to provide a responsible means on residential construction. I have provided examples of fire fighters being killed in occupancies utilizing lightweight construction practices and the subsequent reports detailing the need to protect lightweight construction. I have also provided two reports generated by a neutral governmental agency recommending protection requirements for lightweight construction. These incidents, and others like them, have produced great hardships on the people involved, they have created widows, fatherless children, injured fire fighters and many who bear the pain of fatalities that could have been prevented. I strongly urge your support for this proposed code change.

1. National Institute for Occupational Safety and Health Report F206-26. July, 2007.
2. National Institute for Occupational Safety and Health Report F2007-12, May, 2008.
3. National Institute for Occupational Safety and Health Report F206-24, September, 2007.
4. National Institute for Occupational Safety and Health Report F2007-07, November, 2007.
5. National Institute for Occupational Safety and Health Alert, “Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures”.
6. National Institute for Occupational Safety and Health Workplace Solutions, *Preventing Deaths and Injuries of Fire Fighters Working Above Fire-Damaged Floors*, February, 2009.
7. National Research of Canada, Institute for Research in Construction; Fire performance of Houses, Phase I, Study of Unprotected Floor Assemblies in Basement Fire Scenarios, December, 2008.
8. Tyco Industries, *A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions*, September 2008.
9. Underwriters Laboratories, *Structural Stability of Engineered Lumber in Fire Conditions*, September 30, 2008

Floor assembly where Fire Engineer Arnie Wolf was killed

Residential use of cold form steel with penetrations and 24” on center

Even lighterweight materials – Georgia Pacific XJ-85

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: DECRANE-RB-1-R501.3

RB88–09/10
R502.14 (New), Chapter 44 (New)

Proponent: Joseph Fleming, representing the Boston Fire Department

1. Add new text as follows:

R502.14 Fire floor protection. Floors within dwelling units utilizing light-frame construction shall be protected on the underside by a minimum of 5/8" gypsum board applied in accordance with Section R702.3
Exceptions:

1. Crawl spaces where the maximum clear height is 3 feet or less and is not intended for use or storage.
2. The building is protected with an automatic sprinkler system designed to NFPA 13D or Section P2904 of this code.
3. Floors in which the exposed materials on the underside are protected by a Class A Fire-Retardant Coating as defined by NFPA 703.

2. Add new standard to Chapter 44 as follows:

NFPA
703-09 Fire-Retardant Treated Wood and Fire-Retardant Coatings for Building Materials

Reason: When the Building Codes in the US transitioned to lightweight components in order to provide the same structural support at lower costs it was a well intentioned idea. However, it has had tragic unintended consequences in many circumstances. The lightweight components, which provided equivalent performance, at lower cost of construction, to the previously used "heavier components" during normal use, did not provided equivalent performance during structural fires. It may have been assumed that the lighter weight components would survive long enough to let occupants escape but what about occupants who are elderly, handicapped, or trapped because of ineffective smoke alarms. In these cases, firefighters have to conduct search and rescue operations. Often firefighters arrive in the middle of the night with no information about the occupants and must assume that someone needs to be rescued. In these circumstances firefighter's lives, as well as the occupants they are searching for are being put at an unreasonable risk.

The lightweight construction was considered to provide the same "safety factor" as the older heavier construction because it performed in a similar manner under specific tests designed to measure its ability to support a load during normal conditions. However, it is important to keep in mind that these tests measured only one aspect, albeit a critical aspect, of the material's safety. (A design with little flexibility due to conservative or incomplete assumptions has little "*robustness*". A design with a lot of flexibility due to liberal and complete assumptions has a lot of "*robustness"*.) The older heavier construction was extremely "robust," in that it performed for a long time under fire conditions in the same manner that it performed under non-fire conditions. The same cannot be said for light weight construction. The lighter weight construction is not equivalent to the heavier constriction unless it is as "robust" as the heavier construction.

To correct mistakes of the past and to provide better assurance that the light weight construction is equivalent to and as "robust" as the older heavier construction we must provide extra protection to allow it to perform under fire and non-fire conditions in the same manner that heavier construction material performs.

Specific examples where fire fighters have died, or been injured, due to, structural collapse during fire because of the use of this "less expensive" design have been documented by NIOSH Firefighter Fatality Reports.

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

Analysis: The proposed new standard, NFPA 703, is currently referenced in the *International Fire Code*.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: FLEMING-RB-2-R502.14

~~RB89–09/10~~
~~R502.1.3, R602.1.1, R802.1.2~~

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

R502.1.3 End-jointed lumber. Approved end-jointed lumber identified by a grade mark conforming to Section R502.1 may be used interchangeably with solid-sawn members of the same species and grade. End-jointed lumber used in an assembly required elsewhere in this code to have a fire resistance rating shall have the designation "Heat Resistant Adhesive" or "HRA" included in its grade mark.

RB184-09/10: Add proposal as follows:

RB184–09/10

R302.1, Table R302.1(1), Table R302.1(2) (New), R309.5 (New)

Proponent: Tom Lariviere, Chairman - Joint Fire Service Review Committee

1. Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1(1); or for *dwellings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2).

Exceptions:

1. Walls, projections, openings, or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same lot.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(1)
EXTERIOR WALLS

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	(Fire-resistance rated)	1 hour-tested in accordance with ASTM E 119 or UL 263 with exposure from both sides	<5 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet to 5 feet
	(Not fire-resistance rated)	0 hours	5 feet
Openings in walls	Not allowed	N/A	<3 feet
	25% Maximum of Wall Area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R317.3	<5 feet
		None required	5 feet

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable

TABLE R302.1(2)
EXTERIOR WALLS – DWELLINGS WITH FIRE SPRINKLERS

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	(Fire-resistance rated)	1 hour-tested in accordance with ASTM E 119 or UL 263 with exposure from the outside	0 feet
	(Not fire-resistance rated)	0 hours	3 feet[a]
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet[a]
	(Not fire-resistance rated)	0 hours	3 feet
Openings in walls	Not allowed	N/A	<3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R317.3	<3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable

a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with Section P2904, the fire separation distance for non-rated exterior walls and rated projections shall be permitted to be reduced to zero feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

2. Add new text as follows:

R309.5 Fire Sprinklers. Private garages shall be protected by fire sprinklers where the garage wall has been designed based on Table R302.1(2), Footnote a. Sprinklers in garages shall be connected to an automatic sprinkler system that complies with Section P2904. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft^2. Garage doors shall not be considered obstructions with respect to sprinkler placement.

Reason: In the last code cycle, Proposal RB67-07/08 (which was withdrawn at the Final Action Hearings) provided as one of its sprinkler alternatives a reduction in exterior wall fire ratings that we believe still is a reasonable and justifiable sprinkler incentive. This proposal will provide a reasonable sprinkler alternative in the IRC when residential sprinkler systems are installed.

This proposal provides a significant financial and design incentive for residential sprinklers. From a financial perspective, the proposal permits cost reductions related to exterior wall construction and, in the case of a planned community, could result in more developable lots. From a design advantage perspective, the proposal permits homes to have larger footprints without triggering fire-rated exterior walls and permits more flexible use of windows on walls facing property lines.

From a fire safety perspective, the proposed requirements under new Table R302.1(2) generally put the code back where it was in 2000 and 2003, so there is essentially no concession compared to how homes have been built under the IRC since the code was first published in 2000. In 2006, the IRC's fire separation distances for non-rated exterior walls were increased from 3 feet to 5 feet for the purpose of coordinating the IRC's residential separation distances with those in the IBC (Code Change G128-03/04). History shows that residential sprinklers reliably limit fire spread to the room of origin, and with such protection, allowing the code to revert to a 3-foot separation distance provides a reasonable compensation for sprinklers. Certainly, the probability of a favorable outcome in the event of a fire is much better for a sprinklered building with a 3-foot separation versus a nonsprinklered building with a 5-foot separation, so encouraging sprinklers is a preferred approach.

The proposed garage requirement for R309.5 provides a limitation on the application of new Table R302.1(2) by only allowing use of sprinkler incentives in areas where sprinklers are provided. Normally, garages aren't required to have sprinklers; however, where a designer chooses to take advantage of reduced separation requirements for a garage wall, it is appropriate for the garage to be provided with sprinklers as a means of property protection. Proposed design criteria for sprinklers were derived from NFPA 13R Section 6.8.3.3, which addresses sprinkler protection for garages in buildings protected by NFPA 13R sprinkler systems. Often, garage protection is provided by dry pendent or dry sidewall sprinklers connected to a wet pipe sprinkler system.

The original Table R302.1(1) has been retained for jurisdictions that may adopt this edition of the Code without the mandatory sprinkler requirements that are presently in the 2009 IRC and for cases where there are additions or modifications to an existing non-sprinklered property.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: LARIVIERE-RB2-R302.1

RB185-09/10: Add proposal as follows:

RB185–09/10
R302.2

Proponent: Tom Lariviere, Chairman - Joint Fire Service Review Committee

Add new text as follows:

R302.2 Soffits. Soffit construction shall be securely attached to framing members and shall be constructed of a minimum of one of the following:

1. ½ inch wood sheathing or gypsum board installed under aluminum or vinyl coverings,
2. ½ inch wood sheathing or gypsum board, or
3. Other approved materials or assemblies that provide a minimum 15 minute fire rating.

Venting requirements shall apply to both soffit and underlayments and shall not exceed 150% of the minimum net free air requirements established in Section R806.2.

Reason: Greater building density has contributed to an increase in the spread of fires into the attics of adjacent, exposed structures. Many of the fires pass into the exposed building by penetrating the soffit area. This proposal provides prescriptive requirements to retard the intrusion of fire into attic spaces from exterior exposure.

This proposal will require protection of the underside of the soffit by providing a wood or gypsum board barrier. Item 3 allows the use of other materials when they are approved by the code official and provide a 15 minute fire rating.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: LARIVIERE-RB3-R302.2

RB19–09/10
Table R302.1

Proponent: Steven Orlowski, National Association of Home Builders (NAHB)

Revise table as follows:

TABLE R302.1
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour-tested in accordance with ASTM E 119 or UL 263 with exposure to both sides	<u>≤3</u> ~~5~~ Feet
	(Not fire-resistance rated)	0-Hours	<u>≥3</u> ~~5~~ Feet
Projections	(Fire-resistance rated)	1-Hour on the underside	<u>≤2</u> ~~4~~ Feet
	(Not fire-resistance rated)	0-Hours	<u>≥3</u> ~~5~~ Feet
Openings	Not Allowed	N/A	< 3 Feet
	25% Maximum of Wall Area	0-Hours	3 Feet
	Unlimited	0-Hours	5 Feet
Penetrations	All	Comply with Section R302.4	< 5 Feet
		None Required	5 Feet

Reason: The purpose of this proposed change is to retain the original fire separation distances to the dimensions used in *2003 International Residential Code*. During the 2004/2005 Code Development Cycle, the Code Committee disapproved this change given that the proponent failed to provide supporting evidence or data to sustain the increase in the fire separation distance. The committee's decision was overturned at the final action hearings without any additional substantiation being brought forth by the proponent. To this day, there are no known reports or studies that demonstrate the previously allowed 3 foot separation distance from the property line and 6 foot separation between structures failed to provide the minimum required safe distance for fire separation.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: ORLOWSKI-RB-4-T. R302.1

RB20–09/10
R302.1

Proponent: Don Davies, Salt Lake City Corporation, representing the Utah Chapter of ICC

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1. <u>Structures without exterior walls at adjoining lot lines shall not have roof projections within 5'-0" of the lot line.</u>

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.

unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

2. Add new text as follows:

R309.5 Fire Sprinklers. Private garages shall be protected by fire sprinklers where the garage wall has been designed based on Table R302.1(2), Footnote a. Sprinklers in garages shall be connected to an automatic sprinkler system that complies with Section P2904. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft^2. Garage doors shall not be considered obstructions with respect to sprinkler placement.

Reason: In the last code cycle, Proposal RB67-07/08 (which was withdrawn at the Final Action Hearings) provided as one of its sprinkler alternatives a reduction in exterior wall fire ratings that we believe still is a reasonable and justifiable sprinkler incentive. This proposal will provide a reasonable sprinkler alternative in the IRC when residential sprinkler systems are installed.

This proposal provides a significant financial and design incentive for residential sprinklers. From a financial perspective, the proposal permits cost reductions related to exterior wall construction and, in the case of a planned community, could result in more developable lots. From a design advantage perspective, the proposal permits homes to have larger footprints without triggering fire-rated exterior walls and permits more flexible use of windows on walls facing property lines.

From a fire safety perspective, the proposed requirements under new Table R302.1(2) generally put the code back where it was in 2000 and 2003, so there is essentially no concession compared to how homes have been built under the IRC since the code was first published in 2000. In 2006, the IRC's fire separation distances for non-rated exterior walls were increased from 3 feet to 5 feet for the purpose of coordinating the IRC's residential separation distances with those in the IBC (Code Change G128-03/04). History shows that residential sprinklers reliably limit fire spread to the room of origin, and with such protection, allowing the code to revert to a 3-foot separation distance provides a reasonable compensation for sprinklers. Certainly, the probability of a favorable outcome in the event of a fire is much better for a sprinklered building with a 3-foot separation versus a nonsprinklered building with a 5-foot separation, so encouraging sprinklers is a preferred approach.

The proposed garage requirement for R309.5 provides a limitation on the application of new Table R302.1(2) by only allowing use of sprinkler incentives in areas where sprinklers are provided. Normally, garages aren't required to have sprinklers; however, where a designer chooses to take advantage of reduced separation requirements for a garage wall, it is appropriate for the garage to be provided with sprinklers as a means of property protection. Proposed design criteria for sprinklers were derived from NFPA 13R Section 6.8.3.3, which addresses sprinkler protection for garages in buildings protected by NFPA 13R sprinkler systems. Often, garage protection is provided by dry pendent or dry sidewall sprinklers connected to a wet pipe sprinkler system.

The original Table R302.1(1) has been retained for jurisdictions that may adopt this edition of the Code without the mandatory sprinkler requirements that are presently in the 2009 IRC and for cases where there are additions or modifications to an existing non-sprinklered property.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: LARIVIERE-RB2-R302.1

RB185-09/10: Add proposal as follows:

RB185–09/10
R302.2

Proponent: Tom Lariviere, Chairman - Joint Fire Service Review Committee

Add new text as follows:

R302.2 Soffits. Soffit construction shall be securely attached to framing members and shall be constructed of a minimum of one of the following:

1. ½ inch wood sheathing or gypsum board installed under aluminum or vinyl coverings,
2. ½ inch wood sheathing or gypsum board, or
3. Other approved materials or assemblies that provide a minimum 15 minute fire rating.

Venting requirements shall apply to both soffit and underlayments and shall not exceed 150% of the minimum net free air requirements established in Section R806.2.

Reason: Greater building density has contributed to an increase in the spread of fires into the attics of adjacent, exposed structures. Many of the fires pass into the exposed building by penetrating the soffit area. This proposal provides prescriptive requirements to retard the intrusion of fire into attic spaces from exterior exposure.

This proposal will require protection of the underside of the soffit by providing a wood or gypsum board barrier. Item 3 allows the use of other materials when they are approved by the code official and provide a 15 minute fire rating.

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

FS155–09/10
1406.2.1; IRC R302.1.2 (New)

Proponent: Michael Love, representing Metropolitan Washington DC Fire Marshal's Committee

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE SAFETY COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IBC Fire Safety

Revise as follows:

1406.2.1 Ignition resistance. Combustible exterior wall coverings shall be tested in accordance with NFPA 268.

Exceptions:

1. Wood or wood-based products.
2. Other combustible materials covered with an exterior covering other than vinyl sidings listed in Table 1405.2.
3. Aluminum having a minimum thickness of 0.019 inch (0.48mm).
4. Exterior wall coverings on exterior walls of Type V construction.

1406.2.1.1 Fire separation 5 feet or less. Where installed on exterior walls having a fire separation distance of 5 feet (1524 mm) or less <u>to buildings, structures or decks</u>, combustible exterior wall coverings shall not exhibit sustained flaming as defined in NFPA 268.

<u>Exceptions:</u>

1. <u>Decks constructed of fire retardant treated wood</u>
2. <u>Exterior balconies and decks protected by automatic sprinklers as provided for in Section 903.3.1.2.1</u>

1406.2.1.2 Fire separation greater than 5 feet. For fire separation distances greater than 5 feet (1524 mm) <u>to buildings, structures or decks</u>, an assembly shall be permitted that has been exposed to a reduced level of incident radiant heat flux in accordance with the NFPA 268 test method without exhibiting sustained flaming. The minimum fire separation distance required for the assembly shall be determined from Table1406.2.1.2 based on the maximum tolerable level of incident radiant heat flux that does not cause sustained flaming of the assembly.

<u>Exceptions:</u>

1. <u>Decks constructed of fire retardant treated wood</u>
2. <u>Exterior balconies and decks protected by automatic sprinklers as provided for in Section 903.3.1.2.1</u>

PART II – IRC Building/Energy

Add new text as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwellings* and *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).

5. Foundation vents installed in compliance with this code are permitted.

R302.1.2. Combustible Exterior Walls and Combustible Decks . Combustible exterior wall coverings and sheathing that are ignitable below 12.5 KW/m^2 and exhibit sustained flaming shall not be used where installed on exterior walls having a fire separation distance of 5 feet (1524 mm) to combustible decks or balconies.

Exception: Decks constructed of fire retardant treated wood

Reason:
Part I- A technical change is needed to Section 1406 relating to the lack of fire resistance of the exterior surface of exterior combustible walls when directly exposed to combustible decks. It is likely that code development did not consider the need to require fire resistance for the exterior wall from these structures but there is a growing concern for the number of fires that start on and under combustible decks which when ignited burn fiercely.

This code change proposal is not intended to address all fires that could present an exposure to combustible exterior walls. It focuses on the higher risk and increased likelihood for a fire involving a combustible deck that is directly attached or within five feet of the combustible exterior wall. Since decks would have a limited exposure to a building any additional expenditure for more fire resistant materials is reduced. Ultimately a sheathing of gypsum even in thin layers increases the resistance.

1406.2.1.1 and 1406.2.1.1 both add the same language to include proximity to buildings, structures or decks and allows an exception for decks constructed of fire retardant wood.

This code change proposal is not intended to address all fires that could present an exposure to combustible exterior walls. It focuses on the higher risk and increased likelihood for a fire involving a combustible deck that is directly attached to or within five feet of the combustible exterior wall. Since decks would have a limited exposure to a building any additional expenditure for more fire resistant materials is reduced. Ultimately a sheathing of gypsum even in thin layers increases the resistance.

These fires are rarely extinguished before it has spread into the void of the exterior combustible wall or up the exterior surface of the walls and into the attic. While the most frequent facing surface of the exterior wall is vinyl siding this is listed in specs as non-combustible. There is experience that indicates no effective resistance to fire though as the siding readily melts away to allow fire access to the substrate sheathing which most often is a combustible material such as Oriented Strand Board (OSB), low density fiber board and Rigid Foam Insulation. These common materials are combustible but OSB resists direct flame longer then rigid foam insulation. Tests conducted by the National Institute for Standards and Technology showed that when a plume of heated gases and flame impinges on a combustible exterior wall it will ignite the combustible exterior wall that is within five feet. This scenario may actually be less dramatic then a well advanced fire involving an attached deck which could preheat the combustible wall and directly expose it to a vertical flame. This exposure and create a more intense flame spread vertically on the wall. Some materials used as a substrate to the exterior siding will resist fire more then others; some materials readily spread fire vertically directly to the roof along the exterior surface; into a non-fire resistant soffit then into the attic, or destroys the integrity of the substrate material and the enters the wall void.

Decks have become more like exterior rooms with furniture, outdoor kitchens and primarily the presence of people. Barbecue grills, lighting and the inappropriate disposal of smoking materials are all hazards that have been the causes of fires that first ignite decks then spread easily to and into the structure of a home or similar building. Once ignited decks burn violently with direct flame and radiant heat exposure to combustible exterior walls. The fact that the fuel in a deck is open on all sides which enhances oxidization for complete combustion and ample direct flame as well as preheating from radiant heat make them a perfect primary fire source to feed fires that most often spread to and involve the roof and attic of homes. The direct flaming attack on these walls cause nearly immediate destruction of combustible and easily degraded sidings to allow immediate access and exposure to the interior structure. Due to the unique flow of the heat and gases from the deck fires into the structure these fires most often result in near total loss of structure. In the Washington D.C Metro area these fires have resulted in many fires one incident which killed a firefighter and another fire incident that severely burned multiple firefighters.

Part II- Add a new section to IRC Chapter 3 as R302.1.2 to increase fire resistance of combustible exterior walls when directly exposed to combustible decks. It is likely that the code development process did not consider the need to require fire resistance for the exterior wall from decks but there is a growing concern for the number of fires that start on and under combustible decks which when ignited burn fiercely. IRC considers exposure buildings in regard to fire spread but does not include the hazard of combustible deck fires. While IRC has some limited passive fire resistance of residential construction through use of fire blocking and compartmentation it does not recognize the hazard of a deck involved in fire to the structure of the main building through the exterior facing of the wall.

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Cost Impact: Part I & II- Product information indicates that a product such as a gypsum-based exterior sheathing is comparable to other sheathing and is more resistant to fire.

Part I – IBC FIRE SAFETY

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

Part II – IRC BUILDING/ENERGY

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: LOVE-FS1-1406.2.1.1-RB-1-R302.1.2

FS156–09/10

1404.12, 1405.2, 1405.18 (New), 1405.18.1 (New), Table 1405.18.1 (New), 1405.18.2 (New), 1405.18.2.1 (New), Table 1405.18.2.1 (New), 1405.18.2.2 (New), Table 1405.18.2.2 (New), 1405.14.1, 1405.14.2 (New), 1405.14.2.1 (New), 1405.14.2.2 (New), 1405.14.2.3 (New), 2304.6; IRC R703.3 (New), R703.3.1 (New), Table R703.3.1 (New), R703.3.2 (New), R703.3.2.1 (New), Table R703.3.2.1 (New), R703.3.2.2 (New), Table R703.3.2.2 (New), R703.4, Table R703.4, R703.5.1, R703.6.1, R703.7.4.1, R703.11.2, R703.11.2.1, R703.11.2.2, R703.11.2.3

Proponent: Jay H. Crandell, PE, d/b/a ARES Consulting, representing the Foam Sheathing Coalition

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARI8NG ORDERS FOR THESE COMMITTEES.

PART I – IBC STRUCTURAL

1. Add new text as follows:

1404.12 Foam plastic sheathing. Foam plastic sheathing shall comply with requirements for foam plastic insulation in Section 2603. When used as a water-resistive barrier, the foam plastic sheathing material and installation shall be approved in accordance with Section 1404.2.

2. Revise as follows:

1405.2 Weather protection. *Exterior walls* shall provide weather protection for the building. The materials of the minimum nominal thickness specified in Table 1405.2 shall be acceptable as *approved* weather coverings. Foam plastic sheathing used in exterior wall covering assemblies with approved exterior weather coverings shall comply with Section 1405.18.

3. Add new text as follows:

1405.18 Foam plastic sheathing. Foam plastic sheathing used in exterior wall covering assemblies shall comply with this section, Section 2603, Chapter 13, and the foam sheathing manufacturer's approved installation instructions.

1405.18.1 Minimum thickness. The thickness of foam plastic sheathing shall comply with Table 1405.18.1.

Exception: Where foam plastic sheathing is applied directly over or behind wall sheathing or other solid substrate capable of separately resisting the required wind pressure, the limitations of Table 1405.18.1 shall not apply.

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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: WALKER-RB-1-R202

RB4–09/10
R202

Proponent: Maureen Traxler, City of Seattle, WA, representing the Seattle Department of Planning & Development

Revise definition as follows:

STORY ABOVE GRADE PLANE. Any *story* having its finished floor surface entirely above *grade plane*, ~~except that a *basement* shall be considered as a *story above grade plane*~~ or in which ~~where~~ the finished surface of the floor next above ~~the *basement* meets any one of the following~~ is:

1. ~~Is~~ More than 6 feet (1829 mm) *above grade plane*~~.~~; or
2. ~~Is more than 6 feet (1829 mm) above the finished ground level for more than 50 percent of the total building perimeter.~~
2~~3~~. ~~Is~~ More than 12 feet (3658 mm) above the finished ground level at any point.

Reason: The IRC and the IBC currently have different definitions of "story above grade plane." These changes are intended to have the IRC definition match that of the IBC.

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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: TRAXLER-RB-2-R202

RB5–09/10
R202

Proponent: James Ranfone, American Gas Association

Revise definition as follows:

TOWNHOUSE. A separately owned single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from foundation to roof and with open space on at least two sides.

Reason: To eliminate any potential misinterpretation that the townhouse definition is not to be applied to multifamily townhouse-like construction or developments. The States of Florida and Georgia are in the process of amending their adopted IRC in a similar manner.

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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: RANFONE-RB-1-R202

RB6–09/10
R202

Proponent: Dennis Pitts, American Forest & Paper Association

Revise definition as follows:

WOOD/PLASTIC COMPOSITE. A composite material made primarily from wood or cellulose-based materials ~~and~~ in combination with a smaller fraction of plastic(s) by weight.

Reason: This change is being put forward to coordinate the IRC definition with revisions under consideration for ASTM D 7032. The revision clarifies that the "primary" material in the composite is wood or other cellulose-based material with plastic(s) representing a smaller fraction of material.

4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason: There are currently no provisions in the residential code to limit the roof projection for carports and patio covers where there is no exterior wall adjoining the lot line. Since carports and patio covers have openings exceeding 25% they must be placed at least 5 feet from the lot line as required in I.R.C. Table R302.1. Fire-resistance rating of the projections beyond the exterior walls is addressed in I.R.C. Table R302.1; but in the instance where there is no wall, rating a portion of the roof covering serves no useful purpose and is not addressed by Table R302.1 which deals with exterior walls.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: DAVIES-RB-1-R302.1

RB21–09/10
R302.1

Proponent: Maureen Traxler, City of Seattle, WA, representing the Seattle Department of Planning & Development

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwellings* and accessory buildings shall comply with Table R302.1.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. No protection is required for walls, projections, openings or penetrations in walls of structures located on the same lot where the *fire separation distance* is measured between a dwelling and a structure accessory to it. Garages shall comply with Section R302.6, ~~Walls of *dwellings* and *accessory structures* located on the same *lot*.~~
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason: As written, exception #2 does not clearly indicate which walls are exempt from the requirements of Table R302.1, or whether it applies to penetrations or openings in the walls. For example, a large shed (which is not exempt from a permit) that is accessory to a dwelling may be within 3' of the lot line, but according to exception #2 the shed wall nearest the property line does not need to be protected, because it is on the same lot as the dwelling. That does not meet the intent of the code. This proposal better indicates which walls and wall elements the exception applies to, and provides a cross reference to the section that has requirements specific to garages, since garages requirements differ from those of Table R302.1.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: TRAXLER-RB-4-R302.1

RB22–09/10
R302.2, R302.2.4

Proponent: Michael Gardner, representing the Gypsum Association; Jason Thompson, PE, National Concrete Masonry Association (NCMA), representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

R 302.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302.1 for exterior walls.

Exception: A common ~~1-hour~~ 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.

R 302.2.4. Structural independence. Each individual townhouse shall be structurally independent.

Exceptions:

1. Foundations supporting *exterior walls* or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common 1~~-hour~~ 2-hour fire-resistance-rated wall as provided in Section R302.2.

Reason: (Gardner) Lost in the outcome of last fall's debate on residential sprinklers was the impact it made on the common walls that are often used to separate townhouse units. One of the approved proposals that incorporated sprinkler systems into townhouses reduced the rating on the common wall that can be used between townhouse units from two hours to one hour. This proposal is intended to restore the two hour rating to the common wall.

The 2009 IRC permits townhouses a structural independence exemption if they are separated by a common one-hour rated wall that complies with Section 302.2. The 2009 IRC also contains no mandatory sound transmission requirements for common walls. As a consequence, the 2009 IRC will permit two adjacent three story townhouse units to be separated by a common wall that displays no structural independence characteristics and has an STC rating of approximately 33.

Because of the reduced rating, a fire that overwhelms the sprinkler system in a room abutting the common wall will display an increased potential to adversely impact the structural integrity of the common wall and the adjacent townhouse units. In addition, the lack of a robust sound barrier between units creates the potential for a less than acceptable living environment.

The 2006 IRC required the common wall to maintain a two-hour rating. While the 2006 IRC also contained a structural independence exemption, the common two-hour wall required by the code provided an obvious level of increased fire protection not evidenced in the 2009 IRC. The 2006 code, by mandating a two-hour rating, also required the use of a wall that would automatically display a minimum STC rating almost 10 points higher than the minimum wall required by the 2009 code.

The code has never permitted the common wall that may be constructed by the exception to R 302.2 to display a rating that is lower than the rating that would be achieved by the standard charging language in R302.2. That section has historically required townhouses to be evaluated as separate buildings and to be constructed with separate and parallel exterior walls that separate the two adjacent units. The 2009 IRC now permits the common wall to have a lower rating than the basic walls prescribed by the code and also permits the common wall to be constructed without the structural independence characteristics required by R302.2.

Reason: (Thompson) Code change RB66-07/08 required townhouses constructed in accordance with the International Residential Code to be provided with automatic sprinkler protection. While this new requirement added a fire safety feature to townhouses the code change also reduced the level of fire safety that existed in the code by reducing the fire resistance rating required for the common wall separating dwelling units in townhouses. This code change will restore the previous IRC code requirement that the common wall separating dwelling units in townhouses to have a minimum fire resistance rating of 2-hours. There are several reasons why the common wall fire resistance rating needs to be returned to 2-hours.

First, Code Change RB66-07/08 justified the addition of mandatory sprinkler protection for townhouses based on sprinklers being the best tool for providing additional fire safety in residential occupancies. Given that the 2006 IRC already had an established level of fire safety for residential occupancies utilizing townhouse construction with 2-hour fire rated construction for the common wall, the goal for improving fire safety with the addition of sprinkler protection was not fully achieved. The existing level of fire safety was diminished by the reduction in the fire resistance rating of the common wall from 2-hours to 1-hour.

Second, Code Change RB66-07/08 created an inconsistency in the IRC. If two separate one and two family dwellings are constructed on individual lots and each built at the property line, Section R302.1 and Table R302.1 will require the exterior wall of each structure to be built with a 1-hour fire resistance rating using a fire exposure from both sides. The net result is that both dwellings are separated from the other adjacent, closely located dwelling by wall construction with a total cumulative fire resistance of 2-hours. Yet, if these same two individual structures are physically connected at the property line by a common wall the code permits the fire resistance rating between townhouse units to be reduced to 1-hour. The level of fire safety for these two dwelling configurations is not consistent

This code change achieves the full level of fire safety provided for in residential occupancies through the use of sprinkler protection and built-in fire resistant construction. It also will eliminate the fire safety inconsistency in the IRC between dwelling units built at property lines and dwelling units constructed as townhouses and connected at property lines by a common wall.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: GARDNER-RB-3-THOMPSON-RB-1-R302.2

Exception: A parapet is not required in the two cases above when the roof is covered with a minimum class C roof covering, and the roof decking or sheathing is of noncombustible materials or *approved* fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of 5/8-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by a minimum of nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a minimum distance of 4 feet (1219 mm) on each side of the wall or walls and there are no openings or penetrations in the roof within 4 feet (1219 mm) of the exterior or common walls.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher roof deck shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

Reason: This change is proposed to provide consistency between the IRC and the IBC. Specifically, to make IRC Section R302.2.2 consistent with IBC Section 705.11(4). This change would make townhouse construction consistent between both the IRC and the IBC for this type construction.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: ANDERSON-RB-1-R302.2.2

RB25–09/10
R302.3

Proponent: Steven Orlowski, National Association of Home Builders (NAHB)

Revise as follows:

R302.3 Two-family dwellings. *Dwelling units* in two-family dwellings shall be separated from each other by wall and/or floor assemblies having not less than a 1-hour fire-resistance rating when tested in accordance with ASTM E 119 or UL 263. Fire-resistance-rated floor-ceiling and wall assemblies shall extend to and be tight against the *exterior wall*, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D or Section P2904.
2. Wall assemblies need not extend through *attic* spaces when the ceiling is protected by not less than 5/8-inch (15.9 mm) Type X gypsum board and an *attic* draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings*. The structural framing supporting the ceiling shall also be protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

Reason: The purpose of this proposal is to reference the applicable residential fire sprinkler standard for one- and two- family dwellings, along with the relevant provisions within the *International Residential Code* regarding the installation of a plumbing based fire suppression system as referenced in Section P2904.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: ORLOWSKI-RB-5-R302.3

RB26–09/10
R302.5.1

Proponent: Sean DeCrane, Cleveland, OH Fire Department, representing the Cleveland Fire Department and the International Association of Fire Fighters

Revise as follows:

R302.5.1 Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than 13/8 inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 13/8 inches (35 mm) thick, or 20-minute fire-rated doors equipped with a self-closing device.

Reason: There are times when proposed code submittals require a very lengthy substantiation, and then there are times when code change proposals just make sense. I would believe this is one of those times where a code change proposal makes a lot of sense. We are seeking a requirement to install items for very minimal costs yet great life saving potentials.

As we place greater amounts of thermoplastics in our homes and garages, especially kids' toys, we are increasing the fuel load and toxic by-products. The most obvious by-product of incomplete combustion is carbon monoxide. We know how deadly carbon monoxide is to the occupants of homes. Carbon monoxide is also a by-product of the internal combustion engine. Especially during the winter months the fire service responds to numerous cases of potential carbon monoxide incidents. With an open door between the living quarters and the garage, where the car is warming up for the trip to work, we are allowing the free flow of carbon monoxide from the garage into the home. Some may not believe there is a concern with this situation and may also point out some difficulty in reporting the data of exactly how many individuals were killed by these incidents. Creating and submitting code proposals is about the present but also the future. With the reversal of the code requirement of a self closing door we are allowing millions of homes to be built with a potential safety hazard. Carbon monoxide is a silent and deadly killer and in many incidents the victims do not realize they are slowly being exposed to potentially life threatening levels of carbon monoxide. This is one of the reasons the ICC membership voted to require the installation of carbon monoxide detectors.

We know that requirement of carbon monoxide detectors will save lives. In fact, I have seen numerous responses where a detector alerted an occupant to the presence of dangerous amounts of carbon monoxide, which in turn, allowed them to notify the fire department. With a lack of a requirement of a self closing door we have the potential of creating a Peter Cried wolf situation that will be played out across the country. A self closing door helps to protect the occupants of a home from the dangers in the garage. During the fall and winter months many occupants warm their car before leaving for work or to run an errand. With the increase use of remote starters many of these individuals are engaging their vehicle without visual contact. This creates a potential for the migration of carbon monoxide to the living quarters, even if this amount is not in a lethal range it will be in range to initiate a response from the CO detector, thereby, requiring a response from the local fire department. A response to requires fire fighters and equipment and incurs costs. It also places a responding company in emergency mode while responding increasing the risks to those fire fighters and other drivers at an increased risk. If the fire service downgrades responses to CO alarms then we risk the potential of placing citizens at risk who are truly experiencing a CO emergency. The argument is not to remove the detectors but to place an added protection of a self closing door between the living quarters and the garage.

Even if an individual does not believe that Carbon Monoxide is a true threat there are additional products of combustion that are far deadlier than CO. Hydrogen Cyanide is increasingly being identified as a potential life hazard in fire incidents. In a report published by the Cyanide Poisoning Treatment Coalition, it is reported when the National Institute of Occupational Safety and Health completed their studies of the tragic Station Night Club fire in Warick, RI they found "Within seconds of the ignition of the fire, concentrations of the toxic products carbon monoxide and hydrogen cyanide soared and oxygen levels plummeted to create conditions incompatible with sustaining life"[1]. The report noted "that hydrogen cyanide is approximately 35 times more toxic than carbon monoxide during acute exposure". In tests conducted and referenced by the report, "a series of experiments the Swedish National Testing and Research Institute (SNTRI), assessed the emission of hydrogen cyanide and carbon monoxide under both non-flaming (i.e. pyrolizing) and flaming (i.e. fire) conditions during burning of wool, nylon, synthetic rubber, melamine, and polyurethane foam. The results show that all of these substances liberated high quantities of cyanide when burned-particularly under pyrolizing conditions characterized by low oxygen". If we take a step back and look at most garages, when the garage door is closed, they are box structures that will allow smoke and the by-products of a fire to travel in the least restrictive path, the open door. An open door between the garage and living quarters allows the easy access for the highly toxic by-products of combustion.

To summarize, deadly by-products of combustion, accidental carbon monoxide poisonings from vehicles and needless nuisance alarms are strong, and compelling, arguments to support this code change proposal requiring self closing doors between the garage and living areas in one and two-family homes.

[1] *Smoke Perceptions, Myths and Misunderstandings*, Cyanide Poisoning Treatment Coalition

Cost Impact: The code change proposal will minimally increase costs of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: DECRANE-RB-3-R302.5.1

The CPSC identified 15,600 fires associated with dryers in a single year. Studies have shown that metal ducts protect the structure from the spread of fire. Additionally, noncombustible material or fire caulk around the annular space prevents the fire from spreading into the wall or ceiling cavity. The same can be accomplished with manufactured noncombustible receptacles. The noncombustible receptacles also allow for the proper storage and recoil of the transition flexible duct to a metal duct.

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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: BALLANCO-RB-1-R302.11

RB36–09/10
R302.12

Proponent: Fire Chief Kevin A. Gallagher, Town of Acushnet, MA, representing the Fire Chief's Association of Massachusetts

Revise as follows:

R302.12 Draftstopping. In combustible construction where there is usable space both above and below the concealed space of a floor/ceiling assembly, draftstops shall be installed so that the area of the concealed space does not exceed ~~1,000~~ 500 square feet (~~92.9m2~~) (46.45m^2). Draftstopping shall divide the concealed space into approximately equal areas. Where the assembly is enclosed by a floor membrane above and a ceiling membrane below, draftstopping shall be provided in floor/ceiling assemblies under the following circumstances:

1. Ceiling is suspended under the floor membrane.
2. Floor framing is constructed of truss-type open web or perforated members.

Reason: Currently R302.12 requires draftstopping in void spaces created by a floor membrane above and ceiling membrane below if the area (length x width) is in excess of 1,000 square feet. The unit of measurement does not take into consideration the height of the void.

Prefabricated construction allows for the construction of both ceiling and floor assemblies in typical wood frame, "modular" residential residences. When the modular boxes are assembled on-site, the upper story boxes are laid to rest on the top of the lower level boxes. With each unit having a complete ceiling and floor assembly a void space is created between levels of useable space. It is not uncommon for these void spaces to be up to twenty (20) inches in height and encompass the full length and width of the modular boxes.

Two fires in Massachusetts in 2008 demonstrate the speed in which fire can spread once it penetrates the void space. Both fires occurred in two story homes of modular construction and entered the structure from the exterior. Both structures consisted of two, first level boxes measuring 48 feet by 14 feet joined at a marriage wall with two similar size boxes situated above and also attached at a marriage wall. The void spaces created by this assembly was 672 square feet in the front with a similar size void space in the rear. However, the distance between the floor and ceiling membrane measured 20 inches thus creating a void of 1,116 cubic feet.

It is common practice in the prefabricated home industry to utilize polyurethane foam structural adhesives on one side of the structural members that supports the gypsum board ceiling. Tests have shown that certain types of structural adhesives are easy to ignite, burn at a rapid rate, generate considerable heat energy and lose considerable amounts of mass. These adhesives are found inside the void space.

The area created by the void (672 square feet) in either of the two Massachusetts modular homes that were destroyed by fire did not trigger the Code requirement for draftstopping. Once the fire entered the void it spread -- in an unobstructed fashion -- the full length and width of the void space. The fire also destroyed the primary means of affixing the gypsum board to the ceiling membrane thus expedited ceiling collapse and exposing the lower levels to fire conditions.

Draft stops, as defined by Section R202 (Definitions) are designed to "restrict the movement of air within open spaces of concealed areas of building components. " Floor / ceiling assemblies are included in the stated list of qualifying building components. The free movement of superheated air, gases and other products of combustion pre-heats structural members within the void space. In the presence of flammable polyurethane structural adhesives, the spread of heat, gases and fire is increased. The collapse of the ceiling membrane, considerable distances from the location of the fire, is a very real possibility.

This Code change attempts to reduce the size of the void space found in multistory residences of modular construction by reducing the trigger for draftstopping from 1,000 square feet to 500 square feet. As currently written, the Code requires a reduction by 50% of void spaces in excess of 1,000 square feet. A void space meeting the draftstopping requirements and 1,001 square feet would be reduced to two void spaces each approximately 500 square feet in area. Changing the trigger for draftstopping to 500 square feet would capture those void spaces that range in size between 500 – 1,000 square feet.

This proposal substitutes new measurement criteria for current provisions of the Code.

FLOOR
CEILING

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: GALLAGHER-RB-2-R302.12

RB37–09/10
R302.12

Proponent: Fire Chief Kevin A. Gallagher, Town of Acushnet, MA, representing the Fire Chief's Association of Massachusetts

Revise as follows:

R302.12 Draftstopping. In combustible construction where there is usable space both above and below the concealed space of a floor/ceiling assembly, draftstops shall be installed so that the ~~area~~ volume of the concealed space does not exceed 1,000 ~~square~~ cubic feet ~~(92.9 m^2)~~ (28.32 m^3). Draftstopping shall divide the concealed space into approximately equal areas. Where the assembly is enclosed by a floor membrane above and a ceiling membrane below, draftstopping shall be provided in floor/ceiling assemblies under the following circumstances:

1. Ceiling is suspended under the floor membrane.
2. Floor framing is constructed of truss-type open web or perforated members.

Reason: Currently R302.12 requires draftstopping in void spaces created by a floor membrane above and ceiling membrane below if the area (length x width) is in excess of 1,000 square feet. The unit of measurement does not take into consideration the height of the void.

Prefabricated construction allows for the construction of both ceiling and floor assemblies in typical wood frame, "modular" residential residences. When the modular boxes are assembled on-site, the upper story boxes are laid to rest on the top of the lower level boxes. With each unit having a complete ceiling and floor assembly a void space is created between levels of useable space. It is not uncommon for these void spaces to be up to twenty (20) inches in height and encompass the full length and width of the modular boxes.

Two fires in Massachusetts in 2008 demonstrate the speed in which fire can spread once it penetrates the void space. Both fires occurred in two story homes of modular construction and entered the structure from the exterior. Both structures consisted of two, first level boxes measuring 48 feet by 14 feet joined at a marriage wall with two similar size boxes situated above and also attached at a marriage wall. The void spaces created by this assembly was 672 square feet in the front with a similar size void space in the rear. However, the distance between the floor and ceiling membrane measured 20 inches thus creating a void of 1,116 cubic feet.

It is common practice in the prefabricated home industry to utilize polyurethane foam structural adhesives on one side of the structural members that supports the gypsum board ceiling. Tests have shown that certain types of structural adhesives are easy to ignite, burn at a rapid rate, generate considerable heat energy and lose considerable amounts of mass. These adhesives are found inside the void space.

The area created by the void (672 square feet) in either of the two Massachusetts modular homes that were destroyed by fire did not trigger the Code requirement for draftstopping. Once the fire entered the void it spread -- in an unobstructed fashion -- the full length and width of the void space. The fire also destroyed the primary means of affixing the gypsum board to the ceiling membrane thus expedited ceiling collapse and exposing the lower levels to fire conditions.

This Code change attempts to reduce the size of the void space found in multistory residences of modular construction by incorporating the height of the void thus changing the unit of measurement from square feet to cubic feet. Draft stops, as defined by Section R202 (Definitions) are designed to "restrict the movement of air within open spaces of concealed areas of building components. " Floor / ceiling assemblies are included in the stated list of qualifying building components. The free movement of superheated air, gases and other products of combustion pre-heats structural members within the void space. In the presence of flammable polyurethane structural adhesives, the spread of heat, gases and fire is increased. The collapse of the ceiling membrane, considerable distances from the location of the fire, is a very real possibility.

Applying this Code change to traditional, stick framed construction would yield the following results; a void space of 1,000 square feet which incorporates floor framing consisting of an open web truss system of 12" depth would calculate to 1,000 cubic feet resulting in no change from the current code. The same void space with an 18" depth to the open web truss would generate 1,500 cubic feet thus requiring draftstopping. A 24" open web truss would create a void space of 2,000 cubic feet thus requiring compartmentalization.

By reducing the overall size of the void, the lightweight engineered structural components found inside the void are offered protection under fire conditions.

This proposal substitutes new measurement criteria for current provision of the Code.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: GALLAGHER-RB-1-R302.12

1004.7 Fixed seating. For areas having fixed seats and aisles, the occupant load shall be determined by the number of fixed seats installed therein. The occupant load for areas in which fixed seating is not installed, such as waiting spaces and wheelchair spaces, shall be determined in accordance with Section 1004.1.1 and added to the number of fixed seats.

For areas having fixed seating without dividing arms, the occupant load shall not be less than the number of seats based on one person for each 18 inches (457 mm) of seating length.

The occupant load of seating booths shall be based on one person for each 24 inches (610 mm) of booth seat length measured at the backrest of the seating booth.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: Conner-E5-1028.15

E150–09/10

1029.1 (IFC [B] 1029.1); IRC R310.1

Proponent: Steven Orlowski, representing National Association of Home Builders

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC MEANS OF EGRESS COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IBC MEANS OF EGRESS

Revise as follows:

1029.1 (IFC [B] 1029.1) General. In addition to the means of egress required by this chapter, provisions shall be made for emergency escape and rescue in Group R and I-1 occupancies. Basements and sleeping rooms below the fourth story above grade plane shall have at least one exterior emergency escape and rescue opening in accordance with this section. Where basements contain one or more sleeping rooms, emergency escape and rescue openings shall be required in each sleeping room, but shall not be required in adjoining areas of the basement. Such openings shall open directly into a public way or to a yard or court that opens to a public way.

Exceptions:

1. In ~~other than Group R-3 occupancies,~~ Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, ~~or~~ 903.3.1.2 or 903.3.1.3.
2. In other than Group R-3 occupancies, sleeping rooms provided with a door to a fire-resistance-rated corridor having access to two remote exits in opposite directions.
3. The emergency escape and rescue opening is permitted to open onto a balcony within an atrium in accordance with the requirements of Section 404, provided the balcony provides access to an exit and the dwelling unit or sleeping unit has a means of egress that is not open to the atrium.
4. Basements with a ceiling height of less than 80 inches (2032 mm) shall not be required to have emergency escape and rescue windows.
5. High-rise buildings in accordance with Section 403.
6. Emergency escape and rescue openings are not required from basements or sleeping rooms that have an exit door or exit access door that opens directly into a public way or to a yard, court or exterior exit balcony that opens to a public way.
7. Basements without habitable spaces and having no more than 200 square feet (18.6m^2) in floor area shall ~~not be required to have emergency escape windows.~~

PART II – IRC BUILDING/ENERGY

R310.1 Emergency escape and rescue required. Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) above the floor. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below

the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

~~Exception~~ Exceptions:

1. Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m^2).
2. Emergency escape and rescue openings shall not be required in one- and two family dwellings and townhouses that are equipped with an approved automatic sprinkler system in accordance with Section R313 or Section P2904.

Reason: Based on extensive research on the performance of residential smoke alarms, the NFPA 72 technical committee on residential alarms has determined that both ionization and photoelectric smoke alarms provide adequate escape time along the normal path of egress in both fast flaming and slow smoldering fires. In tests conducted by NIST, the results show that when smoke alarms are present and functioning properly, these devices will detect and notify the occupant with enough time to vacate the structure prior to untenable conditions being reached within the dwelling. The purpose for the emergency egress is to provide a secondary means of escape and rescue, in the event that the normal path of egress becomes blocked or conditions are unsustainable.

During the last code development cycle, the sprinkler proponents testified that residential fire sprinklers are effective in 96% of the fires that grow large enough to activate the system. With the recent addition of residential sprinklers, the time for evacuating the structure before conditions become untenable and incapacitate the occupant have been extended. When sprinklers are used in tandem with smoke alarms, the available escape time in a fast flaming fire is increased and occupants are given more time for escape. Proponents also testified that when sprinklers are present it will provide additional time for firefighters to conduct search and rescue, since the fire will be either extinguished or contained.

If homes are required to be equipped with both an active suppression system and alarm system, it is time to start reevaluating the need for some of the passive life safety features in the home that have previously been justified to protect occupants in the event of a fire. While this proposal may raise the eyebrows of many skeptics, the concept of not requiring emergency egress and rescue openings in one- and two- family dwellings equipped with an automatic suppression system is not new since this exception has been permitted in NFPA 101 The Life Safety Code for several years. In addition, the International Building Code has exempted R-1, R-2 and I-1 occupancies from requiring emergency escape and rescue openings when an approved automatic suppressions system is installed.

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

PART I – IBC MEANS OF EGRESS

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IRC BUILDING/ENERGY

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME:Orlowski-E1-1029.1

E151–09/10

406.2.2, [F] 907.5.2.3.4, 1007.9, 1011.3, 1022.8, 1104.4, 1106.7, 1108.2.2, 1108.2.3, 1108.4.1.1, 1108.4.1.2, 1108.4.1.4, 1108.4.1.5, 1109.1, 1109.2.1.1, 1109.2.2, 1109.2.3, 1109.3, 1109.4, 1109.6, 1109.8, 1109.13, [P] 2902.4, 3001.3, 3411.6, E104.3, E105.1, E105.2.1, E105.2.2, E105.3, E105.4, E105.6, E106.2, E106.3, E106.4, E106.4.9, E106.5, E107.2, E109.2.1, E109.2.2.1, E109.2.6, E109.2.8, E110.4; IFC 907.5.2.3.4, [B] 1007.9, [B] 1011.3, [B] 1022.8; IPC 403.4; IEBC [B] 310.6, 605.1

Proponent: Curt Wiehle, Minnesota Construction Codes and Licensing Division, representing CCLD

THIS IS A 4 PART CODE CHANGE. ALL FOUR PARTS WILL BE HEARD BY THE MEANS OF EGRESS COMMITTEE AS SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THIS COMMITTEE.

PART I – IBC MEANS OF EGRESS

Revise as follows:

1101.2 Design. Buildings and facilities shall be designed and constructed to be accessible in accordance with this code and ICC A117.1.

RB186-09/10: Add proposal as follows:

RB186–09/10
R310.1

Proponent: Tom Lariviere, Chairman - Joint Fire Service Review Committee

Revise as follows:

R310.1 Emergency escape and rescue required. Basements, habitable attics, and every sleeping room shall have at least one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) above the floor. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

Exceptions:

1. Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m^2).
2. In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

Reason: Fire sprinklers are universally recognized as the most effective means of reducing America's fire losses and preventing firefighter deaths and injuries associated with firefighting operations. Both of these objectives are fundamental to the mission of fire and life safety. This proposal is based on the increased safety provided when residential fire sprinklers are installed.

The use of construction allowances based on the installation of fire sprinkler systems is traceable in model building codes for at least 80 years, and today, these construction allowances are woven into the text of nearly every ICC code. Likewise, in communities throughout the United States where residential sprinklers are required, construction allowances have played a critical roll in developing and maintaining community support for sprinklers. Nevertheless, construction allowances based on the installation of fire sprinklers remain few and far between in the IRC, offering little to offset the cost of installing sprinklers or to enhance their value through building design options.

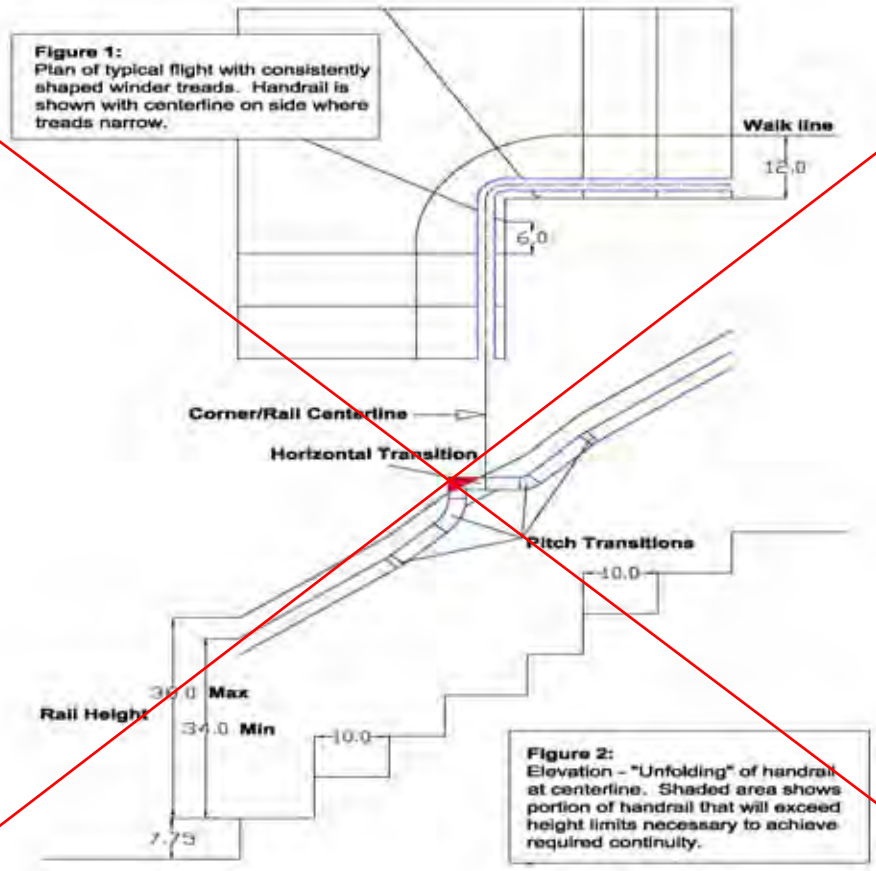
This proposal will provide greater flexibility to use a variety of window types and configurations to provide required light and ventilation (it should be noted an exception to the emergency escape window requirement is unlikely to result in rooms without windows or doors because rooms will still require light and ventilation to comply with R303.1 and it seems unlikely that homeowners would choose to forgo natural light in bedrooms). For example, by allowing side-hinged windows, smaller windows or strategically positioned windows that wouldn't meet the current escape window requirements, there are potential gains in energy efficiency and wind resistance versus traditional hung windows with friction seals used to meet escape provisions.

To those who might regard egress windows as a safety feature that should not be equated to sprinkler protection, consider that the IBC already allows elimination of escape windows in Groups R-1, R-2, R-4 and I-1 occupancies (IBC Section 1028, Exception 1) based on the installation of fire sprinklers. It simply makes no sense that sprinkler protection should be considered as providing adequate safety without escape windows in fraternities, apartments, hotels, adult care, child care and assisted living facilities, among others, but not in one- and two family dwellings. In fact, even the NFPA Life Safety Code, a document with a pure life safety focus, provides an exception to the escape window requirement for one- and two-family dwellings [2006 NFPA 101, Section 24.2.2.1.2(2)] based on the installation of fire sprinklers in accordance with NFPA 13D. Recognizing the high level of safety that will be provided in homes that have both smoke alarms and sprinklers, providing adequate time for occupants to escape a fire using the normal means of egress, and with so much code precedent and a high incentive value, it makes sense to extend the sprinkler allowance for escape windows to include one- and two-family dwellings and townhouses.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: LARIVIERE-RB4-R310.1



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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: COOPER-RB-2-R311.7.7.1

RB50–09/10
R311.9 (New)

Proponent: Katherine Bang, City of Portland, OR, representing the City of Portland and Bureau of Development Services

Add new text as follows:

311.9 Exit Discharge. When walkways connecting the required exit door with the public right of way are less than 10 feet from the building and travel in front of other dwelling units or garages, the exterior walls shall have not less than 1-hour fire resistive construction for a distance of 10 feet above grade and openings shall be protected with 45 minute assemblies.

Exceptions:

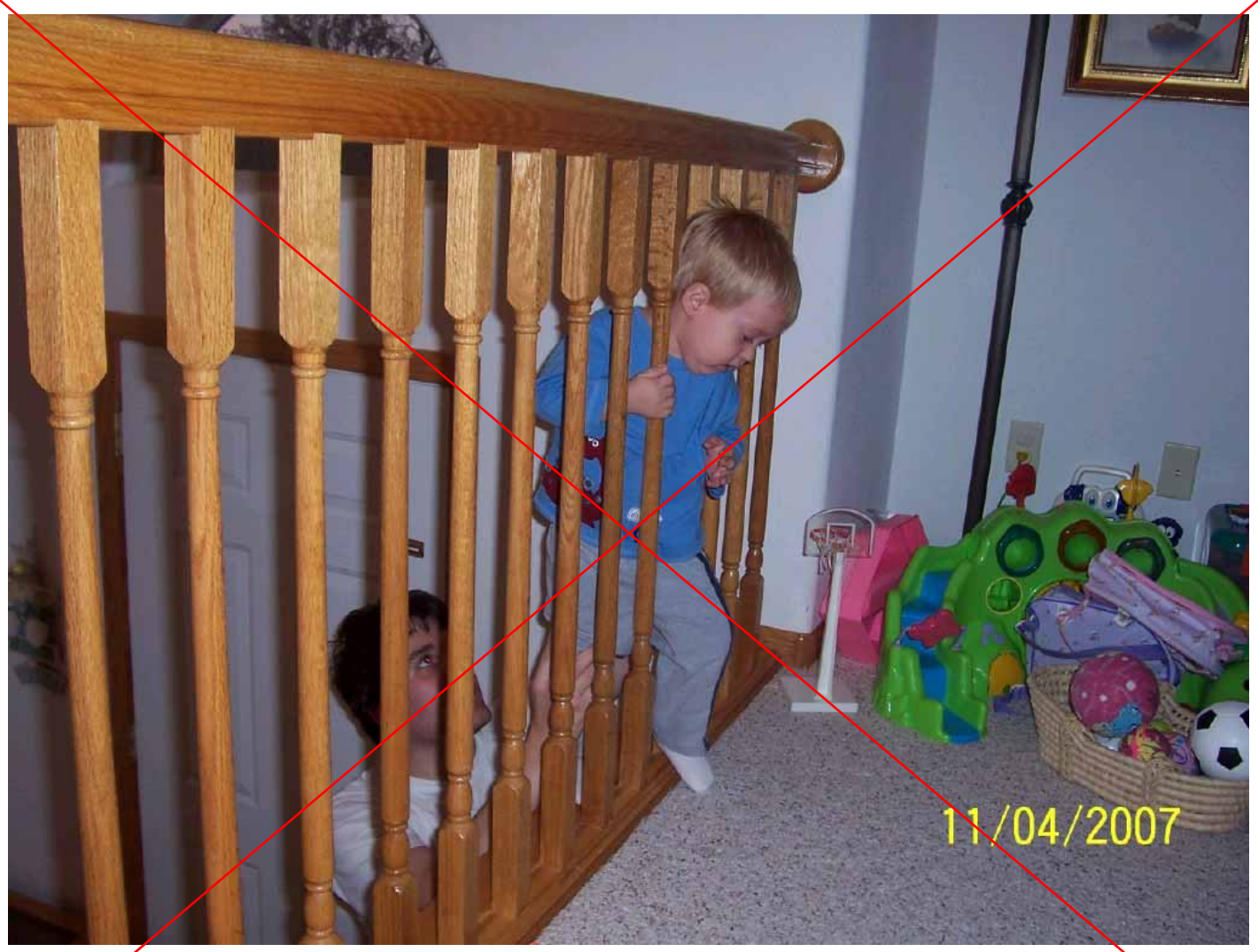
1. Fully sprinklered buildings.
2. Exterior walkways allowing travel in two directions to either the public right of way or an area of refuge no less than 50 fifty feet from all buildings on the property.

Reason: Townhouses have become more common in recent years and in some instances the townhouses are oriented such that the exterior exit door faces an interior property line. The occupants are required to travel past other dwelling units to reach the public right of way. Since the residential code allows unprotected walls and openings within 3 feet of the property line, the path of exit discharge can be easily compromised. The residential code is silent about the path of exit discharge. This is becoming a fire and life safety concern with the code now allowing multiple dwelling units on the lot.

Cost Impact: There is potential cost impact from the proposed amendment.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: BANG-RB-1-R311.9



Cost Impact: The cost of balusters and spindle product costs and installation will increase and could double the original cost prior to this change.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: Kerlik-RB-1-R312.3

RB53–09/10

R313.1, R302.2, R302.2.4

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

R313.1 Townhouse automatic fire sprinkler systems. An automatic residential fire sprinkler system shall be installed in *townhouses*.

Exceptions:

1. Townhouse groups containing six or fewer dwelling units and that are not more than two stories in height above grade plane.
2. An automatic residential fire sprinkler system shall not be required when *additions* or *alterations* are made to existing *townhouses* that do not have an automatic residential fire sprinkler system installed.

R302.2 Townhouses. Each *townhouse* shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302.1 for exterior walls.

Exception: A common ~~1-hour~~ 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.

R302.2.4 Structural independence. Each individual *townhouse* shall be structurally independent.

Exceptions:

1. Foundations supporting *exterior walls* or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. *Townhouses* separated by a common ~~1-hour~~ 2-hour fire-resistance-rated wall as provided in Section R302.2.

Reason: This proposal accomplishes two things. First, it interjects some reason into requirements for sprinkler systems for small townhouse developments. Small townhouse developments are common in smaller communities for elderly or low income housing. These communities often have limited water supplies available and the cost of sprinkler systems creates an economic hardship. By allowing unsprinklered townhouse groups with no more than six dwelling units and not more than two stories in height, some affordability will be reintroduced to the code. Townhouses have passive fire protection between each unit and do not have a history of unsatisfactory fire performance.

The second part of this code change eliminates the ability to use a 1 hour rated wall in townhouses with fire sprinklers. Townhouses are permitted to have separate water services for each dwelling unit. The recent mortgage crises has resulted in scattered townhouse units being foreclosed and water services in these dwelling units shut off by the water utility both for nonpayment and because the dwelling units are not heated, again possibly for non-payment. This is done without the knowledge of the local building departments and even if the building departments knew of the utility shut offs; they are powerless to require a utility to provide service to a nonpaying customer. This results in occupied townhouses separated from non-occupied townhouses that have no sprinkler protection and only a 1-hour fire wall between them. Unoccupied dwellings are presumed to have a higher fire risk due to the potential for arson or vandalism and allowing the reduction in passive fire protection is inappropriate, dangerous, and short sited.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: DAVIDSON-RB-9-R313.1

RB54–09/10
R313.1, R313.2, R313.2.1

Proponent: Steven Orlowski, National Association of Home Builders (NAHB)

Revise as follows:

R313.1 Townhouse automatic fire sprinkler systems. When provided, ~~A~~ an automatic residential fire sprinkler system shall be installed in townhouses in accordance with section R313.1.1.

Exception: An automatic residential fire sprinkler system shall not be required when additions, ~~or~~ alterations, or repairs are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.

R313.2 One- and two-family dwellings automatic fire sprinkler systems. ~~Effective January 1, 2011,~~ When provided, an automatic residential fire sprinkler system shall be installed in one- and two-family dwellings in accordance with Section R313.2.1.

Exception: An automatic residential fire sprinkler system shall not be required for additions, ~~or~~ alterations, or repairs to existing buildings that are not already provided with an automatic residential fire sprinkler system.

Reason: The purpose of this proposal is to delete the reference of the mandatory requirement of residential sprinkler systems in all one- and two-family dwellings and townhouses and replace with language that explains the proper installation design and requirements of the system when it is provided. This change will provide the homeowner with the continued ability to choose whether or not a residential fire sprinkler system is appropriate for their situation.

NAHB strongly disagrees with the fire services perception of America's fire problem and the proposed solution to reduce the number of fire fatalities that occur each year. According to NFPA reports, the occupants chances of surviving a residential house fire without any life safety devices such as smoke alarms or sprinklers is 98.87%. By installing smoke alarms and insuring they are in operating condition, the chances of surviving a residential fire is increased to 99.45%. NFPA estimates that an additional 890 lives could be saved each year if smoke alarms were maintained in working condition.

In 1977, less than 0.008% of the housing market was affected by structure fires. In 2005, that number was reduced to less than 0.002%. Over the past three decades, there has a substantial decrease in the number of residential structure fires in relation to the growth of American housing. No one can predict when or where a fire will occur, but to require every home to be equipped with a residential sprinkler system based on the figures below is not cost-effective.

Consideration as to whether the requirement for fire sprinklers in dwellings be mandatory should remain a local issue. The sole purpose of an Appendix P in the 2006 International Code was to provide local jurisdictions with the means to adopt a code or standard that is applicable to their community. Not every jurisdiction agrees that radon resistant construction, patio coverings, and safety inspections of existing appliances need to be regulated or inspected . Contrary to the belief of some activists, several jurisdictions have decided that Appendix P (the provisions for residential sprinkler systems) is not applicable to their state or local jurisdictions. Of the 47 states that have adopted the International Residential Code, none have adopted the 2006 IRC with the inclusion of Appendix P. During the adoption process in six states, there was a proposal put forth to include appendix P in the formal adoption of the 2006 IRC and the proposal was voted down every time.

According to the U.S. fire administration more than half states in America are below the national fire death rate of 13.6 per million and over the past ten years the number of one- and two- family dwelling fires, deaths and injuries have fallen (6%, 18% and 26% respectively).

While the fire service and sprinkler advocates acknowledge that the median age of a home is 32 years, the connection between fire deaths and the age of the home is elusive. For several years data has been collected for several relevant facts about fires. The cause of the fire, whether smoke alarms were present and were working, type of smoke alarm present, whether the fire was confined and did not activate the sprinkler system.

While there have been no studies conducted to investigate whether fire fatalities are less likely to occur in newer homes, there is supporting evidence of this in reports issued by NFPA regarding the performance of smoke alarms. According to these reports, there is a significant difference in the number of fatalities and the number of fires when the smoke alarm present. This includes information regarding smoke alarms that were either battery operated, hardwired with battery backup or hardwired. According to April 2007 Report "U.S. Experience with Smoke Alarms and other Fire Detection/Alarm Equipment" by Marty Ahrens, 65% of the reported residential home fire deaths occurred in homes where there was no smoke alarm present (43%) or did not operate (22%). Of the 35% fire fatalities that occurred when a smoke alarm was present and operated, it was reported that two-thirds of the non-confined home structure fires occurred in dwellings with battery operated smoke alarms with the remaining third evenly divided between homes with hardwired and hardwired with battery backup.

Source	Code Cycle Required	# of Fires	# of Fatalities	# of Injuries	Property Damage in Millions
Battery only	Before 1982	88,300	1,230	5,850	$2,353
Hardwired Only	1982-1992	19,900	170	1,300	$743
Hardwire/Battery	1992- Present	18,000	210	1,490	$568

Reference: April 2007 Report "U.S. Experience with Smoke Alarms and other Fire Detection/Alarm Equipment" by Marty Ahrens

From this information we can see that as the requirements for smoke alarms have evolved, as well as other improvements in the methods used for passive fire protection construction, there are fewer fires and fewer fire fatalities in homes that are equipped with smoke alarms. Along with improvements to the power source, the *National Fire Alarm Code* has also increased the number of required smoke alarms in a one- and two- family dwelling over the years. In 1992 it required that all smoke alarms be interconnected. When you consider the advances made in the requirements of smoke alarms and look at the results in reducing the number of fire fatalities, the solution is educating the public about the importance of working smoke alarms and practicing proper fire prevention.

The most cost-effective means of reducing the loss life is through increasing the public's awareness on the use and maintenance of smoke alarms. According to NFPA reports an estimated 890 live could be saved annually if existing homes were equipped with working smoke alarms. 65% of the reported fire fatalities from 2000-2004 occurred in homes were smoke alarms were either not present or were present but failed to operate. CPSC surveys have shown that while 88% of the households screened had at least one smoke alarm, 72% of these smoke alarms were battery powered only.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: ORLOWSKI-RB-1-R313

RB55–09/10
R313.1.1

Proponent: Phillip A. Brown, American Fire Sprinkler Association

Revise as follows:

R313.1.1 Design and installation. Automatic residential fire sprinkler systems for *townhouses* shall be designed and installed in accordance with Section P2904 or NFPA 13D.

Reason: This adds the same requirement to this section as that found in Section P2904.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: BROWN-RB-1-R313.1.1

RB56–09/10
R313, R313.1, R313.1.1, R313.2, R313.2.1, Appendix P (New)

Proponent: Steven Orlowski, National Association of Home Builders (NAHB)

1. Delete without substitution:

~~**SECTION R313**~~
~~**AUTOMATIC FIRE SPRINKLER SYSTEMS**~~

~~**R313.1 Townhouse automatic fire sprinkler systems.** An automatic residential fire sprinkler system shall be installed in *townhouses*.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required when *additions* or *alterations* are made to existing *townhouses* that do not have an automatic residential fire sprinkler system installed.~~

~~**R313.1.1 Design and installation.** Automatic residential fire sprinkler systems for *townhouses* shall be designed and installed in accordance with Section P2904.~~

~~**R313.2 One- and two-family dwellings automatic fire systems.** Effective January 1, 2011, an automatic residential fire sprinkler system shall be installed in one- and two- family *dwellings*.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required for *additions* or *alterations* to existing buildings that are not already provided with an automatic residential sprinkler system.~~

~~**R313.2.1 Design and installation.** Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.~~

2. Add new text as follows:

APPENDIX P
AUTOMATIC FIRE SPRINKLER SYSTEMS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

AP101 Fire sprinklers. An approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with Section P2904 of the *International Residential Code* or Section 903.3.1 of the *International Building Code*.

Reason: The purpose of this proposal is to delete the reference of the mandatory requirement of residential sprinkler systems in all one- and two-family dwellings and townhouses and reinstate the provisional requirements of mandatory sprinklers into an adoptable Appendix P. Based on the large amount of negative response to the events in Minneapolis, NAHB is seeking to re-establish the adoptable language of Appendix P from the 2006 *International Residential Code* to allow each city, county, and state to determine for themselves whether residential sprinklers should be required. This proposed change will eliminate the need for jurisdictions amend the code and continue to provide communities with the ability to adopt a residential fire sprinkler ordinance when it is appropriate for their community.

NAHB strongly disagrees with the fire services perception of America's fire problem and the proposed solution to reduce the number of fire fatalities that occur each year. According to NFPA reports, the occupants chances of surviving a residential house fire without any life safety devices such as smoke alarms or sprinklers is 98.87%. By installing smoke alarms and insuring they are in operating condition, the chances of surviving a residential fire is increased to 99.45%. NFPA estimates that an additional 890 lives could be saved each year if smoke alarms were maintained in working condition.

In 1977, less than 0.008% of the housing market was affected by structure fires. In 2005, that number was reduced to less than 0.002%. Over the past three decades, there has a substantial decrease in the number of residential structure fires in relation to the growth of American housing. No one can predict when or where a fire will occur, but to require every home to be equipped with a residential sprinkler system based on the figures below is not cost-effective.

Consideration as to whether the requirement for fire sprinklers in dwellings be mandatory should remain a local issue. The sole purpose of an Appendix P in the 2006 International Code was to provide local jurisdictions with the means to adopt a code or standard that is applicable to their community. Not every jurisdiction agrees that radon resistant construction, patio coverings, and safety inspections of existing appliances need to be regulated or inspected . Contrary to the belief of some activists, several jurisdictions have decided that Appendix P (the provisions for residential sprinkler systems) is not applicable to their state or local jurisdictions. Of the 47 states that have adopted the International Residential Code, none have adopted the 2006 IRC with the inclusion of Appendix P. During the adoption process in six states, there was a proposal put forth to include appendix P in the formal adoption of the 2006 IRC and the proposal was voted down every time.

According to the U.S. fire administration more than half states in America are below the national fire death rate of 13.6 per million and over the past ten years the number of one- and two- family dwelling fires, deaths and injuries have fallen (6%, 18% and 26% respectively).

While the fire service and sprinkler advocates acknowledge that the median age of a home is 32 years, the connection between fire deaths and the age of the home is elusive. For several years data has been collected for several relevant facts about fires. The cause of the fire, whether smoke alarms were present and were working, type of smoke alarm present, whether the fire was confined and did not activate the sprinkler system.

While there have been no studies conducted to investigate whether fire fatalities are less likely to occur in newer homes, there is supporting evidence of this in reports issued by NFPA regarding the performance of smoke alarms. According to these reports, there is a significant difference in the number of fatalities and the number of fires when the smoke alarm present. This includes information regarding smoke alarms that were either battery operated, hardwired with battery backup or hardwired. According to April 2007 Report "U.S. Experience with Smoke Alarms and other Fire Detection/Alarm Equipment" by Marty Ahrens, 65% of the reported residential home fire deaths occurred in homes where there was no smoke alarm present (43%) or did not operate (22%). Of the 35% fire fatalities that occurred when a smoke alarm was present and operated, it was reported that two-thirds of the non-confined home structure fires occurred in dwellings with battery operated smoke alarms with the remaining third evenly divided between homes with hardwired and hardwired with battery backup.

Source	Code Cycle Required	# of Fires	# of Fatalities	# of Injuries	Property Damage in Millions
Battery only	Before 1982	88,300	1,230	5,850	$2,353
Hardwired Only	1982-1992	19,900	170	1,300	$743
Hardwire/Battery	1992- Present	18,000	210	1,490	$568

Reference: April 2007 Report "U.S. Experience with Smoke Alarms and other Fire Detection/Alarm Equipment" by Marty Ahrens

From this information we can see that as the requirements for smoke alarms have evolved, as well as other improvements in the methods used for passive fire protection construction, there are fewer fires and fewer fire fatalities in homes that are equipped with smoke alarms. Along with improvements to the power source, the *National Fire Alarm Code* has also increased the number of required smoke alarms in a one- and two- family dwelling over the years. In 1992 it required that all smoke alarms be interconnected. When you consider the advances made in the requirements of smoke alarms and look at the results in reducing the number of fire fatalities, the solution is educating the public about the importance of working smoke alarms and practicing proper fire prevention.

The most cost-effective means of reducing the loss life is through increasing the public's awareness on the use and maintenance of smoke alarms. According to NFPA reports an estimated 890 live could be saved annually if existing homes were equipped with working smoke alarms. 65% of the reported fire fatalities from 2000-2004 occurred in homes were smoke alarms were either not present or were present but failed to operate. CPSC surveys have shown that while 88% of the households screened had at least one smoke alarm, 72% of these smoke alarms were battery powered only.

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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: ORLOWSKI-RB-2-R313

RB57–09/10

R313, R313.1, R313.1.1, R313.3.2, R313.2.1

Proponent: Rick Davidson, City of Maple Grove, MN

Delete without substitution:

~~SECTION R313~~
~~AUTOMATIC FIRE SPRINKLER SYSTEMS~~

~~R313.1 Townhouse automatic fire sprinkler systems.~~ ~~An automatic residential fire sprinkler system shall be installed in *townhouses*.~~

~~Exception:~~ ~~An automatic residential fire sprinkler system shall not be required when *additions* or *alterations* are made to existing *townhouses* that do not have an automatic residential fire sprinkler system installed.~~

~~R313.1.1 Design and installation.~~ ~~Automatic residential fire sprinkler systems for *townhouses* shall be designed and installed in accordance with Section P2904.~~

~~R313.2 One- and two-family dwellings automatic fire systems.~~ ~~Effective January 1, 2011, an automatic residential fire sprinkler system shall be installed in one- and two- family *dwellings*.~~

~~Exception:~~ ~~An automatic residential fire sprinkler system shall not be required for *additions* or *alterations* to existing buildings that are not already provided with an automatic residential sprinkler system.~~

~~R313.2.1 Design and installation.~~ ~~Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.~~

Reason: In the run-up to the vote on residential sprinklers in Minneapolis, the reason statements published in the monographs were repeated over and over.

You heard that sprinkler systems won't freeze in cold climates (unfortunately that does happen); that there won't be any increase in water tap fees; that sprinklers add only a few hundred dollars to the cost of a home; that the public feels sprinklered homes are desirable; that more people die in older homes because there are more of them; that a shocking 45% of firefighter deaths occur on the fire ground at residential occupancies, almost always 1- and 2-family dwellings; that smoke alarms aren't reliable enough as they age to protect a home; that homes without a public water supply can always involve design changes to accommodate sprinklers; that use of fire hydrants, not residential sprinkler systems are the cause of some water contamination; that putting the rules in place will drive down the cost of sprinkler systems; that sprinkler systems are maintenance free; that there are plenty of trained installers and inspectors to install and monitor sprinkler systems; that sprinkler systems won't leak; and that moving sprinkler requirements from the appendix to the body of the code is necessary because municipalities aren't adopting the appendix chapter quickly enough. You also heard general statements that sprinkler systems save lives, that the annual loss of lives to fire is a catastrophe, and on and on…

Unfortunately, most of those arguments are speculative, based on anecdotal evidence, or downright false.

You heard "If sprinklers were installed in all new homes constructed in the US, the fire death rate would decrease by 50%". But there are no statistics to project how many lives could be saved in residential dwellings if sprinklers are required. Without some type of analysis, it seems the solution is to throw a bunch of the public's money at the problem, if there is one, and hope that it helps. If the fire death rate were to drop only 2% as a result of these expensive systems, is the solution cost effective in a minimum standard code?

You didn't hear why, if smoke alarms aren't as effective as they age or when they are disabled, the same wouldn't occur with sprinkler systems. And you didn't hear why the fire service doesn't engage in a nationwide effort to have operating smoke alarms in every home in the country. That could be accomplished for a fraction of the cost of installing residential sprinklers and have an immediate impact on fire deaths because there are numerous studies on the number of fire deaths that have occurred when smoke alarms were not present or failed to operate because of dead batteries or age.

You didn't hear projections that if sprinkler systems were installed in all new homes that the number of fires in residences would decline by any specific amount. Again, if there are no studies to support the effectiveness of a solution, isn't there a significant risk that the solution may not work and the money wasted? Doesn't the argument ignore the fact that homes built today are inherently more fire resistant than the homes built 50 years ago? According to the US Fire Administration, the number of fire deaths in residential structures in the US has dropped from 3250 in 1998 to 2895 in 2007, about an 11% reduction, this with an increasing population. Something right must be happening if the numbers are dropping so significantly when the population is on the rise.

You didn't hear how many firefighter lives would be saved if all new residential dwellings were sprinklered. By the way, the statement given by sprinkler proponents that 45% of fire fighter deaths occur at residential occupancies seems to be a gross error. The US Fire Administration has published the document "Firefighter Fatalities in the United States in 2005". The following is from that study:

> *"For the purposes of this study, the term "firefighter" covers all members of organized fire departments in all States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam. It includes career and volunteer firefighters; full-time public safety officers acting as firefighters; State, territory, and Federal Government fire service personnel, including wildland firefighters; and privately employed firefighters, including employees of contract fire departments and trained members of industrial fire brigades, whether full-or part-time. It also includes contract personnel working as firefighters or assigned to work in direct support of fire service organizations.*
>
> *Under this definition, the study includes not only local and municipal firefighters, but also seasonal and full-time employees of the U.S. Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, the Bureau of Fish and Wildlife, the National Park Service, and State wildland agencies. The definition also includes prison inmates serving on firefighting crews; firefighters employed by other governmental agencies, such as the U.S. Department of Energy; military personnel performing assigned fire suppression activities; and civilian firefighters working at military installations."*

An "on-duty death" is explained as:

> *"The term "on-duty" refers to being involved in operations at the scene of an emergency, whether it is a fire or nonfire incident; responding to or returning from an incident; performing other officially assigned duties such as training, maintenance, public education, inspection, investigations, court testimony, or fundraising; and being on call, under orders, or on standby duty, except at the individual's home or place of business. An individual who experiences a heart attack or other fatal injury at home as he or she prepares to respond to an emergency is considered on duty when the response begins. A firefighter who becomes ill while performing fire department duties and suffers a heart attack shortly after arriving home or at another location may be considered on duty, since the inception of the heart attack occurred while the firefighter was on duty."*

Given these explanations, the study goes on to state that 115 fire fighters died while on-duty in 2005. The following table breaks down the types of duty engaged in that caused the death. It is clear to see that 45% of the fire fighter deaths did not occur on the residential fire ground as was stated by sprinkler proponents.

Table 5. Firefighter Deaths by Type of Duty (2005)

Type of Duty	Number of Deaths
Fireground Operations	27
Responding/Returning	23
Other On Duty	24
Training	14
Nonfire Emergencies	6
After an Incident	21
Total	**115**

The study states that 27 of the 115 fire fighters deaths occurred during fire ground activities. Following is a description of each incident:

Fireground Operations
Twenty-seven firefighters died while engaged in activities at the scene of a fire in 2005:

- *Two New York City Fire Department firefighters were killed when they were trapped by fire progress in an occupied multiple dwelling. Firefighters were forced to make a five-story jump when their escape routes were cut off.*
- *Two Wyoming firefighters were killed when they were overcome by fire progress in a residential fire. The fire emerged from concealed spaces and extended rapidly.*
- *Thirteen firefighters suffered heart attacks at fire scenes in 2005:*
  - *Three of the heart attacks occurred at wildland fires.*
  - *Eight firefighters suffered heart attacks at fires in residential occupancies. Two of these fires had suspicious or arson-related causes.*
  - *A Delaware firefighter suffered a heart attack at an alarm activation incident.*
  - *An Arkansas firefighter suffered a heart attack at the scene of a car fire.*
- *Two firefighters were electrocuted at fire scenes in 2005:*
  - *A California firefighter was electrocuted when he came into contact with an energized wire at a residential structure fire.*
  - *A Kansas firefighter was killed after he called to report a wildland fire resulting from a lightning strike at his home. The firefighter went outside to investigate, contacted a live power line, and was fatally electrocuted.*
- *Two firefighters were killed when rapid changes in fire conditions trapped them. Both fires occurred in residential occupancies, one in New York and the other in Michigan.*
- *A Virginia firefighter was burned fatally as he fought a wildland fire. His body was discovered the next day, after he failed to return from his efforts.*
- *A Kentucky firefighter was killed when the fire apparatus he had driven rolled forward and crushed him at the scene of a residential structure fire.*
- *A North Carolina firefighter was killed when a fire-damaged tree limb crushed him as firefighters attempted to extinguish a fire in the tree.*
- *A Missouri firefighter became entangled in a man lift and was killed during a fire in a mill.*
- *A Texas firefighter was killed while advancing a hoseline in an abandoned residential structure. The roof of an addition collapsed under fire conditions and trapped the firefighter.*
- *A New York firefighter collapsed and died of a CVA that struck as he arrived on the scene of a working residential structure fire.*

Tragically, firefighter deaths occur. But 45% of the firefighter deaths do not occur at residential fires as the above statistics indicate. The statement is just plain false.

The reliability of sprinkler systems was argued to be superior and necessary because of the failure of smoke alarms. But the National Fire Protection Association published a report in June 2007 entitled *"U.S. EXPERIENCE WITH SPRINKLERS AND OTHER AUTOMATIC FIRE EXTINGUISHING EQUIPMENT"* by John R. Hall, Jr. In that report Mr. Hall states: *"Based on 2002-2004 fires reported to U.S. fire departments, when sprinklers cover the area of fire origin, they operate in 93% of all reported structure fires large enough to activate sprinklers. When they operate, they are effective 97% of the time, resulting in a combined effectiveness reliability of 90%."*

While 90% is certainly admirable, it is far from being perfect. It also points out the fallacy in allowing reductions in passive fire protection in lieu of sprinkler systems. A fire that may have been contained with passive systems may be a much more serious event when it occurs in a building with lesser passive protection and a failed sprinkler system.

And it is often argued that sprinkler systems require no maintenance. This has been stated many times by proponents. But that conflicts with NFPA 13D section 4.2 and the installation instructions from sprinkler head manufacturers such as Tyco and others who all state that certain maintenance activities should be performed.

The U.S. Fire Administration published the report "***U.S. Fire Administration/National Fire Data Center*** **Fatal Fires Topical Fire Research Series, Volume 5 – Issue 1** ***March 2005"*** in which it stated:

■ *The leading cause of fires that resulted in fatalities was arson (27%), followed by smoking (18%).*

■ *The leading areas of fire origin in fatal residential structure fires were sleeping (29%) and lounge (21%) areas.*

■ *Smoke alarms either were not present in 42% of residential fatal fires or alarms were present but did not operate in 21% of residential fatal fires.*

CAUSES OF FATAL FIRES
The leading cause of fatal fires in 2002 was incendiary/suspicious (arson), which accounted for 27% of fatal fires. Figure 3 compares the causes of fatal fires in all properties and in residential properties.
Smoking, long the leading cause of fatal fires, trailed as the second leading cause of all fatal fires at 18%. Arson was also the leading cause of the fatal residential structure fires (22%), but by a small margin over smoking (21%). This again is a departure from years past as smoking has long been the leading cause (by a wide margin) of fatal residential fires.
Multiple fatality fires in residential structures were most often caused by heating (26%), followed by arson (23%). By contrast, arson and smoking (each 22%) cause most single fatality residential structure fires.
Figure 4 shows the leading areas of fire origin in fatal residential structure fires. They started most frequently in sleeping (29%) and lounge areas (21%). Fires starting in kitchens account for another 15%.

SMOKE ALARM PERFORMANCE
Smoke alarm performance in fatal residential structure fires is shown in Figure 6. Although more than 90% of homes have smoke alarms today, no smoke alarms were present in 42% of residential structure fires where fatalities occurred. Smoke alarms were present in 58% of fatal residential structure fires, but only operational in 37% of those fatal fires.

This report raises several questions. If the leading cause of fatal fires is arson, would sprinkler systems impact those numbers if tampering is a possibility? And if smoking is a major cause of fire fatalities, should the vast majority of the public be forced to pay for protection made necessary in part by those who chose a particularly unhealthy lifestyle? The failure to have working smoke alarms in so many of the fatal fires is a national travesty. Why isn't more being done to correct this problem? At the very least, this information casts doubt on the validity of spending hundreds of millions (or billions) of dollars on systems that may not solve the problems they are intended to solve.

You also heard testimony on various polls that indicated that the public felt a sprinklered home was more desirable than one without sprinklers. I suspect that a similar poll would find that car owners would find a Cadillac to be more desirable than a Chevy as well. The polls didn't ask if someone would be willing to pay several thousand dollars more to have a sprinkler system installed.

Another argument that was trotted out recently was that having sprinkler requirements in the appendix, which may have been the foot in the door, wasn't sufficient because jurisdictions weren't embracing sprinklers at a pace to satisfy proponents. But those requirements first appeared in the 2006 IRC. The 2006 IRC had hardly been in print before activists began pushing to have the rules moved into the body of the code. Jurisdictions hardly had time to consider the impacts of residential sprinklers or adopt them.

You heard a lot of emotional testimony on this issue. But these decisions should not be based on emotion but on science and facts. And the facts tell a story contradicting the emotional testimony.

The housing industry is in a fragile state. Residential builders are struggling and failing as are building materials suppliers. Homes are appraising at less than the cost to construct them. Building department staff members are being laid off at alarming rates. This is not the time to impose costly and potentially ineffective building systems.

Please approve this code change.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: DAVIDSON-RB-10-R313

RB58–09/10
R314.1

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

Revise as follows:

R314.1 Smoke detection and notification. All smoke alarms shall be listed and labeled in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72.

Reason: Only listed products that are labeled have been subjected to periodic, unannounced inspections during production.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: EUGENE-RB-10-R314.1

RB59–09/10
R314.4

Proponent: Lou Malattia, Clark County Building Safety Division, representing the Washington Association of Building Officials

Revise as follows:

R314.4 Power source. Smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection. Smoke alarms shall be interconnected.

Exception:

1. Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power.
2. Interconnection and Hard-wiring of smoke alarms in existing areas shall not be required where alteration or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space, or basement available which could provide access for hard-wiring and interconnection without the removal of interior finishes. Physical interconnection of all alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation.

Reason: Although power may be accessible to hard wire one of the existing smoke detectors, it may be difficult to interconnect all of them. The requirement for interconnection being satisfied by a wireless activation isn't universally accepted, and in many jurisdictions this would not be accepted.

RB187-09/10: Add proposal as follows:

RB187–09/10
R314.3

Proponent: Tom Lariviere, Chairman - Joint Fire Service Review Committee

Revise as follows:

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.

   Exception: In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

3. ~~On~~ In a common area on each ~~additional~~ story of the dwelling, including basements and habitable attics but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

When more than one smoke alarm is required to be installed within an individual dwelling unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

Reason: Fire sprinklers are universally recognized as the most effective means of reducing America's fire losses and preventing firefighter deaths and injuries associated with firefighting operations. Both of these objectives are fundamental to the mission of fire and life safety. This proposal is based on the increased safety provided when residential fire sprinklers are installed.

The value of smoke alarms with respect to life safety is well recognized. Nevertheless, code requirements associated with how many smoke alarms must be installed in a dwelling and where they must be located were developed without respect to the presence of fire sprinklers. It is widely known that the addition of fire sprinklers to a dwelling will provide a significant improvement to life safety and property protection versus having smoke alarms alone, so eliminating a minimal number of smoke alarms when fire sprinklers are installed is a reasonable approach.

Contrary to what one might expect as a result of reducing the number of smoke alarms, the proposed revision could actually improve the performance of smoke alarms because it will require that a minimum of one smoke alarm be located in the common area on each floor. Currently, the code only requires smoke alarms outside of sleeping areas, often satisfied by installing a smoke alarm in the hallway outside of bedroom doors. The number of alarms will only be reduced in cases where there is more than one sleeping area on a floor.

Given that fires often start in kitchens and living rooms, installing a smoke alarm in a more central area, as required by this proposal, may well result in more effective detection of fires in these areas. Plus, with the code still requiring smoke alarms in each bedroom, connected to common area smoke alarms, waking effectiveness and protection of bedroom areas will not be impacted by this proposal.

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

Public Hearing:				
	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: LARIVIERE-RB1-R315.2

The fire alarm and detection community has watched as manual pull boxes are permitted to be omitted, but this is the first time automatic smoke detection is permitted to be omitted. Please stop this dangerous trend and provide the early warning needed for the safe evacuation of these occupants. Sprinkler are not perfect and they do have a great reputation for saving lives, but they provide the best chances for survival when used along with the early warning provided by smoke detectors.

Cost Impact: This code change proposal would increase the cost by $0.15 to $0.30 per square foot.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: SHEETS-F2-907.2.10.2.DOC

F112–09/10
907.2.11 (IBC [F] 907.2.11); IRC R314.1

Proponents: Joseph Fleming, Deputy Chief, Boston Fire Department, representing The Boston, MA Fire Department; Sean DeCrane, Cleveland Fire Department representing the Cleveland, OH Fire Department and the International Association of Fire Fighters

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IFC COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IFC

Revise as follows:

907.2.11 (IBC [F] 907.2.11) Single and multiple-station smoke alarms. *Listed* single- and multiple-station photoelectric smoke alarms complying with UL 217 shall be installed in accordance Sections 907.2.11.1 through 907.2.11.4 and NFPA 72.

PART II – IRC BUILDING/ENERGY

Revise as follows:

R314.1 Smoke detection and notification. All smoke alarms installed to meet the requirements of this code shall be the photoelectric type and shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72.

Reason: (**Fleming)** According to the United States Fire Administration (http://www.usfa.dhs.gov/downloads/pdf/tfrs/v5i1.pdf) 37% of fire fatalities occur with operational smoke alarms and another 21% occur with disabled alarms. The use of photoelectric alarms, as opposed to alarms using ionization technology could reduce both by ½. This would reduce fire deaths in the U.S. by approximately 25% which translates into over 750 lives saved each year. The following information supports this estimated benefit.

1. There are some fires were smoke alarms/detectors cannot provide a benefit: arson fires in egress paths, victims intimate with flaming fires, explosions, etc. In addition, it is unlikely that smoke alarms/detectors provide the critical warning to occupants who are awake. As a consequence, when discussing smoke alarms, we should focus our attention on the types of fires where the smoke alarm can provide a crucial benefit to occupants not on all the types of fires that occur. The vast majority of fires where a smoke alarm/detector can help occupants are smoldering fires started when the victim is asleep.

    - *Smoke detectors should be able to save at least 60% and possibly 75% of sleeping victims, but only 13% of victims who were awake.* (McGuire, J., Ruscoe, B., The Value of a Fire Detectors in the Home, Fire Study No. 9, National Research Council of Canada, Division of Building Research, Ottawa, Ont., Canada, December, 1962.)
    - *"Delayed discovery, typically associated with fires that occur at night when everyone is asleep, also tends to be a characteristic of the smoldering fire caused by discarded smoking material. These smoldering fires are the leading causes of US fire fatalities and detectors are ideally designed to deal with them.* ("A Decade of Detectors", Fire Journal 09/85, John Hall - NFPA.)

2. In flaming fires the ionization alarm/detector is faster than the photoelectric by 30-50 seconds. This extra time is virtually irrelevant to alert occupants. For example, in the recent smoke alarm testing involving flaming cooking fires (http://smokealarm.nist.gov/pdf_files/SmokeDetectors_Q&As_Feb2008.pdf), which is the most common type of flaming fire, although the photo was 30-50 seconds slower than the ionization it still provided on average over 10 minutes warning. It has often been said that in a fire "seconds count." However it is hard to imagine a scenario were the extra seconds provided by the ionization in the most common type of flaming fires makes a difference for life safety, when the photoelectric is already providing on average over 10 minutes of Available Safe Egress Time. As a consequence, although photoelectric alarms/detectors respond later in flaming fires this is a quantitative as opposed to a qualitative advantage. Here are some quotes from researchers.

    - *The advantage of ionization smoke detectors during flaming fires is only about a 15-20 second earlier warning. This margin will only be decisive for the loss of human life in extraordinary circumstances. In general the difference between the alarm times for the optical and the ionization detectors are reduced when the detection is made from an adjacent room. (*Meland, Oysten, and Lonuik, Lars, "Detection of Smoke - Full Scale Tests with Flaming and Smouldering Fires, "Fire Safety Science," - Proceedings of the Third International Symposium, July, 1991,)

- *Under the conditions of ignition from flames, the ionization chamber type detector exhibited a greater sensitivity to the smoke produced than the photoelectric system. However, the rate of generation of smoke was so great that the extra time given by the ionization chamber as a result may be of little practical use. (*R., (Riley, K., and Rogers, S., "A Study of the Operation and Effectiveness of Fire Detectors Installed in the Bedrooms and Corridors of Residential Institutions", Fire Research Station, Fire Research Current Paper 26/78, Borehamwood, England, April 1978.)

3. In smoldering fires the photoelectric is faster than the ionization by 30 minutes or more. This extra time is critical for sleeping occupants. If the ionization was consistently providing adequate warning, it would not matter that it was slower than the photoelectric. Unfortunately it doesn't. According to NIST's testimony to the Boston City Council), *"ionization alarms may not always alarm even when a room is filled with smoke from a smoldering fire."* In addition, according to data collected by NIST Report during smoldering fires the ionization smoke alarm often provided less than 1-2 minutes of Available Safe Egress Time. (1-2 minutes is the minimum time needed for sleeping occupants to escape.) In fact the ionization, in many cases, was providing negative available safe egress time. (http://smokealarm.nist.gov/pdf_files/StatementfortheRecordWG1finalsmokealarmstatement.pdf

   This finding has been noted by many other researchers.
   - *Ionization chamber type detectors, in the room of origin and the corridor, did not, in the smoldering fire tests, provide adequate warning that the escape route was impassable or that conditions in the room were potentially hazardous to life. (*R., Riley, K., and Rogers, etc.)
   - *"This test will show that most photoelectric detectors, operated by battery will detect smoke at about 1.5-3% smoke, which is good. The test will show that the photoelectric detectors operated by household current will activate between 2 and 4 %, which is still good. But, the test also will show that many ionization detectors will not activate until the smoke obscuration reaches 10-20 and sometimes 25%. … Therefore, because of the present state of the art in detecting smoke, the Subcommittee on Smoke Detectors can take no other course but to recommend the installation of photoelectric detectors."* ("Residential Smoke Alarm Report - Prepared by Special Automatic Detection Committee of the International Association of Fire Chiefs," The International Fire Chief, September 1980.)
   - The tests i.e. the CALCHIEFS Tests, being commented upon in the previous quote were conducted by the Los Angeles Fire Dept. They concluded that photoelectrics were the preferred smoke alarm for all hallways and bedrooms. ("An Evaluation of Fire Detectors for Residential Placement," Los Angeles City Fire Dept., Fire Prevention Bureau – Research Unit, August 1981.)
   - *"Photoelectric detectors sighted in the hallway are more effective for detecting smoldering smoke than ionization detectors, providing adequate escape time for most conditions of size and location of the smoke sources. Ionization detectors sited in the hallway generally provide inadequate escape times unless smoke movement into the hallway is slowed down by narrow door openings, causing a slower loss of visibility, or unless they are sited close to the smoke source." (* P.F. Johnson and S. K. Brown, "Smoke Detection of Smoldering Fires in a Typical Melbourne Dwelling," *Fire Technology,* Vol. 22, No. 4, 1986, pp. 295-340.)
   - *"The ionization detectors detected smoke from a smoldering fire much later than optical (photoelectric) detectors. When the particular conditions during the fire development are taken into consideration there are reasons to indicate that this detection principle would not provide adequate safety during this type of fire".* (Meland, Oysten, and Lonuik, Lars, "Detection of Smoke - Full Scale Tests with Flaming and Smouldering Fires, "Fire Safety Science," - Proceedings of the Third International Symposium, July, 1991, pp. 975-984.)

4. In addition to being inadequate at providing adequate warning in smoldering fires, several researchers have identified that the ionization smoke alarm is far more susceptible to disablement due to nuisance alarms than is the photoelectric. Here are some quotes from the recent NIST Smoke Alarm Report. http://smokealarm.nist.gov/

   Additionally a separate study of nuisance alarm sources was conducted because this was identified as an important issue in a prior study by the U.S. Consumer Product Safety Commission. It was observed that ionization alarms had a propensity to alarm when exposed to nuisance aerosols produced in the early stages of some cooking activities, prior to noticeable smoke production. This phenomenon could be particularly vexing to homeowners who experience such nuisance alarms. … While one third of the smoke detectors did not work on the initial test, half of these were made operational by restoring power. Homeowners interviewed revealed that most of these were intentionally disconnected due to nuisance alarms, mostly from cooking.

   For the Toasting Scenario the ionization located near the kitchen responded in about 130-150 seconds. The photoelectric responded in 225-300. In fact according to NIST, *"Photoelectric alarm thresholds were met only after item started to char and produce visible smoke."* So although both responded, it is much more likely that the ionization will repeatedly respond to most normal toasting and be more likely to be disabled..

   Here are some recent quotes by other researchers on nuisance alarms.
   - *"Homes with ionization alarms had more than 8 times the rate of false alarms as those with photoelectric. In small rural residences, photoelectric smoke alarms have lower rates of false alarms and disconnections." (*Perkins, M., "Ionization and photoelectric smoke alarms in rural Alaskan homes," Western Journal of Medicine, 2000;173:89-92 (Contact: Alaska Injury Prevention Center, Anchorage, AK.))
   - *"We favor photoelectric detectors to reduce rates of nuisance alarms from cooking and to provide optimal protection from cigarette related fires." (*Kuklinski, D., Berger, L., Weaver, J., "Smoke detector Nuisance Alarms: A Field Study in a Native American Community," NFPA Journal; Sept/Oct. 1995.)
   - *"On direct observation at first follow-up, ionization study alarms were more likely to be non-functional, 20% ionization vs. 5% photoelectric, with the most common reason being a disconnected or absent battery." (*Mueller, B., et al, "Randomized controlled trial of ionization and photoelectric smoke alarm functionality," Injury Prevention, 2008; 14:80-86.)

   Even smoke alarm manufacturers are aware of the benefits of photoelectric technology. (They just do a very poor job of communicating this to consumers.)
   - *"The optical smoke alarm therefore is less likely to react to the results of cooking and this makes it far more suitable for installation near kitchens or in confined spaces such as bed sits. The slight price differential between the two types of alarms can be balanced out by the elimination of false alarms being triggered by nearby kitchens and bathrooms."* "Domestic smoke alarms – a guide for specifiers," Bendall, D. (BFK Brands Europe), Fire Prevention 281 July/August 1995.

- *"Never install ionization smoke alarms in areas where cooking fumes, open fires and products of combustion are present. Where these conditions occur and a smoke alarm must be installed, a photoelectric alarm is the best option."* http://www.kidde.com.au/utcfs/kid/How+Smoke+Alarms+Work.html

5. Combination alarms/detectors have the potential to provide the quickest response to both smoldering and flaming fires but due to the excessive nuisance alarms from the ionization part of the alarm/detector, they should not be allowed near kitchens and bathrooms. In addition, the minor advantage that ionization or combination have over photoelectric in flaming fires is marginal and probably not critical.

   To quote a study (Mueller et al) cited earlier, *"An alarm containing both technologies is more expensive; it may also be more likely rendered non-functional if either technology causes frequent nuisance alarms. Our results suggest that installing photoelectric alarms on main floors of homes similar to those in our study may increase the proportion of functioning alarms and therefore provided longer term protection,"*

   Other items to consider:
   - I am not aware of any "wireless alarms" that come as combination (photo/ion).
   - Both ion and photo are sold with 10 year batteries. Are Combination (ion/photo)?
   - Combination CO/Smoke come with CO/Ion or CO/Photo. Is there a Combo Smoke Alarm/CO?
   - Why require dual in sprinkled occupancies when, according to the USFA, the only type of fire that can kill someone is a smoldering fire? "*Even though fire sprinklers are effective life safety devices you still need smoke alarms. Some fires can begin as smoldering fires that produce smoke and gases but don't generate enough heat to activate the sprinklers. Smoke alarms are needed to provide warning for these situations."* (http://www.usfa.dhs.gov/citizens/all_citizens/home_fire_prev/manufactured/sprinklers-mh.shtm)

6. I would like to mention that based on this research the Australasian Fire Authorities Council has recommended the use of photoelectric smoke alarms as opposed to ionization or combination.

   http://www.afac.com.au/__data/assets/pdf_file/0020/3674/AFACSmokeAlarmposition1June2006.pdf

7. Precedents for this action.

   a. Since 1998 the Massachusetts State Building Code has mandated photoelectric smoke alarm within 20 feet of a kitchen or bathroom due to the propensity of ionization smoke alarms to experience nuisance alarms.
   b. Since 2002 **NFPA 72 (the National Fire Alarm Code)** has only allowed ionization smoke alarms near kitchens if they were equipped with a silence button. The NFPA 72 committee has finally recognized the advantage that photoelectric smoke alarms have in regards to nuisance alarms. However I take exception to their assumption that a "hush button" neutralizes the ionizations propensity for nuisance alarms. No study has shown these to be effective at reducing disablement of ionization alarms. http://www.nfpa.org/assets/files/PDF/ROP/72-A2009-ROC.pdf (Page 72-249)
   c. **New Vermont Law** – Photoelectric-only type of smoke alarms are required to be installed in the vicinity of any bedrooms and on each level of a dwelling, for all new dwellings and dwellings that are sold or transferred, beginning January 1, 2009. http://www.dps.state.vt.us/fire/heating/photoelectric.html
   d. **Massachusetts has voted to Change the State Fire Code** so that as of January 1, 2010, smoke alarms with only ionization technology will not be allowed to meet the code. http://www.realtown.com/massachusettsrealestate/blog/massachusetts-smoke-detector-laws-changing
   e. **The 7th Edition of the Massachusetts State Building Code** was updated so that as of January 1, 2008 smoke alarms with only ionization technology will not be allowed to meet the code. http://www.ludlow.ma.us/building/permit_applications/life-safety-systems-app.pdf

Bibliography – In addition to references cited above, the following will be provided to the committee.

1. Fleming, J., *"Photoelectric vs. Ionization Detectors - A Review of the Literature,"* NFPRF Fire Suppression and Detection Research Symposium, Orlando, FL, 2/98.
2. Fleming, J., *"Photoelectric vs. Ionization Detectors - A Review of the Literature, Revisited,"* (NFPRF Fire Suppression and Detection Research Symposium, Orlando, FL, 01/05. This presentation included analyses of: 1) 30 years of smoke detector studies, 2) the National Institute of Standards Smoke Detector Project, 3) statistic regarding the effectiveness of smoke detectors, ands 4) the effectiveness of Underwriter's Labs Smoke Detector Approval Standard, UL217.)
3. Fleming, J., *"Smoke Detectors and the Investigation of Fatal Fires,"* Published in May 2000 issue of "Fire & Arson Investigator", the official magazine of International Association of Arson Investigators. (Also published on Interfire.org, an Arson Resource Website – posted 02/01.)

Reason: (DeCrane) I do not want to get into me too testimony, even during the reason statement, and my colleague Joseph Fleming from the Boston Fire Department has written an extensive Reason Statement. This will make it difficult to go in depth referencing various reports as Chief Fleming has provided the technical substantiation for this code change.

As a representative of the International Association of Fire Fighters (IAFF), I represent the professional fire fighters of North America. At the IAFF's most recent convention, the Union representatives of over 280,000 professional fire fighters across the United States and Canada, with representatives from the United Kingdom, Australia and New Zealand, voted unanimously to support he requirement of photoelectric smoke detectors.

The representatives, of those who respond to difficult fire scenes involving thousands of fatalities, have determined it is time to move forward with the requirement of photoelectric smoke detectors. Countless times our members have responded to residential fires and removed victims who had disabled their detectors due to nuisance alarms. Tragically many of these families forgot to replace the batteries or reinstall the hard wire detector when they were finished cooking. Unfortunately in many incidents these occupants, or a loved one, ended up paying the ultimate price for their forgetfulness, or some may argue, the lack of the detector industry addressing the problem.

On behalf of the nation's professional fire fighters we request your support for this code change.

Cost Impact: (Fleming) The code change proposal will not increase construction costs in any meaningful manner. The cost difference between ionization and photoelectric is minimal, particularly when one considers the benefit.

Cost Impact: (DeCrane) The code change proposal will minimally increase construction costs.

PART I – IFC

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

PART II – IRC BUILDING/ENERGY

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: FLEMING-DECRANE-F1-907.2.11

F113–09/10
907.2.11.2 (IBC [F] 907.2.11.2)

Proponent: Rick Sheets, Fire Committee Chair, Brinks Home Security, representing National Burglar and Fire Alarm Association

Revise as follows:

907.2.11.2 (IBC [F] 907.2.11.1) Groups R-2, R-3, R-4 and I-1. Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of *occupant load* at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.

   ~~**Exception:** Single- or multiple-station smoke alarms in Group I-1 shall not be required where smoke detectors are provided in the sleeping rooms as part of an automatic smoke detection system.~~

3. In each *story* within *a dwelling unit,* including basements but not including crawl spaces and uninhabitable *attics.* In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm or smoke detector installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

   Exception: Single- or multiple-station smoke alarms in Groups R-2, R-3, R-4, and I-1 shall not be required where smoke detectors are part of an automatic smoke detection system and installed in all the locations required by Section 907.2.11.2.

Reason: There is no logical reason that these other groups (R-2, R-3, R-4) should be discouraged from installing superior fire alarm and detection systems. Professional protection using system-type smoke detection, with all its associated technological features, should be allowed for all similar occupancies, not just I-1. Chapter one of this code at 104.09 states that equal or superior alternate methods are allowed.

Cost Impact: The code change proposal will not increase the cost of construction. (No increase is required, but the change allows for optional protection at additional costs.)

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: SHEETS-F7-907.2.11.2.DOC

The substantive change being proposed is to add language that would allow listed wireless alarms to substitute for wired interconnection of the smoke alarms in both new and existing construction. While the code officials with whom we have discussed this issue would accept wireless systems as being interconnected, we have heard from other sources that some code officials do not recognize wireless interconnection as meeting the code requirement for interconnection. Adding the proposed text would make it clear that listed wireless systems comply with the code.

Cost Impact (Parts I-II): The code change proposal will decrease the cost of construction.

PART I – IFC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IRC BUILDING/ENERGY

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: SIU-F2-907.2.11.3.DOC

F116–09/10

907.2.12 (New) [IBC [F] 907.2.12 (New)], 4603.8 (New); IRC R314.5 (New), R314.5.1(New), R314.5.2 (New), R314.5.3 (New)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IFC COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Proponent: David Fredrick Scarelli representing DBA-Sentry Signal Company

PART I – IFC

Add new text as follows:

907.2.12 (IBC [F] 907.2.12) Line type heat detection. A line type heat detection system that activates at 475°F (246°C) shall be installed in Group R Occupancies in accordance with Sections 907.2.12.1 through 907.2.12.2, NFPA 72, NFPA 70 and manufacturer's instructions.

907.2.12.1 (IBC [F] 907.2.12.1) Location. A line type heat detection shall be installed in the following locations:

1. Above all NM-B Cable
2. Above all electrical boxes
3. Above or near all raceways.

907.2.12.2 (IBC [F] 907.2.12.2) Interconnection. The line type heat detection system shall be interconnected with the smoke alarms required by Section 907.2.11 in such a manner that when the line type heat detection activates such detection shall activate the smoke alarms in all sleeping units and dwelling units.

4603.8 Line type heat detection. A line type heat detection that activates at 475° F (246°C) shall be installed in existing Group R Occupancies in accordance with Sections 4603.8.1 through 4603.8.2, NFPA 72, NFPA 70 and manufacturer's instructions.

4603.8.1 Location. Line type heat detection shall be installed in the following locations:

1. Above all exposed NM-B Cable
2. Above all electrical boxes
3. Above or near all raceways.

4603.8.2 Interconnection. The line type heat detection system shall be interconnected with the smoke alarms required by Section 907.2.11 in such a manner that when the line type heat detection activates such detection shall activate the smoke alarms in all sleeping and dwelling units.

PART II – IRC

Add new text as follows:

R314.5 Line type heat detection. A line type heat detection system that activates at 475°F(246°C) shall be installed in accordance with Sections 314.5.1 through 314.5.2, NFPA 72, NFPA 70 and manufacturer's instructions.

R314.5.1 Location. Line type heat detection shall be installed in the following locations:

1. Above all NM-B Cable
2. Above all electrical boxes
3. Above or near all raceways.

R314.5.2 Interconnection. The line type heat detection system shall be interconnected with the smoke alarms in such a manner that when the line type heat detection activates such detection shall activate all of the alarms in the dwelling unit. Where there are two dwelling units the line type heat detection shall be interconnected with the smoke alarms in both dwelling units.

Reason: According to death certificate data, 25% of fire and flame deaths in 2002 were due to smoke inhalation alone, 26% due to burns and 21% to a combination of burns and smoke inhalation. There were 517,000 structural, 3,140 civilian deaths and 17,730 civilian induries. *(page 37).

ESCAPING – all seemed savable …; SLEEPING – 1/3 estimated as savable; RESCUING OR FIREFIGHTING – ¾ estimated savable … **Reanalysis of who can be saved.** (see additional data attached)

Deterioration of electrical wiring caused by time or the environment is a predominant cause of ignition. *+ (pg. 24)

Fires in electrical distribution systems contribute significantly to the U.S. fire problem, accounting for a consistent portion of the problem year after year. *+ (page 69)

In 2006 an estimated 71,360 injuries involving electrical distribution or lighting equipment were reported to hospital emergency rooms. +

Electrical distributions and lighting equipment dwelling fires are the only type of home fires that have been shown to increase in frequency with increasing dwelling age. *+

The majority of 2002-2005 non-confined home structure fires involving electrical distribution or lighting equipment began with the ignition of products and materials often found in structural areas, including wire or cable insulation (30%), structural members or framing (12%), insulation within the structural area (5%). Pg 6#

Three-fourths (75%) of deaths in 2002-2005 home fires involving electrical distribution or lighting equipment involved victims who were outside the area of origin when the fire began. (pg 6#)

Branch circuit wiring (51%) accounted for half of the 2002-2005 non-confined home structure fires involving wiring. (pg 54 #)

Half (52%) of 2002-2005 non-confined home structure fires involving wiring began in fire areas of origin that are all concealed or exterior spaces. (pg 55 #)

The majority (57%) of 2002-2005 non-confined home structure fires involving overcurrent protection devices began with ignition wire or cable insulation. (pg 89#)

SUMMARY: Electrical distribution equipment is a highly significant contributor to the high number of civilian deaths and civilian injuries resulting year after year in home fires. Many lives can be saved and injuries prevented if earlier warning can be sounded.

CONCLUSION: The line type open switch activated by heat and/or fire is designed by earliest warning to prevent death by asphyxiation and burning.

(6b) Circuitry short circuits and overloads trip the circuit breakers when the breaker rating is reached. Lower leakage causes hot spots along the line and eventually causes fires that could be detected long before they could become autocatalytic. The line type open switch is designed to detect this hazard long before life is endangered.

Bibliography

+ Characteristics of Home Fire Victims, NFPA, Fire analysis and Research Division. July, 2005. Pg. 59, John R. Hall Jr.

** How Many People Can be Saved From Home Fires if Given More Time to Escape? Fire Technology, 40. Pgs 117-126, 2004: John R. Hall Jr. Fire Analysis and Research Division, NFPA

+ Statistics from National Electronic Injury Surveillance System (NEISS). Data obtained from the U.S. Consumer Product Safety Commission (CPSC) website, www.cpsc.gov

*+ Linda E. Smith and Dennis McCoskrie, "What Causes Wiring Fires in Residences?" Fire Journal, Jan/Feb 1990. Volume 84, Number 1

"Home Structure Fires Involving Electrical Distribution and Lighting Equpment." John R. Hall, Jr., Fire Analysis and Research Division, NFPA, March 2008.

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

PART I – IFC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IRC BUILDING/ENERGY

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: SCARELLI F1-907.2.12.DOC

F131–09/10
907.9.4

Proponent: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.

Revise as follows:

907.9.4 Method. To verify that each smoke detector is within its *listed* and marked sensitivity range, it shall be tested using one of the following methods:

1. A calibrated test method;
2. The manufacturer's calibrated sensitivity test instrument;
3. *Listed* control equipment arranged for the purpose;
4. A smoke detector/control unit arrangement whereby the detector causes a signal at the control unit where the detector's sensitivity is outside its acceptable sensitivity range; or
5. Another calibrated sensitivity test method acceptable to the *fire code official*.

Detectors found to have a sensitivity outside the *listed* and marked sensitivity range shall be cleaned and recalibrated or replaced.

Exceptions:

1. Detectors *listed* as field adjustable shall be permitted to be either adjusted within the *listed* and marked sensitivity range and cleaned and recalibrated or they shall be replaced.
2. This requirement shall not apply to single-or multiple-station smoke alarms in one- or two-family dwellings.

Reason: This change is required for consistency with the requirements for NFPA 72. NFPA 72 presently requires sensitivity testing for all smoke detectors and smoke alarms other than those installed in one- or two-family dwellings. This is not a new requirement in NFPA 72.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: HAMMERBERG-F4-907.9.4-2.DOC

F132–09/10
908 (New) [IBC [F] 908(New)], 902 (IBC [F] 902), Chapter 47 (IBC Chapter 35); IRC R315, R202, Chapter 44

Proponent: Roger Evans, Park City Municipal Corporation, representing Utah Chapter of ICC

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IFC COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IFC

1. Add new text as follows:

SECTION 908 (IBC SECTION [F] 908)
CARBON MONOXIDE ALARMS AND
CARBON MONOXIDE DETECTION SYSTEMS

908.1 General. This section covers the application, installation, performance and maintenance of carbon monoxide alarms and carbon monoxide detection systems in new buildings and structures.

908.1.1 Carbon monoxide alarms, carbon monoxide detectors and combination smoke/carbon monoxide devices. Carbon monoxide alarms, carbon monoxide detectors and combination smoke/carbon monoxide alarms and combination smoke/carbon monoxide detectors described in sections 908.1.2 through 908.1.5 shall be installed and maintained in accordance with the provisions of this code, NFPA 72 and NFPA 720.

908.1.2 Carbon monoxide alarms. Single- or multiple-station carbon monoxide alarms shall be listed and labeled in accordance with ANSI/UL 2034.

908.1.3 Carbon monoxide detectors. Carbon monoxide detectors shall be listed and labeled in accordance with ANSI/UL 2075.

908.1.4 Combination smoke/carbon monoxide alarms. Combination smoke/carbon monoxide alarms shall be listed and labeled in accordance with ANSI/UL 217 and ANSI/UL 2034

908.1.5 Combination smoke/carbon monoxide detectors. Combination smoke/carbon monoxide detectors shall be listed and labeled in accordance with ANSI/UL 268 and ANSI/UL 2075

908.2 Power Source. Required single- or multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall receive their power by one of the following means:

1. Listed carbon monoxide alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source with secondary power backup and without a disconnecting switch other than those required for overcurrent protection. Listed carbon monoxide alarms that are battery-powered or plug-in with battery backup shall not be permitted in new construction.
2. Listed carbon monoxide detectors shall receive their power from the approved control panel. The approved control panel shall receive its primary power from the building wiring when such wiring is served from a commercial source and the primary power source shall not include a disconnecting switch other than those required for overcurrent protection. The control panel shall be equipped with rechargeable batteries for secondary power backup.
3. Listed low-power radio frequency (wireless) detectors shall be permitted to be battery powered when the battery is electrically supervised and shall be capable of sending an alarm signal to the approved control panel for a minimum of 7 days after sending the initial battery depletion signal.

908.2.1 Interconnection. Where more than one listed carbon monoxide alarm, or, combination smoke/carbon monoxide alarm is required to be installed within a dwelling unit they shall be interconnected in such a manner that the activation of one carbon monoxide alarm shall activate all of the carbon monoxide alarms in the dwelling unit and the activation of a carbon monoxide detector or combination smoke/carbon monoxide detector shall activate the carbon monoxide audible notification devices throughout the individual dwelling unit. The required carbon monoxide alarm signal shall be clearly audible in all sleeping rooms, having a sound level of at least 15 db above average ambient sound level or 5 db above the maximum sound level, or a sound level at least 75 db at the pillow.

Exception: Carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors installed in existing construction shall not be required to cause all carbon monoxide alarms to sound.

908.2.2 Acceptance testing. When the installation of carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors is complete, each alarm or detector and interconnecting wiring shall be tested in accordance with NFPA 72 and NFPA 720.

908.2.3 Where required. Listed single- or multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall be installed in locations described in sections 908.2.4 through 908.2.5.

908.2.4 Group R-1. Group R-1 occupancies located in a buildings that contain fuel burning appliances or which have attached garages, listed multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall be installed in the following locations:

1. On the ceiling or wall of the same room as permanently installed fuel burning appliances in accordance with manufacturers published instructions
2. Centrally located on every habitable level, in every HVAC zone of the building

Exception: Carbon monoxide alarms or carbon monoxide detectors shall not be required in sleeping units unless the sleeping unit contains a fuel-burning appliance.

The required carbon monoxide alarms or carbon monoxide detectors shall be annunciated at a constantly attended location

908.2.5 Groups R-2, R-3 and R-4. Group R-2, R-3 and R-4 occupancies located in buildings that contain fuel burning appliances or which have attached garages, listed multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall be installed in the following:

1. Outside each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms
2. On every level of a dwelling unit, including basements and in every HVAC zone of the building
3. On the ceiling or wall of the same room as permanently installed fuel burning appliances in accordance with manufacturers published instructions.

   Exception: Carbon monoxide alarms or carbon monoxide detectors shall not be required in sleeping units unless the sleeping unit contains a fuel-burning appliance.

The required carbon monoxide alarms or carbon monoxide detectors shall be annunciated at a constantly attended location

2. Add new definitions as follows:

902.1(IBC [F] 902.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

CARBON MONOXIDE.

Single-Station Carbon Monoxide Alarm. A device intended for the purpose of detecting carbon monoxide gas and alerting occupants by a distinct and audible signal comprising of an assembly that incorporates a sensor, control components and an alarm notification appliance in a single unit operated from a power source either located in the unit or obtained at the point of installation.

Multiple-Station Carbon Monoxide Alarm. A carbon monoxide alarm capable of being interconnected to one or more additional carbon monoxide alarms so that the actuation of one causes the appropriate alarm signal to be annunciated in all interconnected alarms.

Carbon Monoxide Detector. A device intended to be connected to an approved carbon monoxide detection system for the purpose of detecting carbon monoxide gas and alerting occupants by a distinct and audible signal.

Carbon Monoxide Detection System. A system of devices that consists of a control panel and circuits arranged to monitor and annunciate the status of carbon monoxide detectors and to initiate the appropriate response to those signals.

Combination Smoke/Carbon Monoxide Device. A device that combines a carbon monoxide alarm or carbon monoxide detector with smoke sensing technology; provided that the combined device is listed by a nationally recognized testing laboratory (NRTL) to the applicable ANSI/ UL Standards for both smoke detection and carbon monoxide detection. Such combined alarm units or detection systems shall emit an audible alarm in a manner that clearly differentiates between the two hazards as specified in the appropriate NFPA and ANSI/UL Standard.

3. Add new standards to Chapter 47 (IBC Chapter 35) as follows:

NFPA

720-2009	Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment 2009 Edition

UL

2034-2008	Standard for Single and Multiple Station Carbon Monoxide Alarms, with Revisions through February 20, 2009
2075-2004	Standard for Gas and vapor Detectors and Sensors, with revisions through September 28, 2007

PART II – IRC BUILDING/ENERGY

1. Revise as follows:

R315.1. Carbon monoxide alarms, carbon monoxide detectors or combination smoke/carbon monoxide devices. Carbon monoxide alarms, carbon monoxide detectors and combination smoke/carbon monoxide devices described in sections R315.1.1 through R315.1.4 shall be installed and maintained in accordance with the provisions of this code, NFPA 72 and NFPA 720. ~~**Carbon monoxide alarms.** In new construction, dwelling units within which fuel-fired appliances are installed or have attached garages shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).~~

R315.1.1 Carbon monoxide alarms. Single- or multiple-station carbon monoxide alarms shall be listed and labeled in accordance with ANSI/UL 2034.

R315.1.2 Carbon monoxide detectors. Carbon monoxide detectors shall be listed and labeled in accordance with ANSI/UL 2075.

R315.1.3 Combination smoke/carbon monoxide alarms. Combination smoke/carbon monoxide alarms shall be listed and labeled in accordance with ANSI/UL 217 and ANSI/UL 2034

R315.1.4 Combination smoke/carbon monoxide detectors. Combination smoke/carbon monoxide detectors shall be listed and labeled in accordance with ANSI/UL 268 and ANSI/UL 2075.

R315.2 Where Required in New Construction. In new construction within which fuel burning appliances exist or which have attached garages, carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall be installed in the following locations:

1. Outside each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms.
2. On every level of a dwelling unit, including basements

~~**R315.2**~~ **R315.3 Where required in existing dwellings.** Where work requiring a permit occurs in existing dwellings that have attached garages or in existing dwellings within which fuel-fired appliances exist, carbon monoxide alarms/detectors shall be provided in accordance with Sections R315.1 and R315.2.

~~**R315.3 Alarm Requirements** Single station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.~~

R315.4 Carbon monoxide alarm signal requirements. Where more than one listed carbon monoxide alarm, or combination smoke/carbon monoxide is required to be installed within a dwelling unit they shall be interconnected in such a manner that the activation of one carbon monoxide alarm shall activate all of the carbon monoxide alarms in the dwelling unit and the activation of a carbon monoxide detector or combination smoke/carbon monoxide detector shall activate the carbon monoxide audible notification devices throughout the individual dwelling unit. The required carbon monoxide alarm signal shall be clearly audible in all sleeping rooms, having a sound level of at least 15 db above average ambient sound level or 5 db above the maximum sound level, or a sound level at least 75 db at the pillow.

R315.5 Power source. Required single- or multiple-station carbon monoxide alarms, carbon monoxide detectors, combination smoke/carbon monoxide alarms or combination smoke/carbon monoxide detectors shall receive their power by one of the following means:

1. Listed carbon monoxide alarms shall be battery-powered, plug-in with battery backup, or receive their primary power from the building wiring when such wiring is served from a commercial source with secondary power backup and without a disconnecting switch other than those required for overcurrent protection.Listed carbon monoxide alarms that are battery-powered or plug-in with battery backup shall not be permitted in new construction.
2. Listed carbon monoxide detectors shall receive their power from the approved control panel. The approved control panel shall receive its primary power from the building wiring when such wiring is served from a commercial source and the primary power source shall not include a disconnecting switch other than those required for overcurrent protection. The control panel shall be equipped with rechargeable batteries for secondary power backup.
3. Listed low-power radio frequency (wireless) detectors shall be permitted to be battery powered when the battery is electrically supervised and shall be capable of sending an alarm signal to the approved control panel for a minimum of 7 days after sending the initial battery depletion signal.

2. Add new definition to Section R202 as follows:

CARBON MONOXIDE.

Single-Station Carbon Monoxide Alarm. A device intended for the purpose of detecting carbon monoxide gas and alerting occupants by a distinct and audible signal comprising of an assembly that incorporates a sensor, control components and an alarm notification appliance in a single unit operated from a power source either located in the unit or obtained at the point of installation.

Multiple-Station Carbon Monoxide Alarm. A carbon monoxide alarm capable of being interconnected to one or more additional carbon monoxide alarms so that the actuation of one causes the appropriate alarm signal to be annunciated in all interconnected alarms.

Carbon Monoxide Detector. A device intended to be connected to an approved carbon monoxide detection system for the purpose of detecting carbon monoxide gas and alerting occupants by a distinct and audible signal.

Carbon Monoxide Detection System. A system of devices that consists of a control panel and circuits arranged to monitor and annunciate the status of carbon monoxide detectors and to initiate the appropriate response to those signals.

Combination Smoke/Carbon Monoxide Device. A device that combines a carbon monoxide alarm or carbon monoxide detector with smoke sensing technology; provided that the combined device is listed by a nationally recognized testing laboratory (NRTL) to the applicable ANSI/ UL Standards for both smoke detection and carbon monoxide detection. Such combined alarm units or detection systems shall emit an audible alarm in a manner that clearly differentiates between the two hazards as specified in the appropriate NFPA and ANSI/UL Standard.

3. Add new standards to Chapter 44 as follows:

NFPA

720-2009	Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment 2009 Edition

UL

2075-2004	First Edition of the Standard for Gas and vapor Detectors and Sensors, with revisions through September 28, 2007

Reason (Part I): The purpose for this code change is to protect people sleeping in commercial Group R occupancies such as hotels, motels, adult & child day care, apartments and dormitories from serious injury or possibly death from unintentional non-fire related carbon monoxide (CO) exposure by mandating the installation of carbon monoxide detection devices. The Centers for Disease Control and Prevention (CDC) reports that an estimated 15,000 emergency department visits and 500 unintentional deaths in the United States each year for the six year period 1999-2004. These carbon monoxide incidents were a contributing factor for 20 states enacting laws to require the installation of carbon monoxide detection devices. Of the 20 states that have adopted requirements for carbon monoxide detection, ten require the installation of carbon monoxide detectors in commercial Group R occupancies. In the absence of a national installation standard for commercial Group R occupancies each jurisdiction developed its own regulations with varying installation requirements.

We recommend that the International Fire Code develop the necessary installation requirements for CO detection devices in commercial Group R.

Cost Impact (Part I): It is estimated that the proposed code modification will have a minimal cost impact on the construction of Group R occupancies. For example in R-1 occupancies a CO alarm or detector will be installed by fuel burning appliance(s) and in each HVAC zone. In other R occupancies cost will be minimal as installation requirements are outside of each sleeping area and on each floor.

Analysis (Part I): UL 2034 is already referenced in the IRC but not currently in the IFC or IBC. If the code change is approved, UL 2034 would be added to Chapter 47 of the IFC and Chapter 35 of the IBC as a referenced standard.

UL 2075 is already referenced in the IFC but not currently in the IBC. If the code change is approved, UL 2075 would be added to Chapter 35 of the IBC as a referenced standard.

Reason (Part II): The purpose for this code change is to improve the life safety of citizens by reducing the incidence of carbon monoxide (CO) poisoning in dwellings and to revise the language in the 2009 edition of the IRC so it is consistent with nationally recognized industry consensus standards.

The CO provisions in the 2009 edition of the IRC did not include the reliable, proven and tested technologies of system-connected CO detectors even though they meet nationally recognized industry consensus standards

1. ANSI/UL 2075, *Gas and Vapor Detectors and Sensors*
2. ANSI/NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*

The performance and reliability of system-connected CO detectors have shown to be extremely high if they are listed and maintained to ANSI/UL 2075 and installed in accordance with NFPA 720. System-connected CO detectors designed to be part of a carbon monoxide detection system are required to be connected to an approved panel. The panel is required to be equipped with rechargeable batteries that keep the carbon monoxide

detection system operating during a power outage and will communicate the power loss condition to the supervising station. When the primary power is restored, the control panel will fully recharge the standby batteries. An added feature of a carbon monoxide detection system is that the interconnecting wiring to system-connected CO detectors are supervised such that a wiring fault results in a trouble signal at the premises and the supervising station.

The installation provisions in the 2009 edition of the IRC seem inconsistent with NFPA 720 when two or more CO alarms are installed within a dwelling unit. Section 9.6.5 of NFPA 720 requires that when two or more carbon monoxide alarms are to be installed that they are interconnected.. The rationale for this requirement is if a CO device is activated in the basement the occupants on the second floor on the opposite end of the home is unable to hear the audible alarm if the devices are not interconnected.

The 2009 edition of the IRC requires CO alarms outside each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms. However, NFPA 720 requires CO devices to be installed on every level of a dwelling unit, including basements as well as outside each separate dwelling unit sleeping area in the immediate vicinity of the bedrooms.

Cost Impact (Part II): It is estimated that the proposed code modification will have a minimal cost impact on the construction of one- and two- family dwellings and townhouses. The proposed new requirements will not require addition CO detection devices to be installed; however the proposed changes will require additional wiring. While there are many variables that affect the cost of construction, most new dwelling construction is anticipated no more than two stories in height and will require wiring between no more than three CO detection devices: one per floor and one in the basement.

Analysis (Part II): A review of the standard(s) proposed for inclusion in the code, NFPA 720-2009, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

UL 2075 is already referenced in the IFC but not currently in the IBC. If the code change is approved, UL 2075 would be added to Chapter 35 of the IBC as a referenced standard.

PART I – IFC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IRC BUILDING/ENERGY

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: EVANSR-F1-908.DOC

F133–09/10

908.7 (New) [IBC [F] 908.7 (New)], 4606.1 (New), Chapter 47 (IBC Chapter 35)

Proponent: Robert J Davidson, Code Consultant/Alan Shuman, President, representing the National Association of State Fire Marshals (NASFM)

1. Add new text as follows:

908.7 (IBC [F] 908.7) Carbon monoxide alarms. Group I or R occupancies located in a building containing a fuel-burning appliance or a building which has an attached garage shall be provided with single station carbon monoxide alarms. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in the *International Building Code*, shall not be deemed to be an attached garage.

Exception: Sleeping units or dwelling units which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be provided with single station carbon monoxide alarms provided that:

1. The sleeping unit or dwelling unit is located more than one story above or below any story which contains a fuel-burning appliance or an attached garage;
2. The sleeping unit or dwelling unit is not connected by duct work or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage; and
3. The building is provided with a common area carbon monoxide alarm system.

4606.1 Carbon monoxide alarms. Existing Group I or R occupancies located in a building containing a fuel-burning appliance or a building which has an attached garage shall be provided with single station carbon monoxide alarms. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in the *International Building Code*, shall not be deemed to be an attached garage.

The UL Listed wireless interconnected smoke alarm system with AC ionization sensor hardwired would allow all of the smoke detectors to be interconnected without requiring hard wiring all of them. The technology is now available where it is not difficult to interconnect all the smoke detectors and thereby improving life safety.

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

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

ICCFILENAME: MALATTIA-RB-1-R314.4

RB60–09/10

R315, R315.1.1, R315.1.2, R315.1.3, Chapter 44

Proponent: Scott Dornfeld, City of Delano, MN

1. Delete without substitution:

~~SECTION R315~~
~~CARBON MONOXIDE ALARMS~~

~~R315.1 Carbon monoxide alarms.~~ ~~For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in *dwelling units* within which fuel-fired *appliances* are installed and in dwelling units that have attached garages.~~

~~R315.2 Where required in existing dwellings.~~ ~~Where work requiring a *permit* occurs in existing *dwellings* that have attached garages or in existing dwellings within which fuel-fired *appliances* exist, carbon monoxide alarms shall be provided in accordance with Section R315.1.~~

~~R315.3 Alarm requirements.~~ ~~Single station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.~~

2. Delete standard as follows:

UL
~~2034-2008 Standard for Single and Multiple Station Carbon Monoxide Alarms~~

Reason: A new rule should never be imposed unless it can be shown that there is a significant hazard posed that can be directly influenced by the rule. It is not the goal of the I-Codes, the stated purpose of which is to provide minimum standards, to eliminate all hazards such that no one will ever be killed or injured as a result of the design of or a defect in a building. It is simply too expensive and impractical to do so. Such is the case with the addition of carbon monoxide requirements in the IRC that nationwide will increase costs to homeowners in the hundreds of millions of dollars with a potentially negligible impact on CO deaths. Additionally, it requires that the alarms be installed any time work is done and a permit is required. This means if I have my house reroofed, I must install CO alarms (but not smoke alarms). I would be required to install them if I have an attached garage even when studies show the likelihood of carbon monoxide poisoning occurring from motor vehicles is extremely low and even if portions of the garage are permanently open to the outside.

Following are some excerpts taken from a publication by the Consumer Product Safety Commission entitled ***"Non-Fire Carbon Monoxide Deaths Associated with the Use of Consumer Products 2003 and 2004 Annual Estimates".***

P. 4 - During 2004, the most recent year for which nearly complete data are available, there were an estimated 162 carbon monoxide (CO) poisoning deaths associated with the use of a consumer product under the jurisdiction of the U.S. Consumer Product Safety Commission (CPSC). There were an estimated 154 fatalities in 2003. Carbon monoxide poisonings referred to in this report do not include those where the CO gas resulted from a fire or a motor vehicle, were intentional in nature or were directly work-related.

Comment: The number of CO deaths was often cited as being in the thousands, not 150-160, which is the accurate number.

Table 1

Estimated Non-Fire Carbon Monoxide Poisoning Deaths

By Associated Fuel-Burning Consumer Product, 1999-2004.

Consumer Product	2002 - 2004+		Annual Estimate					
	Average Estimate	Average Percent	1999	2000	2001	2002	*2003+*	*2004+*
Total Deaths	*166*	*100%*	109	137	122	181	*154*	*162*
Heating Systems	*82*	*49%*	50	81	72	97	*66*	*84*
Unspecified Gas Heating	*7*	*4%*	5	1	5	2	*4*	*14*
LP Gas Heating	*29*	*18%*	22	28	24	41	*22*	*25*
Natural Gas Heating	*30*	*18%*	20	42	28	32	*27*	*30*
Coal/Wood Heating	*3*	*2%*	0	2	6	4	*2*	*4*
Kerosene/Oil Heating	*6*	*4%*	2	8	6	8	*6*	*4*
Diesel Fuel	*< 1*	*< 1%*	*	*	*	1	*	*
Heating Systems, Not Specified	*7*	*4%*	1	*	3	9	*5*	*7*
Charcoal Grills or Charcoal	*7*	*4%*	17	8	10	11	*8*	*3*
Gas Water Heaters	*3*	*2%*	1	3	1	1	*7*	*1*
Gas Grills, Camp Stoves, Lanterns	*5*	*3%*	14	4	1	5	*2*	*8*
Gas Ranges/Ovens	*3*	*2%*	6	12	9	3	*3*	*4*
Other Appliances	*1*	*1%*	1	0	0	0	*2*	*1*
Multiple Appliances	*8*	*5%*	6	2	7	12	*8*	*4*
Engine-Driven Tools	*54*	*33%*	13	27	22	51	*57*	*55*
Generators	*44*	*27%*	7	19	21	41	*50*	*41*
Other Engine-Driven Tools	*10*	*6%*	6	8	1	10	*7*	*14*

\+ Data collection for 2003 and 2004 is incomplete. Italicized estimates may change in the future.

* No reports received by CPSC staff.

Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, CPSC Injury or Potential Injury Incident File, CPSC In-Depth Investigation File, National Center for Health Statistics Mortality File, 1999 - 2004.

Note: Reported average percentages by product may not add to total due to rounding.

P. 6 - Of the 47 estimated deaths in 2003 and 2004 that were associated with LP gas heating systems, 32 (68%) involved unvented portable propane heaters. These unvented portable propane heaters were fueled by a propane tank and were not a component of an installed heating system. Unvented portable propane heaters were either camping heaters that used disposable propane tanks, one pound propane bottles, or tank top heaters that used bulk tanks larger than one pound.

Comment: Unvented portable propane heaters cannot be used as a primary heat source in a building. Therefore these incidents likely occurred when they were used for temporary heat or in locations outside a home such as a camping unit. Requiring CO alarms in homes will have no impact on CO deaths that occur in camping trailers and locations other than the home. Requiring CO alarms in homes because someone might bring an unvented heater into their house and improperly use it is unwarranted.

P. 6 - In 2003 and 2004, an estimated 11 CO deaths (3% of the 316 total consumer product estimate) were associated with charcoal or charcoal grills; an estimated eight deaths (3% of the total consumer product estimate) were associated with a gas water heater; gas grills, camp stoves and lanterns were associated with an estimated eight deaths (3% of the total consumer product estimate); gas ranges and ovens were associated with an estimated seven deaths (2% of the total consumer product estimate); and three deaths were either associated with consumer products that did not fit into the categories given above or there was insufficient detail to categorize the appliance. One fatality was associated with a propane-fueled refrigerator, one was associated with a product simply defined as a "propane appliance" and another as a "gas-fueled appliance". These incidents were categorized as "Other appliances". Additionally, in 2003 and 2004 an estimated 12 deaths were associated with multiple appliances (4% of the total consumer product estimate). The multiple appliances category included all incidents where multiple fuel-burning products were used simultaneously such that a single source of the CO could not be determined. Of the 12 multiple appliance fatalities, six were associated with a generator and another product. These other products were a kerosene heater (three deaths), an LP gas heater (two deaths) and a wood stove. Other fatalities where multiple products were simultaneously used and associated with a CO poisoning death involved a portable propane heater and a gas-powered snow thrower; a portable propane heater and a propane lantern; a kerosene heater and a propane heater; a natural gas heater and hot water heater; a propane furnace and a propane oven in a travel camper; and a natural gas furnace and natural gas oven.

Comment: While it may seem cruel, at times one needs to invoke the "any idiot rule". The code should not require CO alarms to deal with people operating charcoal grills or lawn mowers in their living rooms.

P. 6 - An estimated 112 CO poisoning deaths (35% of the estimated total from 2003 and 2004) were associated with engine-driven tools, which includes generators, riding mowers, a concrete cutter, a gas-fueled welder, power washers, a water pump, an air compressor and an ATV. Generator associated deaths comprise the majority of this category. There were an estimated total of 91 generator-related CO poisoning deaths in 2003 and 2004 (81% of all engine-driven tool fatalities and 29% of the total consumer product estimate).

P. 7 - Of the 123 liquid fueled appliance-related fatalities in 2003 and 2004, 112 (91%) were associated with all engine-driven tools (generators, lawn mowers, power washers, concrete saws, etc.). Generators accounted for 91 of the estimated 123 fatalities (74%) in the Liquid Fueled Appliances category.

Table 2

Estimated Non-Fire Carbon Monoxide Poisoning Deaths

Associated with Consumer Products Organized by Fuel Type, 1999-2004.

Consumer Product	2002-2004+ Average Estimate	2002-2004+ Average Percent	Annual Estimate 1999	2000	2001	2002	2003+	2004+
Total Deaths	*166*	*100%*	109	137	122	181	*154*	*162*
Gas Fueled Appliances	*84*	*51%*	67	91	71	92	*72*	*89*
Room / Space Heater	*33*	*20%*	20	39	23	35	*30*	*34*
Natural Gas Fueled	*8*	*5%*	3	17	5	9	*8*	*8*
Propane Fueled	*19*	*12%*	16	21	17	21	*19*	*18*
Other / Unspecified	*5*	*3%*	1	1	1	5	*3*	*8*
Furnace	*40*	*24%*	25	33	37	48	*28*	*43*
Natural Gas Fueled	*22*	*13%*	16	25	23	24	*19*	*23*
Propane Fueled	*10*	*6%*	6	8	7	20	*3*	*7*
Other / Unspecified	*8*	*5%*	3	*	7	4	*6*	*13*
Range, Oven	*3*	*2%*	6	12	9	3	*3*	*4*
Water Heater	*3*	*2%*	1	3	1	1	*7*	*1*
Refrigerator	*<1*	*<1%*	1	*	*	*	*1*	*
Lantern	*2*	*1%*	8	3	*	2	*1*	*4*
Gas Grill, Camp Stove	*2*	*1%*	5	1	1	3	*1*	*2*
Other	*1*	*<1%*	1	*	*	*	*1*	*1*
Solid Fueled Appliances	*11*	*7%*	17	10	16	15	*10*	*7*
Charcoal / Charcoal Grill	*7*	*4%*	17	8	10	11	*8*	*3*
Wood / Coal Heater	*3*	*2%*	*	2	6	4	*2*	*4*
Coal Furnace	*1*	*<1%*	*	1	1	1	*	*1*
Wood / Coal Stove	*1*	*1%*	*	1	5	1	*2*	*1*
Chimney / Fireplace	*1*	*1%*	*	*	*	2	*	*2*
Liquid Fueled Appliances	*61*	*37%*	16	34	28	59	*63*	*60*
Oil Heater / Heating	*1*	*1%*	*	4	5	3	*1*	*
Kerosene Heater / Heating	*5*	*3%*	2	3	1	4	*5*	*4*
Generators	*44*	*27%*	7	19	21	41	*50*	*41*
Other Engine-Driven Tools	*10*	*6%*	6	8	1	10	*7*	*14*
Lantern / Product / Appliance	*<1*	*<1%*	1	1	*	1	*	*1*
Multiple Products Involved	*8*	*5%*	7	2	8	13	*8*	*4*

\+ Data collection is incomplete for 2003 and 2004. Italicized estimates may change in the future.

* No reports received by CPSC staff.

Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, CPSC Injury or Potential Injury Incident File, CPSC In-Depth Investigation File, National Center for Health Statistics Mortality File, 1999 - 2004.

Note: Reported average percentages by product may not add to total due to rounding.

Table 3
Estimated Non-Fire Carbon Monoxide Poisoning Deaths Associated with Engine-Driven Tools, 1999-2001 vs. 2002-2004.

Engine-Driven Tools	1999-2001 Average Estimate	2002-2004+ Average Estimate	Annual Estimate 1999	2000	2001	2002	*2003+*	*2004+*
Total	**21**	*54*	**13**	**27**	**22**	**51**	*57*	*55*
Generators	**16**	*44*	**7**	**19**	**21**	**41**	*50*	*41*
Other Engine-Driven Tools	**5**	*10*	**6**	**8**	**1**	**10**	*7*	*14*
Lawn Mowers[1]	5	*6*	6	7	1	5	*6*	*8*
Gas Welder	*	*1*	*	*	*	2	*1*	*
Concrete Saw	*	*1*	*	*	*	1	*	*1*
Power Washer	*	*1*	*	*	*	*	*	*2*
ATV	*	*1*	*	*	*	1	*	*1*
Snow Blower	< 1	*	*	1	*	*	*	*
Air Compressor	*	*< 1*	*	*	*	*	*	*1*
Water Pump	*	*< 1*	*	*	*	*	*	*1*

[1] Lawn Mowers includes riding mowers, garden tractors and gas-fueled powered push mowers.
\+ Data collection is incomplete for 2003 and 2004. Italicized estimates may change in the future.
* No reports received by CPSC staff.
Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, CPSC In-Depth Investigation File, CPSC Injury or Potential Injury Incident File, National Center for Health Statistics Mortality File, 1999 - 2004.
Note: Reported average percentages by product may not add to total due to rounding.

P. 11 - Table 6 shows that in 2003 and 2004, an estimated 230 CO poisoning deaths occurred in homes, including manufactured and mobile homes. From 2002-2004, an annual average of 72 percent of CO poisoning deaths occurred in homes, including manufactured and mobile homes. In 2003 and 2004, an estimated 45 deaths took place in temporary shelters, such as tents, recreational vehicles, cube vans, seasonal cabins, and trailers (including horse trailers). In 2002- 2004, an annual average of 17 percent of CO poisoning deaths took place in temporary shelters. In 2003 and 2004, 25 of the 45 estimated deaths in temporary shelters were most commonly associated with portable gas or LP gas heating or cooking appliances. Generator usage in a temporary shelter was the second largest product category with an estimated 11 deaths in 2003 and 2004. Other scenarios included charcoal and charcoal grills, LP gas lanterns, kerosene heaters and a kerosene cooker. A consistently small percentage of deaths occurred in passenger vans, trucks, or automobiles in which victims were spending the night. For 2003 and 2004, of the estimated 13 CO fatalities in this category, nine were associated with portable LP gas heaters.

Comment: CO alarm requirements in the IRC would not impact incidents in mobile homes, tents, RV's, seasonal cabins, trailers, passenger vans, trucks, and automobiles.

Table 6
Estimated Non-Fire Carbon Monoxide Poisoning Deaths by Location of Death, 1999-2004.

Location of Death	2002-2004+ Average Estimate	2002-2004+ Average Percent	Annual Estimate 1999	2000	2001	2002	*2003+*	*2004+*
Total	*166*	*100%*	**109**	**137**	**122**	**181**	*154*	*162*
Home	*119*	*72%*	60	88	85	128	*110*	*120*
Temporary Shelter	*28*	*17%*	35	34	24	39	*23*	*22*
Auto	*7*	*4%*	7	2	10	8	*8*	*5*
Other	*10*	*6%*	7	13	3	5	*10*	*15*
Unknown	*1*	*1%*	*	*	*	2	*2*	*

\+ Data collection is incomplete for 2003 and 2004. Italicized estimates may change in the future.
* No reports received by CPSC staff.
Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, CPSC In-Depth Investigation File, CPSC Injury or Potential Injury Incident File, National Center for Health Statistics Mortality File, 1999 - 2004.
Note: Reported average percentages by product may not add to total due to rounding.

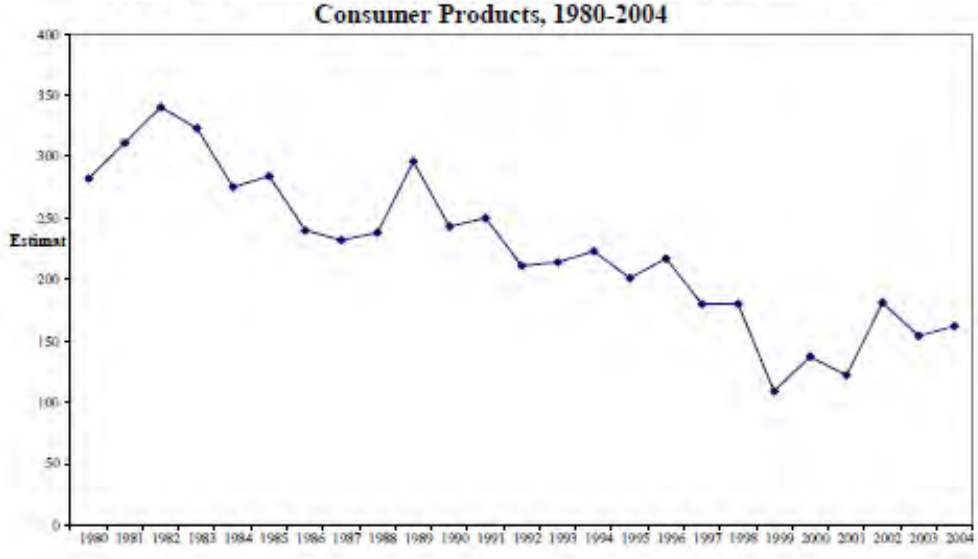
Appendix B: National Estimates of Consumer Product-Related CO Poisoning Deaths, 1980 - 2004

Estimated Non-Fire Carbon Monoxide Poisoning Deaths Associated with Consumer Products, 1980-2004

Year	Estimate
1980	282
1981	311
1982	340
1983	323
1984	275
1985	284
1986	240
1987	232
1988	238
1989	296
1990	243
1991	250
1992	211
1993	214
1994	223
1995	201
1996	217
1997	180
1998	180
1999*	109
2000	137
2001	122
2002	181
2003	154
2004	162

* The Tenth Revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) was implemented.
Source: U.S. Consumer Product Safety Commission / EPHA.

Figure 1: Estimated Non-Fire CO Poisoning Deaths Associated with Consumer Products, 1980-2004



Reading through even these brief excerpts, one wonders if requiring CO alarms would have any impact on CO related deaths at all given the circumstances surrounding most deaths. Furthermore, the number of deaths decreased without government regulation from 340 in 1982 to 162 in 2004. This decrease occurred during a time when the population increased from about 225 million to 296 million in 2004. The steadily decreasing number of deaths and their location doesn't indicate that requiring CO alarms would have any statistical impact on deaths.

Regarding the matter of CO deaths and attached garages, following are excerpts from an article entitled:
The Role of Catalytic Converters in Automobile Carbon Monoxide Poisoning[*] A Case Report by Bradley Vossberg, MD and Judah Skolnick, MD, FCCP
[*] From the Frazier Rehab Center, Jewish Hospital Health Network, Louisville, KY.

Inhaling motor vehicle exhaust fumes is a common method used by people attempting to commit suicide; however, the decreased carbon monoxide concentrations found in the exhaust of late-model automobiles equipped with catalytic converters are changing the clinical presentation of exhaust inhalation.

Closed-environment exposure to MVEGE from automobiles not equipped with catalytic converters can result in death within 30 min. The introduction of catalytic converters beginning with 1975 new-car models dropped CO emission rates to 6.00 g/min. By 1989, the average new-car

CO emission at idling was 0.22 g/min. The catalytic conversion process removes CO, hydrocarbons, and nitrogen oxide; the resultant emission is a more desirable mixture of nitrogen, CO_2, and water. Contemporary three-way catalytic converters eliminate > 99% of CO emissions.

Given the increased efficiency of modern catalytic converters, patients presenting with closed-environment MVEGE exposure may have much lower HbCO levels than would have been previously expected; in some cases, the HbCO level may be normal. Other important factors to be considered are the role of supplemental O_2 given at the scene and the time taken to obtain the HbCO level.

Attached garages do not pose a risk. By definition, an attached garage is three walls and a roof. A garage door is not required. There are no requirements that the garage be air tight or enclosed to a degree that would create any danger, even if CO levels were high.

Clearly, expecting CO alarms to have any positive impact on CO death rates is extremely optimistic and likely unrealistic. If we are going to require the public to spend their money on safety related devices, surely we can find a more productive area on which to spend it.

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

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: DORNFELD-RB-2-R315

RB61–09/10

R316.4, R316.4.1 (New), R316.4.2 (New), Chapter 44 (New)

Proponent: Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

1. Revise as follows:

R316.4 Thermal barrier. Unless otherwise allowed in Section R316.5 or Section R316.6, foam plastic shall be separated from the interior of a building by an *approved* thermal barrier of minimum 1/2 inch (12.7 mm) gypsum wallboard or an *approved* finish material equivalent to a thermal barrier material ~~that will limit the average temperature rise of the unexposed surface to no more than 250°F (139°C) after 15 minutes of fire exposure complying with the ASTME 119 orUL263 standard time temperature curve. The thermal barrier shall be installed in such a manner that it will remain in place for 15 minutes based on NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715~~. The thermal barrier material shall comply with R316.4.1 or R316.4.2.

R316.4.1 The thermal barrier material shall comply with the requirements of the temperature transmission fire test and of the integrity fire test in NFPA 275, Standard Method of Fire Tests for the Evaluation of Thermal Barriers Used Over Foam Plastic Insulation.

R316.4.2 The thermal barrier material shall comply with the temperature transmission test in NFPA 275 and with the conditions of acceptance of FM 4880, UL 1040 or UL 1715 when tested in conjunction with the foam plastic insulation for a period of 15 minutes.

2. Add new standard as follows:

NFPA 275	Standard Method of Fire Tests for the Evaluation of Thermal Barriers Used Over Foam Plastic Insulation	

Reason: NFPA 275 was specifically developed to clarify the test for thermal barrier materials to be used over foam plastic insulation. It contains two tests.

The temperature transmission fire test in NFPA 275 uses the ASTM E 119 (or UL 263) time-temperature fire curve to expose the thermal barrier specimen and it requires the following: "4.8.1 During the 15-minute test period, the average measured temperature rise above the average temperature at the start of the fire test for the thermocouples described in Section 4.3 shall not exceed 250°F (139°C), and the measured temperature rise of any such single thermocouple shall not exceed 325°F (181°C)." Therefore, the temperature transmission fire test in NFPA 275 corresponds to what the code requires now.

The integrity fire test in NFPA 275 requires that the thermal barrier material, together with the foam plastic insulation, be tested to NFPA 286 (which is a 15 minute test) and that the pass/fail criteria are identical to those used for NFPA 286 elsewhere in the code (for example Chapter 8).

The code should continue to recognize that thermal barrier materials tested, in conjunction with foam plastic insulation, to FM 4880, UL 1040 and UL 1715 and complying with the conditions of acceptance of these tests are equally acceptable. NFPA 275 also states that the integrity fire test can be conducted in accordance with these alternate test methods, when their pass/fail criteria are used.

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

Analysis: A review of the standard proposed for inclusion in the code, NFPA 275, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: HIRSCHLER-RB-1-R316.4