RB2-07/08
R102.7.1

Proposed Change as Submitted:

Proponent: William Easterling, Grand Haven, MI, representing himself

Revise as follows:

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to the requirements for a new structure ~~without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated~~. Unless otherwise stated, portions of the existing structure not being altered or repaired need not comply with all of the requirements of this code. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

Reason: The proposed code change is for clarification by putting each unique requirement of the code in its own sentence. Without the current clarification a building official could conclude that proposed alterations or repairs to an existing structure need not comply with the requirements of the code unless specifically stated.

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

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposed language did not improve the code. The committee disagreed with the proposed language that portions of the building not being altered or repaired need not comply with the code. All structures need to comply with the code legally adopted at the time they are constructed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bill Easterling, Grand Haven, MI, representing himself, requests Approval as Submitted.

Phil Forner, Allendale, MI, representing himself, requests Approval as Submitted.

Commenters' Reason: RB2-07/08 should not be disapproved because of the weak and specious committee reason of: "The committee felt that the proposed language did not improve the code. The committee disagreed with the proposed language that portions of the building not being altered or repaired need not comply with the code. All structures need to comply with the code legally adopted at the time they are constructed." Such an interpretation allows Section R102.7.1 to have duo meaning and applicability when it comes to "repairs" as demonstrated by IRC Interpretation 85-05 (attached) and by the committee reasons on RB3-07/08, RB16-07/08, RB90-07/08, and RB91-07/08.

When making repairs to an existing structure, the requirements of the code in effect at the time the repair is being undertaken must be applied instead of the code that was in effect at the time the structure was constructed. The reasoning used by the committee is a perversion of the code which would allow "repairs" to not conform to the requirements for a new structure and will not provide the repair with the minimum requirements to safeguard the public as called for in Section R101.3 and undermine the creditability of the code.

Furthermore contrary to IRC Interpretation No. 85-05 where it "deemed" Section R102.7.1 inapplicable to only certain repairs, IRC Interpretation No. 28-07 (attached) correctly states how R102.7.1 is to be applied to all repairs; stating:

"Existing dwellings that are legally occupied at the time the *International Residential Code* is adopted, and remain unchanged, are not subject retrospectively to the provisions of the code. However, in accordance with the provisions in Section R102.7.1, any new construction, additions, alterations or repairs made to the existing dwelling after the adoption of the *International Residential Code* are required to conform to the requirements of the code for new construction. "

Although new construction, additions, alterations or repairs made to the existing dwelling must comply with provisions for new construction, those portions of the existing dwelling not affected are not required to comply with all of the provisions for new construction. However, new construction shall not create an unsafe condition in the existing dwelling."

As outlined in IRC Interpretation 28-07, approving RB2-07/08 as submitted will separate the two requirements contained in Section R102.7.1 and should assist in preventing the perversion thereof as demonstrated by IRC Interpretation 85-05 along with the committee reasons on RB3-07/08, RB16-07/08, RB90-07/08, and RB91-07/08.

IRC Interpretation No. 85-05
SECTION R105.3.1.1
2003 Edition
Issued: 06-01-06

R105.3.1.1 Substantially improved or substantially damaged existing buildings in areas prone to flooding. For applications for reconstruction, rehabilitation, addition, or other improvement of existing buildings or structures located in an area prone to flooding as established by Table R301.2(1), the building official shall examine or cause to be examined the construction documents and shall prepare a finding with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamage condition. If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the finding shall be provided to the board of appeals for a determination of substantial improvement or substantial damage. Applications determined by the board of appeals to constitute substantial improvement or substantial damage shall meet the requirements of Section R323.

REFERENCED SECTIONS:

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to that required for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

TABLE R301.2(1) CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA FLOOD HAZARDSh

h. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the currently effective FIRM and FBFM, or other flood hazard map adopted by the community, as may be amended.

Q: An existing dwelling constructed prior to the effective date established in Table R301.2(1) is located in an area prone to flooding. Under the applicable provisions of the *2003 International Residential Code*, application is made for a permit to perform work on the existing dwelling. In accordance with Section R105.3.1.1 the building official determines the value of the proposed work to be less than 50 percent of the market value of the existing dwelling. Is the proposed work subject to the provisions of Section R323?

A: No. When proposed work is determined by the building official to be less than 50 percent of the market value of the existing dwelling, the application for permit is not required to be submitted for appeal, and the proposed work is not required to comply with the provisions of Section R323. In addition to the proposed work not being subject to the provisions of Section R323, the portions of the existing dwelling not affected by the proposed work is not required to be modified to comply with the provisions of Section R323. Although the provisions of Section R323 are deemed inapplicable to the existing dwelling and to the work proposed to the existing dwelling, that work which is permitted must comply with all other applicable provisions of the code as provided in Section R102.7.1.
Only when the building official determines the proposed work to be equal to or greater than 50 percent of the market value of the existing dwelling must the application for permit be presented for appeal.

IRC Interpretation No. 28-07
SECTION R102.7.1
2006 Edition
Issued: 09/10/2007
RE_06_28_07

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

REFERENCED SECTION:
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 in height with a separate means of egress and their accessory structures.

Q: In question are existing detached one- and two-family dwellings and townhouses containing basements without emergency escape and rescue openings. The dwellings in question were legally constructed and occupied prior to jurisdictional adoption and enforcement of the *International Residential Code*.

Do the technical provisions of the *International Residential Code* apply to additions and alterations to a legally occupied dwelling that is subject to the provisions of the *International Residential Code* at the time the additions and alterations are made to the existing dwelling?

A: Yes. The additions and alterations to existing dwellings must be made to comply with the technical provisions of the appropriate codes being enforced at the time the work is done.

The provisions of the *International Residential Code*, as defined in Section R101.2, apply to all aspects of construction for detached one-and two-family dwellings, multiple single-family dwellings defined as townhouses and all structures accessory to the dwellings and townhouses. The provisions address all aspects of constructing, altering, repairing, maintaining, using, occupying, enlarging, locating, removing or demolishing any one-family dwelling, two-family dwelling, townhouse or accessory structure. The code regulates any and all activities that modify the dwellings as well as any structures that are incidental to the main dwelling and are located on the same lot.

Existing dwellings that are legally occupied at the time the *International Residential Code* is adopted, and remain unchanged, are not subject retrospectively to the provisions of the code. However, in accordance with the provisions in Section R102.7.1, any new construction, additions, alterations or repairs made to the existing dwelling after the adoption of the *International Residential Code* are required to conform to the requirements of the code for new construction.

Although new construction, additions, alterations or repairs made to the existing dwelling must comply with provisions for new construction, those portions of the existing dwelling not affected are not required to comply with all of the provisions for new construction. However, new construction shall not create an unsafe condition in the existing dwelling. Changing a non-habitable basement to an occupied space without emergency escape and rescue openings creates an unsafe condition that is in conflict with the provisions of the code intended to insure a safe and usable living environment for the occupants of the dwelling.

Final Action: AS AM AMPC____ D

RB4-07/08
R105.2

Proposed Change as Submitted:

Proponent: Steve Hamblin, Clinton City, Layton City, Roy City, Ogden City, Marriott Staterville City, Morgan City, representing Utah Chapter of ICC

Revise as follows:

R105.2 (Supp) Work exempt from permit. Permits shall not be required for the following. Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed ~~120~~ 200 square feet (~~11.15~~ 18.58 m^2).
2. Fences not over 6 feet (1829 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.

(No change to remainder of section)

Reason: A number of shed manufacturing companies throughout the state are producing residential "storage" sheds which are 200 sq. ft. or less. These sheds are typically built to a standard which exceeds the minimum standards required by the IRC. Zoning requirements for the majority of jurisdictions throughout the state will accommodate the location for a 200 sq. ft. shed as easily as a 120 sq. ft. Review for zoning compliance is required regardless of whether a permit is required or not. Many permits currently being issued for sheds with an area between 120 and 200 sq. ft. are being issued based on a one time inspection fee. In most cases this ends up costing the jurisdiction money for providing up to two inspections plus administrative time. The inspections do not typically produce any structural violations. The only known argument for changing the existing 200 square feet maximum area to 120 was to make it consistent with the requirement in the IBC. Sheds which are provided to support a commercial business are typically provided with electrical lighting and outlets which would require a permit regardless of area. They may also be used for the storage of flammables and hazardous materials which would not normally occur in a residential setting. This request would not affect the current IBC requirement. Any shed, regardless of size, which is provided with any electrical, mechanical or plumbing system would still require a permit and inspections despite the proposed modification to Section R105.2, item1.

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

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed to change the size restriction from 120 square feet to 200 square feet for accessory structures used as tool or storage sheds under Section R105.2 work exempt from requiring a permit. It is important to allow people room to store their possessions. This language does not exempt the shed or storage structure from meeting the requirements of the code it simply exempts it from the requirement for a building permit.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bruce Dimmig, City of Surprise, AZ, representing Arizona Building Officials (AZBO), requests Disapproval.

Commenter's Reason: The exception should remain at 120 square feet as the 200 square feet could allow for unintended uses and possible abuses. The larger they are, the more of a problem it could be. The previous cycle reduced the exemption to the 120 square feet because of solid reasoning and that hasn't changed significantly enough to warrant the new limit.

Final Action: AS AM AMPC____ D

RB5-07/08
R105.2

Proposed Change as Submitted:

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R105.2 (Supp) Work exempt from permit. Permits shall not be required for the following. Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet (11.15 m_2).
2. Fences not over 6 feet (1829 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18 927 L) and t the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.
10. Decks and landings, including stairs or ramps serving them, which meet all of the following:
    - 10.1. Are not more than 30 inches above grade at any point
    - 10.2. Are not attached to a building, and
    - 10.3. Do not serve the exit door required by Section R311.4.

(Portions of section not shown remain unchanged)

Reason: The proposed amendment will exclude decks and landings from permits only when:

- no part of the deck floor or landing is more than 30 inches above grade
- the deck or landing has no roof (a deck by definition is a floor system and a deck or landing with a roof is considered a porch)
- the deck or landing is not attached to a building
- the deck or landing does not serve the main exit door

When this code change was submitted in the last cycle, the committee objected on two points:

- low decks should be regulated because they could be considered a gathering area and pose a hazard from collapse
- the proposal would exempt decks from meeting the structural requirements

The risk of injury from a collapse of a deck or landing that would be exempt from permits by this change will be slight. They are very near the ground to begin with. The code already exempts them from guard requirements making it more likely that one would be injured falling off such a deck as opposed to being injured from a collapse. Also, it is believed that a majority of all deck failures occur at the connection of the deck to the dwelling. The revision only covers decks or landings that are freestanding. Such a failure won't happen here. The code exempts certain swimming pools from permits. The drowning potential is significantly more serious than the potential of injury from one of these low decks or landings.

Also the proposal does not exempt decks or landings from meeting structural requirements as the committee suggests. It only exempts those that meet specific criteria from permits and inspections. R105.2 states that exemption from permitting does not allow construction that is not in conformance with the code so the owner still has an obligation to follow any applicable code requirements, just as they do for other exempt construction.

It has been suggested that perhaps there should be a size limit on these decks. Any such limit would be arbitrary and unjustifiable. We are talking residential decks here, not large assembly areas. Size limits are unnecessary.

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

Committee Action: **Disapproved**

Committee Reason: Decks are becoming an extended living space for the home that plays host to hot tubs, cook outs and large parties. In that environment and especially in consideration of elderly persons this language to exempt decks less than 30 inches high from requiring a permit could be problematic.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials, requests Approval as Submitted.

Commenter's Reason: Breaking with tradition, the IRC Committee disapproved this code change with the suggestion that there should be some limit on the size of a deck that could be built without a permit, even if it were ***arbitrary***. They later disapproved other code changes because they were ***arbitrary***. These decks do not reach a size where a greater hazard exists. A 100 square foot deck is no safer or more hazardous than a 200 square foot deck. Proposing an arbitrary limit could result in legal challenges and trigger the argument that the proposed limit is "arbitrary". These decks will have no portion of the floor exceeding 30 inches above grade. They aren't required to have guards so we are not concerned about falling off the deck. We should not be concerned if in a rare occurrence the deck should collapse. Anecdotal evidence suggests that most deck collapses occur because of a failed connection between the dwelling and the deck. These decks will not be attached but free standing. In that rare occurrence that a deck should collapse, the maximum distance the floor would fall would be in the range of 23 inches given a 2X6 joist and 1 ½ inch decking. But many of these decks will be resting on the ground and there will be no hazard whatsoever.

Final Action: AS AM AMPC____ D

RB6-07/08
R105.2

Proposed Change as Submitted:

Proponent: Scott Dornfeld, City of Delano, MN, representing Association of Minnesota Building Officials

Revise as follows:

R105.2 (Supp) Work exempt from permit. Permits shall not be required for the following. Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet (11.15 m^2).
2. Fences not over 6 feet (1829 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.

10. Decks that are not more than 30 inches above grade at any point, are not attached to a dwelling, and do not serve the exit door required by Section R311.4.

(Portions of section not shown remain unchanged)

Reason: The proposed amendment will exclude decks from permits only when:

- no part of the deck floor is more than 30 inches above grade
- the deck has no roof (a deck by definition is a floor system)
- the deck is not structurally attached to the dwelling
- the deck does not serve the main exit door

When this code change was submitted in the last cycle, the committee objected on two points:

- low decks should be regulated because they could be considered a gathering area and pose a hazard from collapse
- the proposal would exempt decks from meeting the structural requirements

Without a doubt there is some hazard of collapse from any deck but in the case of these decks the hazard will be slight. The deck is very near the ground to begin with. The deck will not fall far if it should fail. The code already exempts these decks from guard requirements. Isn't it more likely that one would fall off such a deck as opposed to the deck collapsing? Wouldn't it seem that the potential for injury would be greater if one fell off such a deck as having the deck fail underneath you? Also, it is believed that a majority of all deck failures occur at the connection of the deck to the dwelling. These decks are freestanding. Such a failure won't happen here.

The proposal did not exempt decks from meeting structural requirements as the committee suggests. It only exempts decks that meet specific criteria from permits and inspections. R105.2 states that exemption from permitting does not allow construction that is not in conformance with the code. So the owner still has an obligation to follow any applicable code requirements, just as they do for other exempt construction.

It has been suggested that perhaps there should be a size limit on these decks, why? Any such limit would be arbitrary and unjustifiable. We are talking residential decks here. Not large assembly areas. Size limits are unnecessary.

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

Committee Action: **Disapproved**

Committee Reason: Consistent with the committee's action on RB5-07/08, the committee felt that disapproved to be consistent with the action taken on RB5-07/08.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Scott Dornfeld, City of Delano, MN, representing Association of Minnesota Building Officials, requests Approval as Submitted.

Commenter's Reason: Decks are an extension of the living area. Decks that are not attached to dwellings do not bring any more danger than ones that are attached. There is no mechanical fastening to fail or floor system rim to be pulled off the end of the joist system. These decks many times are designed by a big box store computer program that typically have more post and beams than if you size the deck joist and beams through the IRC. These decks are approx 18" maximum to the bottom of the joist above the grade. If the deck does fail it will not have far to drop unlike a deck that is attached to a rim that is 9 ft above the grade.

Public Comment 2:

Scott Dornfeld, City of Delano, MN, representing Association of Minnesota Building Officials, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R105.2 (Supp) Work exempt from permit. Permits shall not be required for the following. Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

1. through 9. (No change to current text)
10. Decks that are not more than 30 inches above grade at any point, are not attached to a dwelling, ~~and~~ do not serve the exit door required by Section R311.4 and are less than 200 square feet in area.

Commenter's Reason: The addition of the 200 sq ft was a committee comment at the Palm Spring hearings. These decks are an extension of the indoor living area. The limitation will allow many home owners to build a nice size deck that should be safe. Keep in mind that these decks are about 18" to the bottom of the joist so if a failer does happen the deck will not drop far. Most home owners that put hot tubs / spas on the decks typically consult with inspectors before they build to make sure that they have ample support.

Public Comment 3:

Stephan Kiefer, City of Livermore, CA, representing Peninsula, East Bay and Monterey Bay Chapters (Tri-Chapter) of ICC, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R105.2 (Supp) Work exempt from permit. Permits shall not be required for the following. Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed ~~120~~ 200 square feet (~~11.15~~ 18.58 m^2).

2. through 9. (No change to current text)

10. Decks not exceeding 200 square feet (18.58 m^2) in area, that are not more than 30 inches above grade at any point, are not attached to a dwelling, and do not serve the exit door required by Section R311.4.

Commenter's Reason: During the Palm Springs public hearings the IRC committee approved RB4-07/08 to increase the maximum floor area of detached accessory structures listed as item #1 of the work exempt from a permit, from 120 to 200 square feet. That change has been incorporated into this public comment and has been added to the limits proposed for when decks may also be exempt from permit.

We believe that it is consistent with the reasoning to exempt small detached accessory structures to also exempt similarly sized detached decks meeting the criteria of 30 inch maximum height above grade and not serving required exit doors.

Proposals to exempt decks from permits have been under consideration for inclusion into the IRC for two code edition cycles and we believe that all the limitations previously requested by the IRC committees that have heard those proposals have been met by RB6. Further we believe that if a detached accessory structure of up to 200 square feet can be exempt from permit, that this size limit should be considered for detached decks. Please remember that the whole premise of this section as stated in its second sentence is only to exempt issuance of a permit. This section specifically does NOT grant authorization for a deck to be in violation of any requirement (e.g., structural) of this code or other laws (e.g., zoning ordinances) of the jurisdiction. We ask the membership to support the longstanding and practical desire of many jurisdictions to exempt small decks from permitting, and allow this code change to finally become a part of the IRC.

Final Action: AS AM AMPC____ D

RB7-07/08
R106.1.1

Proposed Change as Submitted:

Proponent: Scott Beard, SE, City of Tacoma, WA

Revise as follows:

R106.1.1 Information on construction documents. Construction documents shall be drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official. All braced wall lines, both interior and exterior, shall be clearly identified on the construction drawings and all pertinent information including but not limited to bracing method, location and length of braced wall segments, foundation requirements, attachment schedule, and braced wall segment attachment at top and bottom of segment shall be clearly identified there on.

Reason: The purpose of this change is to add a new requirement to the IRC to benefit the builder and the building official alike. The proposal requires that the relevant wall bracing information required in Section R602.l0 be clearly marked on the construction drawings. Those parts of the wall system that are designated bracing panels have potentially different panel attachment schedules, foundation requirements and specific connection requirements to other parts of the building than do other exterior and interior walls. Not only are braced walls often different from other walls, they are always required in every code conforming structure. An extra burden is placed on our building officials and plan checkers when they have to try to figure out which walls the designer has intended for use as bracing. Requiring such details, as many professional home designers already provide, on all submittals will make the Building Official's, plan checker's, and inspector's job easier, level the playing field, and will insure that bracing is being considered during the design process. It will further ensure that the building's structural detailing is being done by the person being paid to draw the plans, and not by the plan checker. It will also make it easier for the builder to properly construct the required bracing on the job site when the details are clearly spelled out on the drawings. In the long run it will lead to better/stronger housing stock for little or no money.

On a more personal note, as a plan reviewer, I have noticed an increase in the complexity of prescriptive bracing since the days of the legacy codes. In many ways it is a good thing, as it provides many options to builders that never existed before. The problem with these extra options and flexibility is that it is often hard to tell which bracing option the builder had in mind. Not only do I risk incorrectly guessing the house designer's intent, but our field inspector can also guess wrong, as well as the field carpenter in his efforts to build it. Homes with "obvious" bracing are getting fewer and farther between. This code change can correct that, and result in few corrections and "re-do's" in the field.

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

Committee Action: **Disapproved**

Committee Reason: The committee indicated that much of the proposed language to require braced wall lines to be shown on all construction documents was redundant and the term "pertinent" was hard to define. A complete set of construction drawings would already contain this information without having to change the current code language.

Assembly Action: **Approved as Modified**

Modify proposal as follows:

R106.1.1 Information on construction documents. Construction documents shall be drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official. ~~All braced wall lines, both interior and exterior, shall be clearly identified on the construction drawings and all pertinent information including but not limited to bracing method, location and length of braced wall segments, foundation requirements, attachment schedule, and braced wall segment attachment at top and bottom of segment shall be clearly identified there on.~~

Add new section as follows:

R601.3 Information on construction documents. All braced wall lines shall be identified on the construction drawings and shall contain pertinent information including, but not limited to bracing method, location and length of braced wall panels, foundation requirements, attachment schedule, and braced wall attachment at top and bottom.

Individual Consideration Agenda

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

Public Comment:

Chuck Bajnai, Chair, ICC Ad Hoc Wall Bracing Committee, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R106.1.1 Information on construction documents. Construction documents shall be drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official. Where required by the building official, all braced wall lines, ~~both interior and exterior,~~ shall be ~~clearly~~ identified on the construction ~~drawings~~ documents and all pertinent information including, but not limited to bracing methods, location and length of braced wall ~~segments~~ panels , foundation requirements, ~~attachment schedule~~ and ~~braced wall segment~~ attachment of braced wall panels at top and bottom ~~of segment shall be clearly identified there on~~ shall be provided.

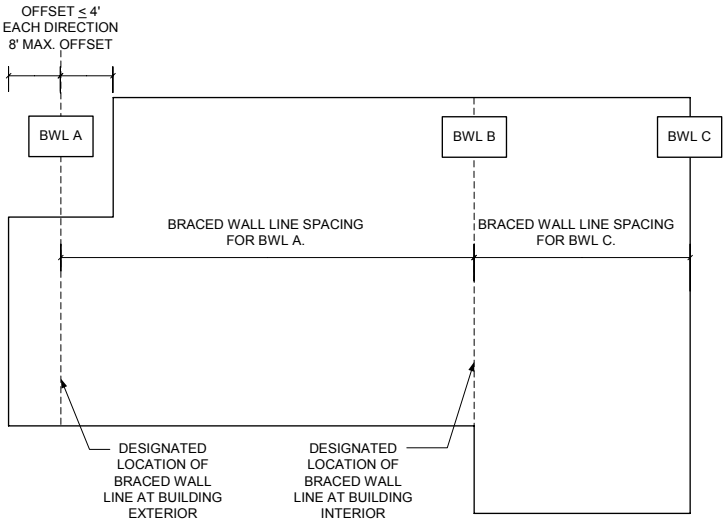
Commenter's Reason: The ICC AHWB committee fully supports the requirement that the plan submitter take responsibility for communicating his/her intention with respect to where the braced wall lines should go.

The committee action was for d*isapproval* was based on their position that requiring braced wall lines be identified on construction documents was redundant and should already be provided on the plans. The assembly action was to support the proposal *as submitted* based on the argument that typically the braced wall line (BWL) information has not been included on the plans and the location of braced wall lines has been left up to the interpretation/judgment of the plan reviewers.

The new provisions in RB147 and the new figure (below) were approved *as submitted* by the committee in Palm Springs. RB147 allow braced wall lines (BWLs) to be located in such a location (i.e. offset) that might not have any braced wall panels (BWPs) on it. Plan preparers have to determine where the braced wall lines are in order to design the structure correctly and plan reviewers need to know where the BWLs are in order to determine compliance.

For simple rectangular shapes the location of the BWLS is obvious to the trained plan reviewer, but when the houses have irregular shapes, the answers are not so obvious, and multiple solutions could be conceived. This is a shift of responsibility from the plan reviewers to the plan preparers in order to eliminate doubt.

The modification is submitted to change "drawings" to "documents" in order to provide consistent text and offer the plan preparer multiple options on how/where to communicate the BWL information. Also the modification allows the building official to not require the BWL information if he/she deems it unnecessary.



NOTE: BRACED WALL SPACING FOR BWL B IS THE GREATER OF THE DISTANCE FROM BWL A TO BWL B OR FROM BWL B TO BWL C.

FIGURE FROM RB147-07/08

Final Action: AS AM AMPC____ D

RB9-07/08
R106.3.1

Proposed Change as Submitted:

Proponent: Tim Burke, Salt Lake City, UT, representing ICC Utah Chapter

Revise as follows:

R106.3.1 Approval of construction documents. When the building official issues a permit, the construction documents shall be approved, in writing or by a stamp which states "~~APPROVED PLANS PER IRC SECTION R106.3.1~~ REVIEWED FOR CODE COMPLIANCE." One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or his or her authorized representative.

Reason: We think this phrase should be worded exactly the same in both codes. The current IRC (stricken out) phrase is a carryover from a legacy code. The changed wording that now appears in the IBC is preferable to the old text. We could not think of any reason why the stamp for residential jobs should be worded differently from a stamp for any other job. One stamp could be used in for the building inspection department instead of two.

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

Committee Action: **Approved as Submitted**

Committee Reason: This action corrects the terminology to more accurately reflect the intent of this section. Further, the committee felt that since the "Reviewed for Code Compliance" stamp requirement was already in the International Building Code one stamp could be used to review both codes.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lawrence Brown, CBO, National Association of Home Builders, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R106.3.1 Approval of construction documents. When the building official issues a permit, the construction documents shall be approved, in writing or by a stamp which states "APPROVED ~~REVIEWED FOR CODE COMPLIANCE~~." One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or his or her authorized representative.

Commenter's Reason: Just using the term "REVIEWED FOR CODE COMPLIANCE" means little in regards to the set of plans one is looking at is actually the "APPROVED" set of plans. All it states is that someone has looked at the plans. It does not mean that the documentation shown on the plans actually complies with the codes. Though not in disagreement with the Proponent, all of the I-Codes should be changed to reflect the modification shown above. At a minimum, most state and local jurisdictions already require the term "APPROVED" to be stamped on the first sheet of the approved set of plans. When on the job site, the inspector needs to know he is reviewing the construction to the set of plans that have been reviewed and approved by their building department.

Final Action: AS AM AMPC____ D

RB10-07/08
R108.6 (New)

Proposed Change as Submitted:

Proponent: Rebecca Baker, Jefferson County, CO, Chair, ICC Ad Hoc Committee on the Administrative Provisions in the I-Codes (AHC-Admin)

Add new text as follows:

R108.6 Work commencing before permit issuance. Any person who commences any work on a building, structure, electrical, gas, mechanical or plumbing system before obtaining the necessary permits shall be subject to a fee established by the applicable governing authority that shall be in addition to the required permit fees.

Reason: Consistency and coordination among the I-Codes are cornerstones of the ICC Code Development Process. This holds true for not only the technical code provisions but also for the administrative code provisions as contained in Chapter 1 of all the I-Codes.

In response to concerns raised by the ICC membership since publication of the first editions of the I-Codes, the ICC Board established, for the 2006/2007 cycle, and extended, for the 2007/2008 cycle, the ICC Ad Hoc Committee on the Administrative Provisions in the I-Codes (AHC-Admin) to review Chapter 1 administrative provisions in the International Codes family and improve the correlation among the I-Codes through the code development process.

The AHC-Admin is submitting a series of code change proposals designed to provide consistent and correlated administrative provisions among the I-Codes. The intent of this correlation effort is not necessarily to have absolutely identical text in each of the I-Codes but, rather, text that has the same intent in accomplishing the administrative tasks among the I-Codes.

This proposal focuses on work commencing before permit issuance and is being submitted by the AHC-Admin to correlate the IRC with current Section 108.4 of the *International Building Code* and *International Existing Building Code* and with the changes that were approved in the 2006/2007 cycle to Section 112 of the *International Fire Code* and Section 110 of the *International Wildland-Urban Interface Code* (see *Supplement to the International Codes/2007)*.

The proposed section recognizes that costs are incurred (i.e., inspection time and administrative) when investigating a project which has commenced work without having obtained a permit. This allows the jurisdiction to recover these costs by establishing a fee, which should be in addition to that collected when the required permit is issued.

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

Committee Action: **Disapproved**

Committee Reason: The committee felt that proposed language needed to be narrowed in focus to reflect only those instances that a permit would be required by code. As it is currently written this could preclude needed work being done on the building site prior to the actual commencement of construction of the structure.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rebecca Baker, Chair, ICC Ad Hoc Committee on the Administrative Provisions in the I-Codes, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R108.6 Work commencing before permit issuance. Any person who commences ~~any~~ work requiring a permit on a building, structure, electrical, gas, mechanical or plumbing system before obtaining the necessary permits shall be subject to a fee established by the applicable governing authority that shall be in addition to the required permit fees.

Commenter's Reason: The ICC Ad-Hoc Committee on the Administrative Provisions in the I-Codes (AHC-Admin) was tasked with reviewing Chapter 1 administrative provisions in each of the I-Codes and attempting to correlate applicable provisions through the code development process.

In response to the direction offered by the IRC Committee, the proposed modification clarifies the intent of the section and narrows the application of this section to only work which requires a permit. The AHC-Admin requests that the modification be approved to provide a useful administrative tool consistent with the IBC and IEBC, and the IFC and IWUIC 2007 Supplements.

Final Action: AS AM AMPC____ D

RB11-07/08

R301.1.1, R301.2.1.1, R301.2.2.3.1, R301.2.2.3.5, Chapter 43

Proposed Change as Submitted:

Proponent: Bonnie Manley, American Iron and Steel Institute (AISI)

1. Revise as follows:

R301.1.1 (Supp) Alternative provisions. As an alternative to the requirements in Section R301.1 the following standards are permitted subject to the limitations of this code and the limitations therein. Where engineered design is used in conjunction with these standards the design shall comply with the *International Building Code*.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual* (WFCM).
2. American Iron and Steel Institute (AISI) *Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings* ~~(COFS/PM) *with Supplement to Standard for Cold-Formed Steel Framing-Prescriptive Method for One- and Two-Family Dwellings*~~ *(AISI S230)*.
3. ICC-400.

R301.2.1.1 (Supp) Design criteria. In regions where the basic wind speeds from Figure R301.2(4) equal or exceed 100 miles per hour (45 m/s) in hurricane-prone regions, or 110 miles per hour (49 m/s) elsewhere, the design of buildings shall be in accordance with one of the following methods. The elements of design not addressed by those documents in Items 1 through 4 shall be in accordance with this code.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM); or
2. *Southern Building Code Congress International Standard for Hurricane Resistant Residential Construction* (SSTD 10); or
3. *Minimum Design Loads for Buildings and Other Structures* (ASCE-7); or
4. American Iron and Steel Institute (AISI), *Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings* ~~*(COFS/PM) with Supplement to Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings*~~ (AISI S230).
5. Concrete construction shall be designed in accordance with the provisions of this code.
6. Structural insulated panels shall be designed in accordance with the provisions of this code.

R301.2.2.3.1 (Supp) Height limitations. Wood framed buildings shall be limited to three stories above grade or the limits given in Table R602.10.1. Cold-formed steel framed buildings shall be limited to ~~two~~ less than or equal to three stories above grade in accordance with ~~COFS/PM~~ AISI S230. Mezzanines as defined in Section R202 shall not be considered as stories. Structural insulated panel buildings shall be limited to two stories above grade.

R301.2.2.3.5 Cold-formed steel framing in Seismic Design Categories D_0, D_1 and D_2. In Seismic Design Categories D_0, D_1 and D_2 in addition to the requirements of this code, cold-formed steel framing shall comply with the requirements of ~~COFS/PM~~ AISI S230.

2. Revise standard in Chapter 43 as follows:

AISI

~~PM-2001~~ S230-07 Standard for Cold-formed Steel Framing-Prescriptive Method for One- and Two-family Dwellings ~~(including 2004 Supplement)~~

Reason: This code change for IRC Section R301 updates the references to AISI S230, *Standard for Cold-Formed Steel Framing -- Prescriptive Method for One- and Two-Family Dwellings*. Major changes between the 2004 AISI-PM and the 2007 edition of AISI S230 include the following:

- Numerical Designation: A new numeric ANSI designation system was initiated for the 2007 editions of the AISI standards. It is intended to simplify the referencing of the documents in this growing series of codes and standards. The new designation for AISI-PM is AISI S230.
- Section A1, Scope: The allowable number of stories in AISI S230 was increased from two to three stories and provisions for such were added throughout the standard. Additionally, the maximum story height was defined. Language was also added to better describe how to handle an irregularity in a high seismic or high wind area that is isolated to a portion of a building.
- Section A2, Definitions: Definitions for most terms used in this standard were removed from this section and centralized in AISI S200, *North American Standard for Cold-Formed Steel Framing – General Provisions*, which is referenced in AISI S230. Definitions for seismic design category D_0 and wind exposures B, C and D were added and the definition for seismic design category D_1 was revised, to be in accordance with the IRC/IBC.
- Section A3, Referenced Documents: The referenced document listing was updated to include the 2007 editions of AISI S100 (*North American Specification for the Design of Cold-Formed Steel Structural Members*), AISI S200, AISI S201 (*North American Standard for Cold-Formed Steel Framing – Product Data*) and AISI S214 (*North American Standard for Cold-Formed Steel Framing – Truss Design*). Also, ASCE 7-05, various ASTM and other references were updated. Reference to the applicable standard for anchor bolts, ASTM F1554-04, was added.
- Section A4, Limitations of Framing Members: Language was updated to reflect the new AISI S201 and ASTM A1003 standards. Provisions for hole reinforcement were added and provisions for hole patching were revised, based on available research and engineering judgment.
- Section B2, Bearing Stiffeners: Requirements for C-shaped and track bearing stiffeners were revised, based on available research and engineering judgment. Provisions were added for clip angle bearing stiffeners, based on a recent testing program at the University of Waterloo.
- Section B4, Anchor Bolts: Provisions were added regarding anchor bolt washers in high wind areas and high seismic areas.
- Section D2, Floor to Foundation or Structural Wall Connection: Provisions were added to allow a single joist with bearing stiffeners in lieu of double joists on foundation walls parallel to the joist span.
- Section E2, Wall to Foundation or Floor Connection: Provisions were added for anchoring gable endwalls, based on a study at the University of Missouri-Rolla.
- Section E3, Wall Stud Sizes: Tables were updated to the latest editions of AISI S100, AISI S211 (*North American Standard for Cold-Formed Steel Framing – Wall Stud Design*) and ASCE 7. Provisions were added for sizing wall studs in gable endwalls, based on a study at the University of Missouri-Rolla.
- Section E7, Headers: Tables were updated to the latest editions of AISI S100, AISI 212 (*North American Standard for Cold-Formed Steel Framing – Header Design*) and ASCE 7. Tables were added for grade 50 members. Provisions were added for single L-headers and inverted L-header assemblies. Clarification was made that provisions for head tracks also apply to sill tracks. Provisions were added for sizing and installing headers in gable endwalls, based on a study at the University of Missouri-Rolla.
- Section E11, Braced Walls In High Wind Areas and High Seismic Areas: Provisions were revised to clarify that braced wall length adjustment factors based upon edge screw spacing less than 4 inches are not applicable to type II braced walls.
- Section F3, Roof Rafters: Tables were updated to the latest editions of AISI S100, AISI S210 (*North American Standard for Cold-Formed Steel Framing – Floor and Roof System Design*) and ASCE 7. Tables were added for grade 50 members. Limits were set on the rake overhang in gable endwalls, based on a study at the University of Missouri-Rolla.
- Section F4, Hip Framing: A new section was added to address hip framing, based on a study at the University of Missouri-Rolla.
- Section F6, Ceiling and Roof Diaphragms: Ceiling diaphragm design and installation requirements were added for gable endwalls, based on a study at the University of Missouri-Rolla.

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

R301.2.2.3.1 (Supp) Height limitations. Wood framed buildings shall be limited to three stories above grade or the limits given in Table R602.10.1. Cold-formed steel framed buildings shall be limited to ~~two~~ less than or equal to three stories above grade in accordance with ~~COFS/PM~~ AISI S230. Mezzanines as defined in Section R202 shall not be considered as stories. Structural insulated panel buildings shall be limited to two stories above grade.

Analysis: Review of proposed new standard AISI S230-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Approved as Submitted**

Committee Reason: This change updates and expands the cold-formed steel framing provisions. The referenced standard is updated to the 2007 AISI S230.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bonnie Manley, American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Modify proposal by revising Item #2 as follows:

AISI

S230-07 Standard for Cold-formed Steel Framing – Prescriptive Method for One- and Two-family Dwellings, with Supplement 2

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification adopts the recently completed Supplement 2 to AISI S230-07 (Standard for Cold-Formed Steel Framing – Prescriptive Method for One- and Two-family Dwellings, 2007 Edition). This supplement was issued in June 2008 and is available for download from the AISI website: www.steel.org. (Click on "Construction" link and then click on "Codes and Standards" link.) It fully replaces Supplement 1 to AISI S230-07, and is intended to revise and clarify provisions related to low wind and low seismic wall bracing.

To fully incorporate AISI S230, Supplement 2 into the IRC, a public comment has also been submitted on Proposal RB168-07/08. Also, to fully integrate AISI S230-07, Supplement 2 into the ICC Codes, a public comment has been submitted on Proposal S238-07/08.

Final Action: AS AM AMPC____ D

RB12-07/08

R301.2.1.1

Proposed Change as Submitted:

Proponent: Gary J. Ehrlich, PE, National Association of Home Builders

Revise as follows:

R301.2.1.1 (Supp) Design criteria. In regions where the basic wind speeds from Figure R301.2(4) equal or exceed ~~100 miles per hour (45 m/s) in hurricane-prone regions, or~~ 110 miles per hour (49 m/s) ~~elsewhere~~, the design of buildings shall be in accordance with one of the following methods. The elements of design not addressed by those documents in Items 1 through 4 shall be in accordance with this code.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM); or
2. *Southern Building Code Congress International Standard for Hurricane Resistant Residential Construction* (SSTD 10); or
3. *Minimum Design Loads for Buildings and Other Structures* (ASCE-7); or
4. American Iron and Steel Institute (AISI), *Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings (COFS/PM) with Supplement to Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings*.
5. Concrete construction shall be designed in accordance with the provisions of this code.
6. Structural insulated panels shall be designed in accordance with the provisions of this code.

Reason: As justification for their IRC code change (RB31-04/05) introducing the additional 100mph limit, IBHS noted four issues: roof sheathing nails, wind bracing requirements, toe-nailed uplift connections, and wall-to-wall connections at the floor line. In lieu of pursuing the individual modifications needed to resolve these issues within the IRC, the proponent simply lowered the ceiling for using prescriptive design provisions along the Atlantic Coast. We believe this was an excessive solution to the problem and not supported by the observed performance of housing properly constructed using any edition of the IRC and subject to extreme wind events. At no time during the code cycle did the proponents ever provide to the committee or the assembly documented evidence of failures of structures constructed to the IRC provisions. Nor did they provide technical justification in the form of engineering calculations or structural research to support their contentions. However, the code development cycle coincided with the 2004 Florida hurricanes and Hurricanes Katrina and Rita, so there was significant political and emotional pressure on the code development community to increase the stringency of building codes, whether or not they were technically justified or appropriately targeted to the risk of severe wind events in those areas subjected to the new provisions.

In both the 2004/2005 and 2006/2007 cycles, individual changes were implemented which address issues raised by IBHS. The minimum roof sheathing nailing was increased from 6d to 8d common nails for all roofs and the nail spacing in the gable and eave end zones was increased for dwellings in the 100mph region. The work of the ICC Ad-Hoc Committee on Wall Bracing in the 2006/2007 cycle resulted in a number of clarifications and improvements to the braced wall provisions. In particular, changes to the continuous sheathed method clarified return corner and uplift restraint requirements and added limits on mixing of continuous sheathing with other methods in high-wind regions. Additional changes proposed by the Ad-Hoc Committee for this cycle will further refine and revise the wall bracing provisions to insure braced wall lines are properly located, detailed and constructed and that braced wall segments are properly anchored to foundations and fastened to wall and roof framing.

The 2004/2005 change raises questions regarding the age of the damaged structures used for justifying the code change. The FEMA Summary Reports on Building Performance from the 2004 hurricane season and from Hurricane Katrina in 2005 indicated that structures built to the 2000 and 2003 IRC performed extremely well. The 2004 hurricane report stated (p.13), "no structural failures were observed to structures designed and constructed to the wind design requirements of…the 2000 IBC/IRC…" The Hurricane Katrina report stated (p.4-8), "Most structural

failures observed by the MAT appeared to be the result of inadequate design and construction methods commonly used before IBC 2000 and IRC 2000 were adopted and enforced." In addition, a study conducted by the Texas Windstorm Insurance Association after Hurricane Rita showed there was substantially less damage and substantially fewer insurance claims in those areas where the 2000 or 2003 IBC and IRC were adopted and enforced.

Estimates performed by NAHB staff show that complying with the SSTD-10 and WFCM provisions can add as much as $10,000 to the cost of a home, making it extremely difficult to construct affordable housing along the Atlantic and Gulf coasts and placing an onerous burden on builders and homeowners, particularly on first-time home buyers. This added cost of construction will have the effect of keeping residents of these coastal areas in older homes which do not have the robust construction provided by the IRC prescriptive provisions and which will be substantially more susceptible to structural failures, water infiltration and damage to personal property in high wind events. NAHB asks for your support of this proposal.

Bibliography: FEMA, *Summary Report on Building Performance, 2004 Hurricane Season*, FEMA 490, Washington, DC, March 2005.
FEMA, *Summary Report on Building Performance, Hurricane Katrina*, FEMA 548, Washington, DC, April 2006.

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

Committee Action: **Disapproved**

Committee Reason: The proponent and opponents need to work together to resolve the four issues: roof sheathing nails, wind bracing, toe-nailed uplift connection and wall-to-wall connection at the floor line. Resolving these issues would result in bringing the wind threshold back to 110 mph for all parts of the country.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gary J. Ehrlich, PE, National Association of Home Builders (NAHB), requests Approval as Submitted.

Commenter's Reason: The continued opposition to including the 100-109mph wind region in the IRC hinges primarily on three items: wall bracing, roof uplift connections, and wall assembly-to-wall assembly uplift connections. Working with the Ad-Hoc Committee on Wall Bracing, WTCA, the Foam Sheathing Coalition and others, NAHB has either developed or assisted in the development of public comments to address these issues. Changes to the wall bracing provisions fix the primary issue—the sense that the current wall bracing amounts are insufficient for wind, especially when coupled with allowable offsets of panels from ends of wall lines that can reduce the minimum bracing provided. Both issues are fixed with public comments to RB143 & RB148. A modification to RB207 will now clearly require clips and straps for roof framing in high-wind regions, while exempting construction in areas of low wind hazards to a costly and unjustified requirement. Further, new factors incorporated in the modification will encourage the construction of high-slope roofs which have been shown to experience substantially less damage in high-wind events. Finally, requirements tying the bracing provisions to the uplift requirements will result in clips and straps being provided at intermediate floors to provide a continuous load path.

In addition, other changes have clarified requirements for attachment of sheathing products (including foam sheathing), attachment of vinyl siding, use of wood structural panels for wind-borne debris protection. While not cited by our opponents in testimony, these changes will further improve building performance and reduce damage (and insurance claims) in high-wind events. With that in mind, NAHB asks for your support of this public comment and approval of this proposal as submitted.

Final Action: AS AM AMPC____ D

RB13-07/08
Table R301.2(1)

Proposed Change as Submitted:

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise footnote g to table as follows:

TABLE R301.2(1) (Supp)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

(Portions of table not shown remain unchanged)

a. Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The weathering column shall be filled in with the weathering index (i.e., "negligible,"

"moderate" or "severe") for concrete as determined from the Weathering Probability Map [Figure R301.2(3)]. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.

b. The frost line depth may require deeper footings than indicated in Figure R403.1(1). The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.
c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.
d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [FigureR301.2(4)].Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.
e. The outdoor design dry-bulb temperature shall be selected from the columns of 97 1/2-percent values for winter from Appendix D of the *International Plumbing Code*. Deviations from the Appendix D temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official.
f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.
g. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of all currently effective FIRMs and FBFMs, or other flood hazard map adopted by the ~~community~~ authority having jurisdiction, as ~~may be~~ amended.
h. In accordance with Sections R905.2.7.1, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."
i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99%) value on the National Climatic Data Center data table "Air Freezing Index- USA Method (Base 32°)" at www.ncdc.noaa.gov/fpsf.html.
j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°)" at www.ncdc.noaa.gov/fpsf.html.
k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with "Yes." Otherwise, the jurisdiction shall indicate "No" in this part of the table.

Reason: The purpose of this code change is to clarify the code so that Table 301.2(1) is properly completed with the required information. The Flood Insurance Study includes information that is necessary for proper interpretation of flood hazard areas and flood elevations that are shown on flood hazard maps. The code should specifically cite the Flood Insurance Study prepared for the adopting jurisdiction, and to recognize that many local jurisdictions have multiple map panels that may have more than one date. The code should cite every effective map, which is best done by citing all panels by number and date.

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

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposed language was redundant. Further, this requirement could force authorities in large jurisdictions or at the state level to potentially be the custodian for thousands of panels of Flood Insurance Rate Maps (FIRM).

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

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

Public Comment:

Rebecca C. Quinn, CFM, RCQuinn Consulting, Inc., representing Department of Homeland Security/Federal Emergency Management Agency, requests Approval as Submitted.

Commenter's Reason: Local jurisdictions that participate in the National Flood Insurance Program (NFIP) agree to maintain the Flood Insurance Rate Maps (FIRM) that show flood hazard areas within their jurisdictions. The current text implies there is just one effective map. Most jurisdictions have more than one FIRM panel and most have had revisions to one or more of their FIRM panels. This code change does not alter the current responsibilities of NFIP-participating communities and will not impose a new burden. Its intent is to recognize that many local jurisdictions have multiple map panels and that those panels may have different dates. It is important that users of the code have access to a list of the effective maps, which is best done by having Table 301.2(1) cite all panels by number and date.

Final Action: AS AM AMPC____ D

RB16-07/08
R301.2.4

Proposed Change as Submitted:

Proponent: William Easterling, Grand Haven, MI, representing himself

Revise as follows:

R301.2.4 (Supp) Floodplain construction. Buildings and structures ~~constructed~~ located in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1) shall be designed and constructed in accordance with Section R324. ~~**Exception:**~~ Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with *Flood Resistant Design and Construction* (ASCE 24).

Reason: The purpose of the proposed code change is to clarify the two different requirements of this code section by using consistent language and proper format. An existing building or structure located in a flood hazard area and not just constructed in a flood hazard area is subject to the requirements of Section R324 as is a building or structure located in a floodway is subject to the requirements of ASCE 24. The additional requirements for floodways over flood hazard areas should be identified as such and not as an exception to the requirements for flood hazard areas. Likewise the minimum requirements of Section R324 should not be waived by exception, but maintained as a minimum requirement for building and structures located in a flood hazard area that may also be a floodway. Any conflicts between R324 and ASCE 24 are addressed by Section R102.1.

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

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was no justification to delete the current exception and preferred the current word constructed as opposed to the proposed word located in the charging text. The proposed language does not improve the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bill Easterling, Grand Haven, MI, representing himself, requests Approval as Submitted.

Phil Forner, Allendale, MI, representing himself, requests Approval as Submitted.

Commenter's Reason: RB16-07/08 should not be disapproved because of the weak and specious committee reason of: "The committee felt that there was no justification to delete the current exception and preferred the current word constructed as opposed to the proposed word located in the charging text. The proposed language does not improve the code." Such an interpretation allows Section R102.7.1 to have duo meaning and applicability when it comes to "repairs" on an existing structure located in a flood hazard area as demonstrated by IRC Interpretation 85-05 (attached) and by the committee reasons on RB2-07/08, RB3-07/08, RB90-07/08, and RB91-07/08.

When performing any repair to an existing structure located in a flood hazard area, the requirements of the code in effect at the time the repair is being undertaken must be applied so that at least the repair will be provided with the minimum requirements to safeguard the public as called for in Section R101.3. Section R105.3.1.1 does not exempt repairs below the design flood elevation from complying with Section R102.7.1, the requirement for new or the use of flood resistant material. Section R105.3.1.1 provides additional requirements applicable to the entire structures if the amount of the repair or improvement exceeds 50% of the structures value; being the "otherwise stated" as identified in Section R102.7.1.

Furthermore contrary to IRC Interpretation No. 85-05 where it "deemed" Section R102.7.1 inapplicable to only certain repairs, IRC Interpretation No. 28-07 (attached) correctly states how R102.7.1 is to be applied to all repairs; stating:
"Existing dwellings that are legally occupied at the time the *International Residential Code* is adopted, and remain unchanged, are not subject retrospectively to the provisions of the code. However, in accordance with the provisions in Section R102.7.1, any new construction, additions, alterations or repairs made to the existing dwelling after the adoption of the *International Residential Code* are required to conform to the requirements of the code for new construction.

Although new construction, additions, alterations or repairs made to the existing dwelling must comply with provisions for new construction, those portions of the existing dwelling not affected are not required to comply with all of the provisions for new construction. However, new construction shall not create an unsafe condition in the existing dwelling."

Approving RB16-07/08 as submitted is consistent with IRC Interpretation 28-07 and is needed to assist in preventing the perversion of the code as demonstrated by IRC Interpretation 85-05 for R105.3.1.1 along with the committee's stated reasons for RB2-07/08, RB3-07/08, RB16-07/08, RB90-07/08 and RB91-07/08.

IRC Interpretation No. 85-05
SECTION R105.3.1.1
2003 Edition
Issued: 06-01-06

R105.3.1.1 Substantially improved or substantially damaged existing buildings in areas prone to flooding. For applications for reconstruction, rehabilitation, addition, or other improvement of existing buildings or structures located in an area prone to flooding as established by Table R301.2(1), the building official shall examine or cause to be examined the construction documents and shall prepare a finding with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamage condition. If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the finding shall be provided to the board of appeals for a determination of substantial improvement or substantial damage. Applications determined by the board of appeals to constitute substantial improvement or substantial damage shall meet the requirements of Section R323.

REFERENCED SECTIONS:

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to that required for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

TABLE R301.2(1) CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA FLOOD HAZARDSh

h. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the currently effective FIRM and FBFM, or other flood hazard map adopted by the community, as may be amended.

Q: An existing dwelling constructed prior to the effective date established in Table R301.2(1) is located in an area prone to flooding. Under the applicable provisions of the *2003 International Residential Code*, application is made for a permit to perform work on the existing dwelling. In accordance with Section R105.3.1.1 the building official determines the value of the proposed work to be less than 50 percent of the market value of the existing dwelling. Is the proposed work subject to the provisions of Section R323?

A: No. When proposed work is determined by the building official to be less than 50 percent of the market value of the existing dwelling, the application for permit is not required to be submitted for appeal, and the proposed work is not required to comply with the provisions of Section R323. In addition to the proposed work not being subject to the provisions of Section R323, the portions of the existing dwelling not affected by the proposed work is not required to be modified to comply with the provisions of Section R323. Although the provisions of Section R323 are deemed inapplicable to the existing dwelling and to the work proposed to the existing dwelling, that work which is permitted must comply with all other applicable provisions of the code as provided in Section R102.7.1.

Only when the building official determines the proposed work to be equal to or greater than 50 percent of the market value of the existing dwelling must the application for permit be presented for appeal.

IRC Interpretation No. 28-07
SECTION R102.7.1
2006 Edition
Issued: 09/10/2007
RE_06_28_07

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

REFERENCED SECTION:
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 in height with a separate means of egress and their accessory structures.

Q: In question are existing detached one- and two-family dwellings and townhouses containing basements without emergency escape and rescue openings. The dwellings in question were legally constructed and occupied prior to jurisdictional adoption and enforcement of the *International Residential Code*.

Do the technical provisions of the *International Residential Code* apply to additions and alterations to a legally occupied dwelling that is subject to the provisions of the *International Residential Code* at the time the additions and alterations are made to the existing dwelling?

A: Yes. The additions and alterations to existing dwellings must be made to comply with the technical provisions of the appropriate codes being enforced at the time the work is done.

The provisions of the *International Residential Code*, as defined in Section R101.2, apply to all aspects of construction for detached one-and two-family dwellings, multiple single-family dwellings defined as townhouses and all structures accessory to the dwellings and townhouses. The provisions address all aspects of constructing, altering, repairing, maintaining, using, occupying, enlarging, locating, removing or demolishing any one-family dwelling, two-family dwelling, townhouse or accessory structure. The code regulates any and all activities that modify the dwellings as well as any structures that are incidental to the main dwelling and are located on the same lot.

Existing dwellings that are legally occupied at the time the *International Residential Code* is adopted, and remain unchanged, are not subject retrospectively to the provisions of the code. However, in accordance with the provisions in Section R102.7.1, any new construction, additions, alterations or repairs made to the existing dwelling after the adoption of the *International Residential Code* are required to conform to the requirements of the code for new construction.

Although new construction, additions, alterations or repairs made to the existing dwelling must comply with provisions for new construction, those portions of the existing dwelling not affected are not required to comply with all of the provisions for new construction. However, new construction shall not create an unsafe condition in the existing dwelling. Changing a non-habitable basement to an occupied space without emergency escape and rescue openings creates an unsafe condition that is in conflict with the provisions of the code intended to insure a safe and usable living environment for the occupants of the dwelling.

Final Action: AS AM AMPC____ D

RB17-07/08
R202, Table R301.5, R313.2

Proposed Change as Submitted:

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing Virginia Building Code Officials Association (VBCOA)

1. Revise definition as follows:

ATTIC. The unfinished space between the ceiling ~~joists~~ assembly of the top story and the roof ~~rafters~~ assembly.

2. Add new definition as follows:

LOFT. A finished or unfinished area, not considered a story, with an occupiable space complying with all of the following requirements:

1. The occupiable floor area is at least 70 square feet, measured between areas that are at least 5 feet tall,
2. The occupiable area has headroom of at least 7' clearance for at least 50% of the occupiable floor area,
3. The occupiable floor width does not exceed 70% of the total width of the structure,
4. The occupiable area is designed to comply with Table R301.5,
5. The space has no exterior walls, and is enclosed by the roof assembly above, knee walls (if applicable) on the sides, and the floor-ceiling assembly below,

3. Revise table as follows:

TABLE R301.5 (Supp)
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
~~Attics with limited storage~~[b, g, h] Attics without storage[b]	~~20~~ 10
~~Attics without storage~~[b] Attics with limited storage[b, g]	~~10~~ 20
Lofts and attics with walk-up stairs	30
Balconies (exterior) and decks [e]	40
Fire escapes	40
Guardrails and handrails [d]	200-[i h]
Guardrails in-fill components [f]	50 [i h]
Passenger vehicle garages [a]	50 [a]
Rooms other than sleeping rooms	40
Sleeping rooms	30
Stairs	40 [c]

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm2, 1 pound = 4.45 N.

a Elevated garage floors shall be capable of supporting a 2,000-pound load applied over a 20-square-inch area.
b. Attics without storage are those where the maximum clear height between joist and rafter is less than 42 inches, or where there are not two or more adjacent trusses with the same web configuration capable of containing a rectangle 42 inches high by 2 feet wide, or greater, located within the plane of the truss. For attics without storage, this live load need not be assumed to act concurrently with any other live load requirements.
c. Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.
d. A single concentrated load applied in any direction at any point along the top.
e. See Section R502.2.2 for decks attached to exterior walls.
f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g. For attics with limited storage and constructed with trusses, this live load need be applied only to those portions of the bottom chord where there are two or more adjacent trusses with the same web configuration capable of containing a rectangle 42 inches high or greater by 2 feet wide or greater, located within the plane of the truss. The rectangle shall fit between the top of the bottom chord and the bottom of any other truss member, provided that each of the following criteria is met:

1. The attic area is accessible by a pull-down stairway or framed opening in accordance with Section R807.1; and
2. The truss has a bottom chord pitch less than 2:12.
3. Required insulation depth is less than the bottom chord member depth.

The bottom chords of trusses meeting the above criteria for limited storage shall be designed for the greater of the actual imposed dead load or 10 psf, uniformly distributed over the entire span.

~~h. Attic spaces served by a fixed stair shall be designed to support the minimum live load specified for sleeping rooms.~~

~~i.~~ h. Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

4. Revise as follows:

R313.2 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.
3. On each additional story of the dwelling, including basements but not including crawl spaces and <u>in lofts, but not in</u> 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:

1. Updating the definition of “attic”. This change is submitted to make the definition of “attic” more inclusive. Many attics are created by the space inside a roof truss. Trusses are made up of top and bottom chords and not roof rafters and ceiling joists. See attached picture.
2. Adding a new definition of “loft”. In general the IRC is tacit about how to handle walk-up attics, room trusses, or the infamous attic-finished-off-to-create-a-third-floor situation, sometimes called a “half story” or “finished attics” (an oxy-moron). In fact contractors frequently provide the gyp board and leave it laying on attic floor for the homeowner to finish off the space at a later time!

Historical perspective:

- The 1995 CABO provides no definition of “attic”, and only refers to it in terms of the size of an access panel required.
- The 1996 BOCA define an “attic” as: “The space between the ceiling beams of the top story and the roof rafters”.
- The 2000 IRC added the word “unfinished” to the definition in BOCA, and changed “beams” to “joists”.

This proposal provides a new term, “loft”, which defines “occupiable” space that may or may not be finished off, but has the potential of being finished off. “Occupiable” space has the same requirements as “habitable” space without using the term “habitable”. This has been intentionally done because the space, in many cases, is “potentially” habitable when the homeowner finishes it off in the future.

“Loft” vs “attic”:

- “Loft” may be finished off or has the potential of being finished off, an “attic” is always “unfinished” by definition.
- “Loft” is not a story, as currently in the code, an “attic” would become a story when finished off (and hence where the problem arises!).
- A “loft” has to have “occupiable” space that could be used as living space. An “attic” does not have to have any special size or space.
- “Loft” and “attic” are both intended to be the space between the ceiling assembly and the roof assembly.

3. In order to clarify the live load requirements for a “loft”, Table R301.5 has been amended to show the minimum acceptable live load for a loft and attic with walk-up stairs is 30 psf. Trusses are typically designed within their software to be 40psf (see attached picture).
4. Changing Table R301.5 eliminates the need for footnote h.
5. R313, Smoke Alarm section is amended to incorporate “lofts” as one place where smoke detectors are required.

This change is necessary because homeowners, plan reviewers, contractors, and inspectors have been misapplying the definition of “attic” because there is no current word that defines a finished “attic”. I contemplated just changing the meaning of “attic” by deleting the word “unfinished” from the definition, but the roots of the definition are too spread out throughout the code. This change gives everyone a word that fills in the language gap.

Job	Truss	Truss Type	Qty	Ply	
CHUCKB	T1	ATTIC	1	1	Job Reference (optional)

BSOP, PETERSBURG, VA 23804, BONNIE LOGAN — 6.400 s Sep 7 2006 MiTek Industries, Inc. Tue May 29 13:01:06 2007 Page 1

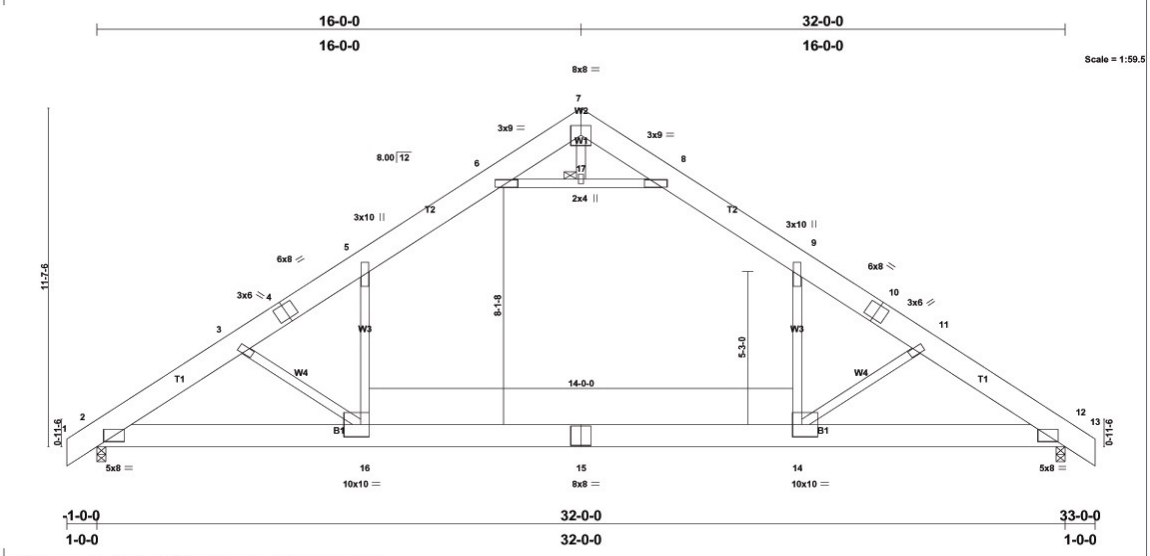


Plate Offsets (X,Y): [14:0-3-8,0-5-0], [16:0-3-8,0-5-0]

LOADING (psf)		SPACING	2-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL	20.0	Plates Increase	1.00	TC	0.95	Vert(LL)	-0.42	14-16	>911	360	MT20	244/190
TCDL	10.0	Lumber Increase	1.00	BC	0.78	Vert(TL)	-0.69	14-16	>548	240		
BCLL	0.0 *	Rep Stress Incr	YES	WB	0.42	Horz(TL)	0.05	12	n/a	n/a		
BCDL	10.0	Code IRC2003/TPI2002		(Matrix)		Wind(LL)	0.08	16	>999	240	Weight: 330 lb	

LUMBER
TOP CHORD 2 X 10 SYP No.1
BOT CHORD 2 X 10 SYP No.1
WEBS 2 X 4 SYP No.2 *Except*
W4 2 X 4 SYP No.3, W4 2 X 4 SYP No.3, W2 2 X 4 SYP No.3

BRACING
TOP CHORD Structural wood sheathing directly applied.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.
JOINTS 1 Brace at Jt(s): 17

REACTIONS (lb/size) 2=2052/0-3-8, 12=2052/0-3-8
Max Horz 2=-242(load case 2)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-2=0/31, 2-3=-3392/0, 3-4=-3002/0, 4-5=-2876/0, 5-6=-2075/0, 6-7=0/712, 7-8=0/712, 8-9=-2075/0, 9-10=-2876/0, 10-11=-3002/0, 11-12=-3392/0, 12-13=0/31
BOT CHORD 2-16=0/2699, 15-16=0/2157, 14-15=0/2157, 12-14=0/2699
WEBS 6-17=-3124/0, 8-17=-3124/0, 5-16=0/1444, 9-14=0/1444, 3-16=-765/107, 11-14=-765/109, 7-17=0/433

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-02; 90mph; h=0ft; TCDL=6.0psf; BCDL=6.0psf; Category II; Exp C; enclosed; MWFRS; Lumber DOL=1.00 plate grip DOL=1.00.
3) This truss requires plate inspection per the Tooth Count Method when this truss is chosen for quality assurance inspection.
4) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-6-0 tall by 1-0-0 wide will fit between the bottom chord and any other members.
5) Ceiling dead load (5.0 psf) on member(s). 5-6, 8-9, 6-17, 8-17
6) Bottom chord live load (40.0 psf) and additional bottom chord dead load (5.0 psf) applied only to room. 14-16
7) This truss is designed in accordance with the 2003 International Residential Code sections R502.11.1 and R802.10.2 and referenced standard ANSI/TPI 1.

LOAD CASE(S) Standard

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

Committee Action: Disapproved

Committee Reason: This is a needed change and has merit but it needs additional work regarding means of egress and smoke alarms. The proponent should rework this and bring it back.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Chuck Bajnai, Chesterfield County, VA, representing Virginia Building Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Modify proposal as follows:

~~**LOFT**~~ **ATTIC, HABITABLE.** A finished or unfinished area, not considered a story, ~~with an occupiable space~~ complying with all of the following requirements:

1. The occupiable floor area is at least 70 square feet, ~~measured between areas that are at least 5 feet tall~~ in accordance with Section R304,
2. The occupiable floor area has ~~headroom of at least 7' clearance for at least 50% of the occupiable floor area~~ a ceiling height in accordance with Section R305,
3. ~~The occupiable floor width does not exceed 70% of the total width of the structure,~~
4. ~~The occupiable area is designed to comply with Table R301.5,~~
5. ~~5.~~ 3. The occupiable space ~~has no exterior walls, and~~ is enclosed by the roof assembly above, knee walls (if applicable) on the sides, and the floor-ceiling assembly below.

TABLE R301.5 (Supp)
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
Attics without storage[b]	10
Attics with limited storage[b, g]	20
Habitable attics and attics served with fixed stairs	30

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm2, 1 pound = 4.45 N.

(Portions of table and footnotes not shown remain unchanged)

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. Such opening shall open directly into a public street, public alley, yard or court. 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: Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m^2).

R311.4 Vertical egress. Egress from habitable levels, including habitable attics and basements not provided with an egress door in accordance with Section R311.2 shall be by a ramp in accordance with Section R311.7 or a stairway in accordance with Section R311.6.

R313.2 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.
3. On each additional story of the dwelling, including basements and habitable attics, but not including crawl spaces and in lofts, but not in 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.

(Portions of proposal not shown remain unchanged)

Commenter's Reason:

1. The Committee agreed that RB17 was a necessary proposal, but thought it needed more work.
2. The original RB17 proposed a new definition "loft", but in discussions with NAHB, we think the definition "habitable attic" more clearly defines the space.
3. I have taken two of the five requirements out of the old definition because it previously implied that all five requirements were prerequisites for the definition to apply, and if one of them was not appropriate, then the space would not be considered a "habitable attic". Therefore I am deleted smoke detectors and fixed stairs out of the definition, and added the requirements into the appropriate code sections instead. The definition is intended to only locate the space and provide its physical size limitations. If the space does not meet the three physical requirements, then it will remain and *attic*.
4. To eliminate any confusion, the live load table R301.5 was modified to put the loading of different attic uses in descending order, and say that *habitable attics* have to be designed for 30 psf (as was the requirement previously required by old footnote "h"). Typically truss manufacturers design the bottom chord of room trusses for 40 psf - so this should clarify this issue.

Final Action: AS AM AMPC____ D

RB20-07/08
R302.1

Proposed Change as Submitted:

Proponent: Daniel J. Kress, Town of Irondequoit, NY, representing Finger Lakes Building Officials Association

Revise as follows:

R302.1 (Supp) 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.
6. Decks attached to townhouses or attached two-family dwellings with walls that are fire-resistance rated shall maintain not less than 3 feet separation between the deck and any interior lot line, or a fire barrier having the same fire-resistance rating as the party wall shall be provided along the lot line.

Reason: The purpose of this proposed code change is not to change, but rather to clarify, the existing provisions of this section of the IRC, which do not specifically mention decks or in any way differentiate between a deck and the exterior walls of a house. At present it is therefore not clear whether decks are subject to the same requirements for their location on the lot, or whether they are not subject to said requirements due to the fact that decks do not have walls. While decks are generally constructed of combustible materials, they do not present the same fire load as a structure with walls; therefore, proximity to the property line does not present the same potential fire hazard as a structure with walls. Where fire-rated construction is presently required, as in the case of townhouses and attached two-family dwellings, minimum distance separation or fire-rated construction will still be required. Clarification of this requirement will better enable consistent enforcement of these provisions.

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

Committee Action: **Disapproved**

Committee Reason: The committee indicated that as currently written the language had several problems. Overall, the proposal is written as a code requirement not an exception and yet is listed in the exception portion of this section. The referenced terms fire barrier and party wall are not currently defined in the International Residential Code. As it is currently written the exception would only apply to decks the have fire-resistance rated walls and it would not allow a situation with multiple townhouses sharing a common deck.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Daniel J. Kress, Town of Irondequoit, NY, representing Finger Lakes Building Officials Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.2 Combustible decks attached to townhouses and two-family dwellings. Combustible decks shall have a fire separation distance not less than 3 feet (914 mm) from the common separation wall of the next dwelling unit extended to the furthest point of combustible construction. Combustible decks closer than 3 feet from the common separation wall of the adjacent dwelling unit shall be provided with a one-hour fire-resistance-rated barrier between them, extended to the furthest point of combustible construction.

Exception: Dwelling units on either side of the common wall sprinklered in accordance with NFPA 13D.

Commenter's Reason: The purpose of this proposed code change is not to change, but rather to clarify, the existing provisions of this section of the IRC, which do not specifically mention decks or in any way differentiate between a deck and the exterior walls of a house. At present it is therefore not clear whether decks are subject to the same requirements for their location on the lot, or whether they are not subject to said requirements due to the fact that decks do not have walls. Such a requirement is already implied by Section R317.2.1 which presently requires common walls to be continuous "…including walls extending through and separating attached accessory structures." While decks are generally constructed of combustible materials, they do not present the same fire load as a structure with walls; therefore, proximity to the property line does not present the same potential fire hazard as a structure with walls. Where fire-rated construction is presently required, as in the case of townhouses and attached two-family dwellings, minimum distance separation or fire-rated construction will still be required. Clarification of this requirement will better enable consistent enforcement of these provisions.

Final Action: AS AM AMPC____ D

RB21-07/08

R302, R309, R311, R315, R317, R502.13

Proposed Change as Submitted:

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

SECTION R302
~~EXTERIOR WALL LOCATION~~ FIRE RESISTIVE CONSTRUCTION

R302.1 (Supp) 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.

TABLE R302.1
EXTERIOR WALLS (Supp)
(No change to current text)

~~R317.2~~ 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~~ R302.1 for exterior walls.

Exception: A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section ~~R317.3~~ R302.4.

~~R317.2.1~~ R302.2.1 **Continuity.** The fire-resistance-rated wall or assembly separating townhouses shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures.

~~R317.2.2~~ R302.2.2 **Parapets.** Parapets constructed in accordance with Section ~~R317.2.3~~ R302.2.3 shall be constructed for townhouses as an extension of exterior walls or common walls in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

   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 (1220 mm) on each side of the wall or 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.

~~R317.2.3~~ R302.2.3 **Parapet construction.** Parapets shall have the same fire-resistance rating as that required for the supporting wall or walls. On any side adjacent to a roof surface, the parapet shall have noncombustible faces for the uppermost 18 inches (457 mm), to include counterflashing and coping materials. Where the roof slopes toward a parapet at slopes greater than two units vertical in 12 units horizontal (16.7-percent slope), the parapet shall extend to the same height as any portion of the roof within a distance of 3 feet (914 mm), but in no case shall the height be less than 30 inches (762 mm).

~~R317.2.4~~ 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 2-hour fire-resistance-rated wall as provided in Section ~~R317.2~~ R302.2.

~~SECTION R317~~
~~DWELLING UNIT SEPARATION~~

~~R317.1~~ **(Supp)** 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 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 13.
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 R502.12.1 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.

~~R317.1.1~~ **R302.3.1 Supporting construction.** When floor assemblies are required to be fire-resistance-rated by Section ~~R317.1~~ R302.3, the supporting construction of such assemblies shall have an equal or greater fire-resistive rating.

~~R317.3~~ **R302.4 Rated penetrations.** Penetrations of wall or floor/ceiling assemblies required to be fire-resistance rated in accordance with Section ~~R317.1 or R317.2~~ R302.2 or R302.3 shall be protected in accordance with this section.

~~R317.3.1~~ **(Supp) R302.4.1 Through penetrations.** Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section ~~R317.3.1.1 or R317.3.1.2~~ R302.4.1.1 or R302.4.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be protected as follows:

1. In concrete or masonry wall or floor assemblies where the penetrating item is a maximum 6 inches (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (92 900 mm2), concrete, grout or mortar is permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating.
2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 or UL 263 time temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire resistance rating of the construction penetrated.

~~R317.3.1.1~~ **R302.4.1.1 Fire-resistance-rated assembly.** Penetrations shall be installed as tested in the approved fire resistance-rated assembly.

~~R317.3.1.2~~ **R302.4.1.2 Penetration firestop system.** Penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (3 Pa) and shall have an F rating of not less than the required fire-resistance rating of the wall or floor/ceiling assembly penetrated.

~~R317.3.2~~ **(Supp) R302.4.2 Membrane penetrations.** Membrane penetrations shall comply with Section ~~R317.3.1~~ R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be so installed such that the required fire resistance will not be reduced.

Exceptions:

1. Membrane penetrations of maximum 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0103 m^2) in area provided the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m^2) in any 100 square feet (9.29 m^2) of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm). Such boxes on opposite sides of the wall shall be separated by one of the following:
   1.1. By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual non-communicating stud cavities;
   1.2. By a horizontal distance of not less than the depth of the wall cavity when the wall cavity is filled with cellulose loose-fill, rockwool or slag mineral wool insulation;
   1.3. By solid fire blocking in accordance with Section ~~R602.8.1~~ R302.11;
   1.4. By protecting both boxes with listed putty pads; or
   1.5. By other listed materials and methods.
2. Membrane penetrations by listed electrical boxes of any materials provided the boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise. Such boxes on opposite sides of the wall shall be separated by one of the following:
   2.1. By the horizontal distance specified in the listing of the electrical boxes;
   2.2. By solid fire blocking in accordance with Section ~~R602.8~~ R302.11;
   2.3. By protecting both boxes with listed putty pads; or
   2.4. By other listed materials and methods.
3. The annular space created by the penetration of a fire sprinkler provided it is covered by a metal escutcheon plate.

~~**R309.1 Garage penetrations**~~ **(Supp) R302.5 Dwelling/garage opening/penetration protection.** Openings and penetrations through the walls or ceilings separating the dwelling from the garage shall be in accordance with Sections ~~R309.1.1 through R309.1.3~~ R302.5.1 through R302.5.3.

~~**R309.1.1**~~ **(Supp) 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 1 3/8 inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches (35 mm) thick, or 20-minute fire-rated doors.

~~**R309.1.2**~~ **(Supp) R302.5.2 Duct penetration.** Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other approved material and shall have no openings into the garage.

~~**R309.1.3**~~ **(Supp) R302.5.3 Other penetrations.** Penetrations through the separation required in Section R309.2 shall be protected as required by Section ~~R602.8~~ R302.11, Item 4.

~~**R309.2 Garage separation**~~ **(Supp) R302.6 Dwelling/garage fire separation.** The garage shall be separated as required by Table ~~R309.2~~ R302.6. Openings in garage walls shall comply with Section ~~R309.1~~ R302.5. This provision does not apply to garage walls that are perpendicular to the adjacent dwelling unit wall.

TABLE ~~R309.2~~ (Supp) R302.6
DWELLING/GARAGE FIRE/SEPARATION

(Portions of table not shown remain unchanged)

~~**R311.5.2**~~ **(Supp) R302.7 Under stair protection.** Enclosed accessible space under stairs shall have walls, under stair surface and any soffits protected on the enclosed side with 1/2-inch (12.7 mm) gypsum board.

R302.8 Foam plastics. For requirements for foam plastics see section R314.

~~**SECTION R315 (Supp)**~~
~~**FLAME SPREAD AND SMOKE DEVELOPMENT**~~

R302.9 Flame spread and smoke developed-index for wall and ceiling finishes. Flame spread and smoke density for wall and ceiling finishes shall be in accordance with R302.9.1 through R302.9.4.

~~**R315.1 Wall and ceiling.**~~ **(Supp) R302.9.1 Flame spread.** Wall and ceiling finishes shall have a flame-spread classification of not greater than 200.

Exception: Flame-spread 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.

~~**R315.2**~~ **R302.9.2 Smoke-developed index.** Wall and ceiling finishes shall have a smoke-developed index of not greater than 450.

~~**R315.3**~~ **(Supp) R302.9.3 Testing.** Tests shall be made in accordance with ASTM E 84 or UL 723.

~~**R315.4**~~ **(Supp) R302.9.4 Alternate test method.** As an alternate to having a flame-spread classification of not greater than 200 and a smoke developed index of not greater than 450 when tested in accordance with ASTM E 84, wall and ceiling finishes, other than textiles, shall be permitted to be tested in accordance with NFPA 286. Materials tested in accordance with NFPA 286 shall meet the following criteria:

During the 40 kW exposure, the interior finish shall comply with Item 1. During the 160 kW exposure, the interior finish shall comply with Item 2. During the entire test, the interior finish shall comply with Item 3.

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. During the 160 kW exposure, the interior finish shall comply with the following:
   2.1. Flame shall not spread to the outer extremity of the sample on any wall or ceiling.
   2.2. Flashover, as defined in NFPA 286, shall not occur.
3. The total smoke released throughout the NFPA 286 test shall not exceed 1,000 m^2.

R302.10 Flame spread and smoke developed index for insulation. Flame spread and smoke developed index for insulation shall be in accordance with R302.10.1 through R302.10.5.

~~**R316.1**~~ **(Supp) R302.10.1 Insulation.** Insulation materials, including facings, such as vapor retarders or vapor permeable membranes installed within floor-ceiling assemblies, roof-ceiling assemblies, wall assemblies, crawl spaces and attics shall have a flame-spread index not to exceed 25 with an accompanying smoke-developed index not to exceed 450 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. When such materials are installed in concealed spaces, the flame spread and smoke-developed limitations do not apply to the facings, provided that the facing is installed in substantial contact with the unexposed surface of the ceiling, floor or wall finish.
2. Cellulose loose-fill insulation, which is not spray applied, complying with the requirements of Section ~~R316.3~~ R302.l0.3, shall only be required to meet the smoke developed index of not more than 450.

~~**R316.2**~~ **(Supp) R302.10.2 Loose-fill insulation.** Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Sections ~~R316.1 and R316.4~~ R302.10.1 and R302.10.4 when tested in accordance with CAN/ULC S102.2.

Exception: Cellulose loose-fill insulation shall not be required to comply with the flame spread index requirement of CAN/ULC S102.2, provided such insulation complies with the requirements of Section ~~R316.3~~ R302.10.3.

~~**R316.3**~~ **R302.10.3 Cellulose loose-fill insulation.** Cellulose loose-fill insulation shall comply with CPSC 16 CFR, Parts 1209 and 1404. Each package of such insulating material shall be clearly labeled in accordance with CPSC 16 CFR, Parts 1209 and 1404.

~~**R316.4**~~ **R302.10.4 Exposed attic insulation.** All exposed insulation materials installed on attic floors shall have a critical radiant flux not less than 0.12 watt per square centimeter.

~~**R316.5**~~ **R302.10.5 Testing.** Tests for critical radiant flux shall be made in accordance with ASTM E 970.

~~**R602.8**~~ **(Supp) R302.11 Fireblocking ~~required~~.** Fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top story and the roof space.

Fireblocking shall be provided in wood-frame construction in the following locations.

1. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs; as follows:
   1.1. Vertically at the ceiling and floor levels.
   1.2. Horizontally at intervals not exceeding 10 feet (3048 mm).
2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.
3. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section ~~R311.2.2~~ R302.7.
4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an approved material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E 136 requirements.
5. For the fireblocking of chimneys and fireplaces, see SectionR1003.19.
6. Fireblocking of cornices of a two-family dwelling is required at the line of dwelling unit separation.

~~**R602.8.1**~~**(Supp)R302.11.1 Fireblocking materials.** Except as provided in Section ~~R602.8~~ R302.11, Item 4, fireblocking shall consist of the following materials:

1. 2-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25.4 mm) nominal lumber with broken lap joints.
3. One thickness of 23/32-inch (18.3 mm) wood structural panels with joints backed by 23/32-inch (18.3 mm) wood structural panels.
4. One thickness of 3/4-inch (19.1 mm) particleboard with joints backed by 3/4-inch (19.1 mm) particleboard.

5. 1/2-inch (12.7 mm) gypsum board.
6. /4-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place.

~~**R602.8.1.1**~~ **(Supp)** **R302.11.1.1 Batts or blankets of mineral or glass fiber.** Batts or blankets of mineral or glass fiber or other approved nonrigid materials shall be permitted for compliance with the 10-foot (3048 mm) horizontal fireblocking in walls constructed using parallel rows of studs or staggered studs.

~~**R602.8.1.1**~~ **R302.11.1.2 Unfaced fiberglass.** Unfaced fiberglass batt insulation used as fireblocking shall fill the entire cross section of the wall cavity to a minimum height of 16 inches (406 mm) measured vertically. When piping, conduit or similar obstructions are encountered, the insulation shall be packed tightly around the obstruction.

~~**R602.8.1.3**~~ **(Supp)** **R302.11.1.3 Loose-fill insulation material.** Loose-fill insulation material shall not be used as a fireblock unless specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.

~~**R602.8.1.2**~~ **R302.11.2 Fireblocking integrity.** The integrity of all fireblocks shall be maintained.

~~**R502.12**~~ **R302.12 Draftstopping ~~required~~.** When 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 square feet (92.9 m^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 framing.
2. Floor framing is constructed of truss-type open-web or perforated members.

~~**R502.12.1**~~ **R302.12.1 Materials.** Draftstopping materials shall not be less than 1/2-inch (12.7 mm) gypsum board, 3/8-inch (9.5 mm) wood structural panels, 3/8-inch (9.5 mm) Type 2-M-W particleboard or other approved materials adequately supported. Draftstopping shall be installed parallel to the floor framing members unless otherwise approved by the building official. The integrity of all draftstops shall be maintained.

~~**SECTION R808**~~
~~**INSULATION CLEARANCE**~~

~~**R808.1**~~ **R302.13 Combustible insulation clearance.** Combustible insulation shall be separated a minimum of 3 inches (76 mm) from recessed luminaires, fan motors and other heat-producing devices.

Exception: Where heat-producing devices are listed for lesser clearances, combustible insulation complying with the listing requirements shall be separated in accordance with the conditions stipulated in the listing.

Recessed luminaires installed in the building thermal envelope shall meet the requirements of Section N1102.4.3.

(Renumber subsequent sections)

R502.13 Fireblocking required. Fireblocking shall be provided in accordance with Section ~~R602.8~~ R302.11.

Reason: The IBC has one chapter, Chapter 7, which contains nearly all of the requirements for fire-resistive construction. In the IRC, fire-resistive construction requirements are spread throughout the document and in no particular order. For example, fireblocking is found in the chapter on walls even though it applies to many locations other than walls. This proposal combines the fire-resistive requirements or references to sections with fire-resistive requirements into one section. There is no need to search through the entire document to find fire-resistive requirements. They should all be found in one location just as they are in the IBC. This proposal is almost entirely editorial. In almost all instances, the sections have been simply renumbered for their new location. The other changes that have been made include:

- Re-titling the section “Fire Resistive Construction”.
- Renumbering of sections throughout.
- Editorial title changes in a few sections.
- Adding the words “and roof” to R302.2.4(3).
- Previous section R602.8.1.2 which was a subsection of “Materials” has been renumbered to be a subsection of “Fireblocking” which is more appropriate.

Again, this is intended to be largely an editorial revision to group like regulations into one section for ease of use of the IRC.

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

Committee Action: **Disapproved**

Committee Reason: The committee indicated that the proposal as currently worded would take the provisions on fireblocking and draftstopping from sections that are specific to wood frame construction and bring them forward into a general section without retaining limits of applicability. When a similar change was proposed for the International Building Code the critical phrase, "in combustible construction" was added. The committee felt that as it was currently worded the proposed language would serve to increase the scope without the proper technical substantiation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

SECTION R302
FIRE RESISTIVE CONSTRUCTION

R302.3.1 Supporting construction. When floor assemblies are required to be fire-resistance-rated by Section R302.3, the supporting construction of such assemblies shall have an equal or greater ~~fire-resistive~~ fire-resistance rating.

R302.4 ~~Rated~~ Dwelling unit rated penetrations. Penetrations of wall or floor/ceiling assemblies required to be fire-resistance rated in accordance with Section R302.2 or R302.3 shall be protected in accordance with this section.

R302.4.2 Membrane penetrations. Membrane penetrations shall comply with Section R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be so installed such that the required fire resistance rating will not be reduced.

Exceptions: (No change)

TABLE R302.6
DWELLING/GARAGE ~~FIRE~~/ SEPARATION

R302.9 Flame spread index and smoke developed index for wall and ceiling finishes. Flame spread index and smoke density for wall and ceiling finishes shall be in accordance with R302.9.1 through R302.9.4.

R302.9.1 Flame spread. Wall and ceiling finishes shall have a flame spread ~~classification~~ index of not greater than 200.

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.

R302.10 Flame spread index and smoke developed index for insulation. Flame spread index and smoke developed index for insulation shall be in accordance with R302.10.1 through R302.10.5.

R302.10.1 Insulation. Insulation materials, including facings, such as vapor retarders or vapor permeable membranes installed within floor-ceiling assemblies, roof-ceiling assemblies, wall assemblies, crawl spaces and attics shall have a flame-spread index not to exceed 25 with an accompanying smoke-developed index not to exceed 450 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. When such materials are installed in concealed spaces, the flame spread index and smoke developed index limitations do not apply to the facings, provided that the facing is installed in substantial contact with the unexposed surface of the ceiling, floor or wall finish.
2. Cellulose loose-fill insulation, which is not spray applied, complying with the requirements of Section R302.l0.3, shall only be required to meet the smoke developed index of not more than 450.

R302.10.2 Loose-fill insulation. Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread index and smoke developed index limits of Sections R302.10.1 and R302.10.4 when tested in accordance with CAN/ULC S102.2.

Exception: Cellulose loose-fill insulation shall not be required to comply with the flame spread index requirement of CAN/ULC S102.2, provided such insulation complies with the requirements of Section R302.10.3.

R302.11 Fireblocking. ~~Fireblocking~~ In combustible construction, fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top story and the roof space.

R302.12 Draftstopping. ~~When~~ 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 square feet (92.9 m^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 framing.
2. Floor framing is constructed of truss-type open-web or perforated members.

(Renumber subsequent sections)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This code change was supported by the committee except for two concerns noted by floor speakers. The committee suggested working with those speakers to resolve the two problem areas. In the sections on fireblocking and draftstopping, language was added to make clear that those sections applied to combustible construction only. The other area of concern resulted in a number of editorial changes aimed at standardizing the terminology as it related to flame spread index, smoke developed index, and similar terms. Those areas of concern are all noted in the modification.

Final Action: AS AM AMPC____ D

RB22-07/08
R202

Proposed Change as Submitted:

Proponent: Thomas Meyers, CBO, City of Central, CO, representing himself

Revise definition as follows:

FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. To the closest interior lot line; or
2. To the centerline of a street, an alley or public way.~~; or~~
3. ~~To an imaginary line between two buildings on the lot~~.

The distance shall be measured at a right angle from the face of the wall.

Reason: The IRC was modified to add the IBC's fire separation distance definition by a public comment to the First Draft of the IRC (202-23 at the 1998 IRC hearing in Kansas City). This was done to provide language consistency between the IRC and the IBC.

Considerable confusion has resulted over the intended or unintended application of the "imaginary line" concept contained in the Fire Separation Distance definition for structures built under the IRC. The IBC contains provisions within the text of the document that clearly indicates how the imaginary line is to be applied. IBC Section 704.3 specifically directs the user to either place an imaginary line between two or more buildings located on a lot to address wall and opening protection. As an alternative, one can eliminate the imaginary line and assess the individual buildings as an aggregate of one "single" building to determine total area. This is necessary to ensure that no individual structure or aggregate of structures exceed the allowable area for a single building as prescribed in IBC Chapter 5.

The IRC completely lacks this level of direction to the user within the text of the code. The IRC does not contain any building area or height limits aside from the 3 story limitation within the scoping provisions. Therefore, the concept of the imaginary line is completely unnecessary in the IRC for the reasons that it is used in the IBC.

Some have argued that the imaginary line should be used to separate buildings inhabited by different tenants on a lot not having property boundaries. This premise is NOT embodied in the IBC, nor is it appropriate for the IRC. The IBC does not mandate the use of imaginary line assessment unless an aggregate of buildings exceeds the area limits of Chapter 5. This occurs (or doesn't occur) regardless of what individual parties share the buildings on a lot.

If the intent of the membership is to create a special level of protection using the concept of the imaginary line, a code change is required to add language outside the fire separation distance definition to clearly tell the user how to apply the concept. In the meantime, the best solution is to completely eliminate "imaginary line" from the definition.

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

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that the proponent's reason statement accurately substantiates the need to remove the reference to an imaginary line between two buildings on the lot. The committee felt that this proposal helped to improve the current code language.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Stephan Kiefer, City of Livermore, CA, representing Peninsula, East Bay and Monterey Bay Chapters (Tri-Chapter) of ICC, requests Disapproval.

Commenter's Reason: This code proposal approved by the code development committee, deletes the requirement to measure fire separation distance from an imaginary line between two buildings on the same lot. If RB22 is approved, two dwellings or townhomes could be built very close together (i.e. 2" separation between them) with no fire rating required for the walls. The best solution is not to eliminate the imaginary line requirement from the IRC, but to clarify how to apply imaginary property lines in the IRC. RB22 should be disapproved until such a clarification is accepted.

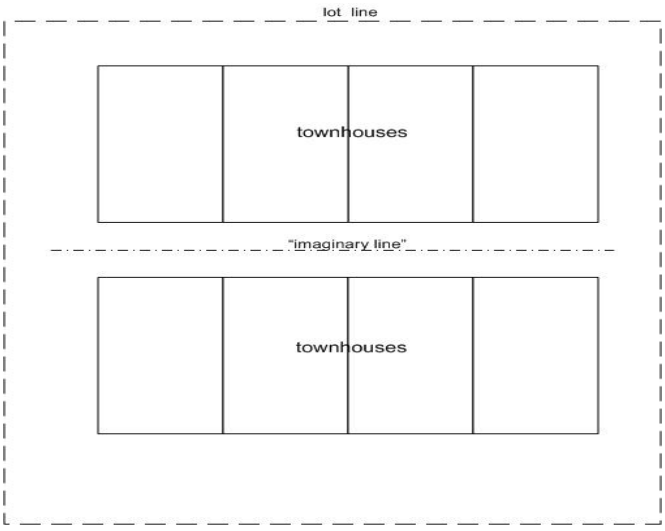
Public Comment 2:

Maureen Traxler, City of Seattle Department of Planning and Development, representing Washington Association of Building Officials Technical Code Development Committee, requests Disapproval.

Commenter's Reason: The "imaginary line" that is deleted by this code change proposal is essential for the purpose of determining exterior wall and opening protection. While it is true, as the proponent stated, that the IRC doesn't have area and height restrictions, the Code does use the concept of fire separation distance to determine the required protection for exterior walls and openings.

Fire separation distance can be measured from one of three points: a lot line, a public way, or an imaginary line between buildings. Where there is no lot line or public way, wall and opening protection depends on the imaginary line. The example below illustrates. Where more than one building is located on a single lot, no wall and opening protection is required unless the definition of fire separation distance includes the imaginary line. The buildings shown in the photo below would be allowed to have unlimited openings at any fire separation distance unless an imaginary line between them is assumed. The imaginary line may not be the best way to regulate this, but this imperfect regulation is better than no regulation.

The proponent correctly noted that the IRC does not provide clear guidance on use of the imaginary line. However, instead of deleting the provision a more helpful approach would be to provide the needed code language to address the situations where the imaginary line is used.



RB22-07/08 Example
This example shows 8 townhouse units located on one lot. Without the "imaginary line" between the two rows of townhouses, there is no code provision requiring protection of openings in the walls that face each other.

Final Action: AS AM AMPC____ D

RB26-07/08
R325 (New)

Proposed Change as Submitted:

Proponent: Chad Lawry, Fire Marshal's Office, City of Vancouver, WA, representing City of Vancouver Firefighters

Add new section as follows:

SECTION R325
FIRE DEPARTMENT EMERGENCY ACCESS AND WATER SUPPLY

R325.1 Fire department emergency access and water supply. Fire department emergency access provisions and water supply for fire protection shall be as approved by the fire code official.

Reason: The IRC is intended to be a stand alone code. Some building officials have stated that none of the provisions of the Fire Code apply to projects constructed under the IRC since it is a stand alone code. Clarification is needed to eliminate confusion as it pertains to the applicability of the Fire Code.

A formal interpretation from ICC was requested from, and given by the ICC. They stated that "the IRC is intended to apply to the built environment and that the provisions of the Fire Code should not be excluded, especially as it pertains to emergency access and water supply for fire protection."

This code change will provide clarification of the applicability of the Fire Code and provide local control of emergency access and water supply requirements.

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

Committee Action: **Disapproved**

Committee Reason: This is a zoning issue not an IRC issue. The committee felt that it is appropriate for fire apparatus access roads to be in the *International Residential Code*, however they should be referenced in the Appendix. Fire apparatus access roads and other infrastructure elements that will be built in the future and the location specific issues as to where and when they are mandated are a decision very much like a zoning restriction that should be made by the jurisdiction. Further, the committee felt the reference to the International Fire Code was inappropriate.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Chad Lawry, Fire Department, Vancouver, WA, representing Vancouver Firefighters, requests Approval as Modified by this Public Comment.

Modify proposal by adding a new Appendix R (duplicate of IFC Appendix B) and a new Appendix S (duplicate of IFC Appendix D as follows:

APPENDIX R
FIRE FLOW REQUIREMENTS FOR BUILDINGS

(Renumber from IFC Appendix B to IRC Appendix R)

APPENDIX S
FIRE DEPARTMENT ACCESS ROADS

(Renumber from IFC Appendix D to IRC Appendix S)

Commenter's Reason: The committee believed that the issue of fire department emergency access and water supply for fire protection should be referenced in an appendix. Taking these two IFC appendices in their entirety and duplicating them in the IRC as appendices supports the concept that the IRC is a stand alone code and provides an opportunity for local AHJ's to adopt the appendices where appropriate.

Final Action: AS AM AMPC____ D

RB28-07/08
R303.4 through R303.4.2 (New)

Proposed Change as Submitted:

Proponent: Steve Ferguson, American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

Add new text and table as follows:

R303.4 Mechanical ventilation. Each dwelling unit shall be provided with a mechanical exhaust system, supply system, or combination thereof to provide whole-building ventilation with outdoor air.

Exception: Dwelling units in climate zones 1 and 2 where refrigeration cooling is not installed.

R303.4.1 Mechanical ventilation rate. The required ventilation system shall provide outdoor air at a rate not less than determined in accordance with Table R303.4.1.

TABLE R303.4.1
MECHANICAL VENTILATION AIR REQUIREMENTS (cfm)

FLOOR AREA (square feet)	BEDROOMS				
	0-1	2-3	4-5	6-7	>7
< 1500	30	45	60	75	90
1501-3000	45	60	75	90	105
3001-4500	60	75	90	105	120
4501-6000	75	90	105	120	135
6001-7500	90	105	120	135	150
> 7500	105	120	135	150	165

R303.4.2 System design. Bathroom and toilet room exhaust fans shall be permitted to be part of such a system. Outdoor air ducts connected to the return side of an air handler shall be considered to be supply ventilation where the air handler's manufacturers' requirements for minimum return air temperature are met.

(Renumber subsequent sections)

Reason: The purpose of this proposal is to provide modest levels of continuous mechanical ventilation in detached one- and two-family houses and low-rise townhouses in order to provide minimum levels of ventilation.

For health and safety reasons, minimum ventilation is necessary to provide acceptable indoor air quality. Modern homes are much tighter than the building stock and do not provide adequate ventilation through air leakage or infiltration. Occupants do not operating windows to provide minimum ventilation levels. Providing continuous mechanical ventilation is required to provide minimum ventilation rates in current construction..

Ventilation is used to control pollutant concentrations in buildings. These pollutants are emitted from building materials, consumer products, and from occupants themselves. Continuous mechanical ventilation reduces these large concentrations and reduces the large exposures for building occupants.

Because of the effects it has on health, comfort, and serviceability, indoor air quality in our homes is becoming of increasing concern to many people. According to the American Lung Association elements within our homes have been increasingly recognized as threats to our respiratory health. The Environmental Protection Agency lists poor indoor air quality as the forth-largest environmental threat to our country. Asthma is leading serious chronic illness of children in the U.S. moisture-related construction defects and damage are on the increase in new houses. Minimum residential ventilation can improve many of these indoor air quality problems.

ASHRAE Standard 62.2-2007 is the only national consensus standard on residential ventilation rates. ASHRAE, the American Society of Heating, Refrigerating and Air-conditioning Engineers, has been setting minimum ventilation rates for buildings for over 100 years in order to provide acceptable indoor air quality. The rates in this proposal are the minimum rates as incorporated in the current version of standard 62.2. As an ANSI standard, these rates represent the consensus of a balanced committee and have undergone extensive public review.

Sherman and Hodgson (2002) have shown that the rates in this proposal are barely sufficient to dilute the typical amount of formaldehyde emitted in typical new construction. The consensus of knowledgeable and balanced experts supports the ventilation rates in Standard 62.2-2007. Several states have adopted similar ventilation requirements (e.g. MN, ME or WA) or are in the process of adopting similar ventilation standards (e.g. CA)

Price and Sherman (2006) have shown that occupants of new homes do not operate their windows and doors sufficiently to meet minimum ventilation requirements through controlled openings. While there are 20% of the population who would manage their windows effectively during mild periods, the vast majority of occupants keep their windows closed most of the time and do not get sufficient ventilation from window and door operation.

Sherman and Chan (2006) have reviewed air tightness data. New houses are substantially tighter than the existing stock and do not get enough ventilation through air infiltration and air leakage to meet minimum rates. Walker and Sherman (2006) have shown that the energy costs of meeting ASHRAE Standard 62.2 would be substantially higher for a house that was leaky enough to meet it through infiltration.

Bibliography: ASHRAE Standard 62.2-2007 *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*

Price, P.N. and M.H. Sherman **"Ventilation Behavior and Household Characteristics in New California Houses,"** April 2006. LBNL-59620 http://epb.lbl.gov/Publications/lbnl-59620.pdf

Sherman, M. H. and A.T. Hodgson. **"Formaldehyde as a Basis for Residential Ventilation Rates",** 2002 LBNL-49577. http://epb.lbl.gov/Publications/lbnl-49577.pdf

Walker, I. S. and M. H. Sherman **"Evaluation of Existing Technologies for Meeting Residential Ventilation Requirements."**2006, LBNL-59998. http://epb.lbl.gov/Publications/lbnl-59998.pdf

Sherman, M.H., Chan W. R., "Building Airtightness: Research and Practice" in *Building Ventilation: the state of the art,* (Santamouris, Wouters, Eds) Earthscan ISBN-13: 978-1-84407-130-2 pp. 137-162, 2006, http://epb.lbl.gov/Publications/lbnl-53356.pdf

Cost Impact: The code change proposal will increase the cost of construction modestly by requiring a mechanical fan system rated for continuous operation.

This code change was heard by the IRC Plumbing/Mechanical Code Development Committee.

Committee Action: **Disapproved**

Committee Reason: There was no supporting data presented by the proponent that demonstrated there is a problem with natural ventilation in existing houses. This code change would allow the residents to manually operate the exhaust fans. There is no way to force them to turn the fan on or to insure they will turn it off when bathroom use or cooking operations are complete which would cause wasted energy.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Steve Ferguson, ASHRAE, requests Approval as Submitted.

Commenter's Reason: For health and safety reasons, minimum ventilation is necessary to provide acceptable indoor air quality. Modern homes are much tighter than the building stock and do not provide adequate ventilation through air leakage or infiltration. Occupants do not operating windows to provide minimum ventilation levels. Providing continuous mechanical ventilation is required to provide minimum ventilation rates in current construction..

Ventilation is used to control pollutant concentrations in buildings. These pollutants are emitted from building materials, consumer products, and from occupants themselves. Continuous mechanical ventilation reduces these large concentrations and reduces the large exposures for building occupants.

Because of the effects it has on health, comfort, and serviceability, indoor air quality in our homes is becoming of increasing concern to many people. According to the American Lung Association elements within our homes have been increasingly recognized as threats to our respiratory health. The Environmental Protection Agency lists poor indoor air quality as the forth-largest environmental threat to our country. Asthma is leading serious chronic illness of children in the U.S. moisture-related construction defects and damage are on the increase in new houses. Minimum residential ventilation can improve many of these indoor air quality problems.

ASHRAE Standard 62.2-2007 is the only national consensus standard on residential ventilation rates. ASHRAE, the American Society of Heating, Refrigerating and Air-conditioning Engineers, has been setting minimum ventilation rates for buildings for over 100 years in order to provide acceptable indoor air quality. The rates in this proposal are the minimum rates as incorporated in the current version of standard 62.2. As an ANSI standard, these rates represent the consensus of a balanced committee and have undergone extensive public review.

Sherman and Hodgson (2002) have shown that the rates in this proposal are barely sufficient to dilute the typical amount of formaldehyde emitted in typical new construction. The consensus of knowledgeable and balanced experts supports the ventilation rates in Standard 62.2-2007. Several states have adopted similar ventilation requirements (e.g. MN, ME or WA) or are in the process of adopting similar ventilation standards (e.g. CA)

Price and Sherman (2006) have shown that occupants of new homes do not operate their windows and doors sufficiently to meet minimum ventilation requirements through controlled openings. While there are 20% of the population who would manage their windows effectively during mild periods, the vast majority of occupants keep their windows closed most of the time and do not get sufficient ventilation from window and door operation.

Sherman and Chan (2006) have reviewed air tightness data. New houses are substantially tighter than the existing stock and do not get enough ventilation through air infiltration and air leakage to meet minimum rates. Walker and Sherman (2006) have shown that the energy costs of meeting ASHRAE Standard 62.2 would be substantially higher for a house that was leaky enough to meet it through infiltration.

Bibliography: ASHRAE Standard 62.2-2007 *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*
Price, P.N. and M.H. Sherman **"Ventilation Behavior and Household Characteristics in New California Houses,"** April 2006. LBNL-59620 http://epb.lbl.gov/Publications/lbnl-59620.pdf

Sherman, M. H. and A.T. Hodgson. **"Formaldehyde as a Basis for Residential Ventilation Rates",** 2002 LBNL-49577. http://epb.lbl.gov/Publications/lbnl-49577.pdf

Walker, I. S. and M. H. Sherman **"Evaluation of Existing Technologies for Meeting Residential Ventilation Requirements."**2006, LBNL-59998. http://epb.lbl.gov/Publications/lbnl-59998.pdf

Sherman, M.H., Chan W. R., "Building Airtightness: Research and Practice" in *Building Ventilation: the state of the art,* (Santamouris, Wouters, Eds) Earthscan ISBN-13: 978-1-84407-130-2 pp. 137-162, 2006, http://epb.lbl.gov/Publications/lbnl-53356.pdf

Note that this proposal includes revised criteria for fenestration that was not included in EC106.

Public Comment 2:

Chuck Murray, Washington State University Energy Program, representing Northwest Energy Code Group, requests Approval as Submitted.

Commenter's Reason: We support RB28 as submitted based on the studies quoted in the original proposal submission and our experience enforcing a ventilation code in Washington State since 1991. To summarize the studies we provide the following:

Fresh air is needed to provide a healthy environment for the occupants and to protect the building from excessive moisture accumulation.

Regardless of how well sealed a home is - or is not, mechanical ventilation is needed at least part of the year. Natural forces simply do not provide consistent ventilation rates throughout the year. This is particularly true in the spring and fall when there is minimal heating or cooling. Natural ventilation needs to be supplemented with mechanical ventilation.

A simple bath fan meets the requirement of this standard. While many different systems may be selected to meet the proposed requirement, a simple bath fan will meet the minimum requirements. That's it. This is a very low cost option that will improve indoor air quality.

Final Action: AS AM AMPC____ D

RB30-07/08
R305.1

Proposed Change as Submitted:

Proponent: Gary J. Ehrlich, PE, National Association of Home Builders

Revise as follows:

R305.1 (Supp) Minimum height. Habitable space, hallways, bathrooms, toilet rooms, laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm).

Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
2. Bathrooms shall have a minimum ceiling height of 6 feet 8 inches (2036 mm) ~~over the fixture and~~ at the center of the front clearance area for fixtures as shown in Figure R307.1. The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a minimum ceiling height of 6 feet 8 inches (2036 mm) above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.

Reason: Exception #4 was added during the 2001 code cycle (RB21-01) for the primary purpose of allowing an existing bathroom to be renovated or a new bathroom added in an existing structure without requiring the ceiling be raised to 7'-0". This was done to mitigate the need to remove an existing ceiling and/or cut floor or roof framing to accommodate the minimum height. The proponent also acknowledged the desire to preserve the ability to construct a sloped ceiling while maintaining an acceptable clearance over sinks & toilets. However, the phrasing of the exception removed the ability to use the current sloped ceiling requirements of Exception #3 to construct a powder room or half-bath under a new or existing stairway with no justification the existing sloped ceiling requirements were inadequate.

The revised text is taken from Indiana State amendment 675 IAC 14-4.3-24, adopted June 2005. The amended requirement insures that there is enough clearance to stand in front of the sink or to use the toilet in a small bathroom, but allows the ceiling to slope over the sink or toilet itself down to the 5'-0" minimum height permitted at the wall using Exception #3. A similar amendment was adopted in South Carolina in February 2007.

This change will preserve the ability of builders to construct bathrooms under stairs in new and existing houses. This means that builders will not have to relocate a proposed bathroom to other locations on the floor, causing additional expense to homeowners and possibly reducing the square footage available for living rooms, bedrooms, dens, or other principal spaces. NAHB asks for your support of this proposal.

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

Committee Action: **Approved as Submitted**

Committee Reason: The committee felt the proposed language helps to improve the code and gives the builder and home owner more useable space in the home, specifically the ability to use more of the space under stairways and still have enough usable space above fixtures.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials, requests Disapproval.

Commenter's Reason: This proposal contains the statement: "The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose." This language is not enforceable. It is purely a judgment call and the application will vary significantly depending on the physical characteristics of the code official. It will be impossible to pursue a violation of this section through the courts as any complaint would surely be thrown out as being arbitrary.

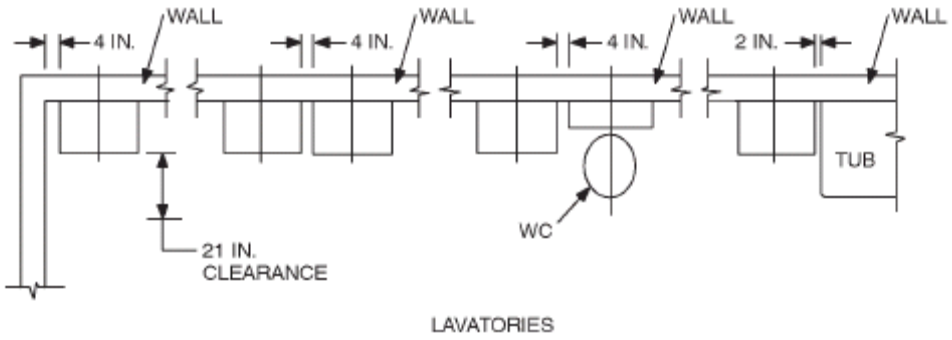
Final Action: AS AM AMPC____ D

RB32-07/08
Figure R307.1

Proposed Change as Submitted:

Proponent: Jud Collins, JULYCO, representing himself/Guy Tomberlin, Fairfax County, VA, representing The Virginia Plumbing and Mechanical Inspectors Association and the Virginia Building and Code Officials Association

Delete portion of figure as follows:



LAVATORIES

No change to the remaining portions of Figure R307.1.

Reason: (COLLINS) There is not any text in the IRC to support the clearances shown for what appears to be lavatories. As such, Figure R307.1 is the only place that indicates any dimensions for lavatory clearances. Until someone includes text in the IRC governing clearances for lavatories, this portion of the figure needs to be removed from the code.

(TOMBERLIN) All of the measurements in this illustration except the clearance in front of the lavatory are not required by any code text what so ever located in the IRC. Many users of the IRC utilize the drawings in the IRC for enforcement and installation practices and in this case the enforcement of these particular dimensions is unfounded and not valid because of the lack of text to support them.

The clearance provision for the lavatory is located in Section P 2705.1 #5 and needs no illustration to further define how to take this basic measurement.

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

Committee Action: **Disapproved**

Committee Reason: While the committee agreed that this portion of Figure R307.1 needed to be better labeled they felt that there was insufficient justification to remove it from the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jud Collins, JULYCO, representing himself, requests Approval as Submitted.

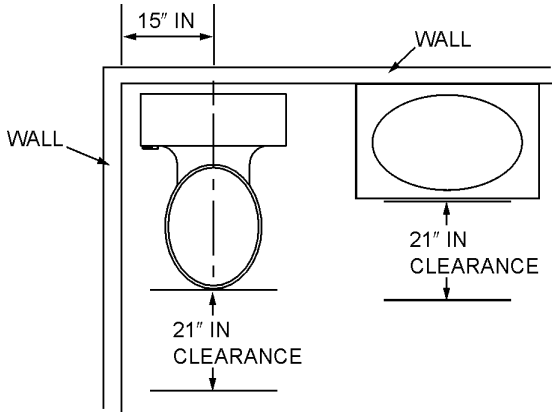
Commenter's Reason: There is not any text in the IRC to support the clearances shown for what appears to be lavatories other than the clearance in front of the lavatory which is found in P2705.1, Item 5. As such, Figure R307.1 is the only place that indicates the 2-inch and the 4-inch dimensions for lavatory clearances. Until someone includes **TEXT** in the IRC including these clearances for lavatories, this portion of the figure needs to be removed from the code.

Public Comment 2:

Guy Tomberlin, Fairfax County, VA, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA), requests Approval as Modified by this Public Comment.

Robert F. Loeper, Jr., President, representing Region VII Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify proposal as follows:



Commenter's Reason: The published reason for committee disapproval was insufficient justification. The justification is that the portion of the illustration recommended to be removed has no code text to support the 2 inch and 4 inch measurements identified within the drawing. Unfortunately some code officials look to illustrations in the code as enforceable and require the specifications to be adhered with. In this case these measurements are nothing more than numbers on a page. All the required fixture clearances and measurements are adequately addressed in the rest of the illustration that is to remain which is supported entirely by Section P2705 text. The only measurement that was requested to be removed with the original proposal that is covered in Section P2705 is the distance in front of the lavatory. The as modified version request that the frontal measurement for the lavatory illustration be moved next to the existing water closet illustration. For further supporting information please re–read the as submitted RB32-07/08.

Final Action: AS AM AMPC____ D

RB33-07/08

R307.1

Proposed Change as Submitted:

Proponent: Bob Gardner, Building Department, City of Thornton, CO, representing Colorado Chapter of ICC

Revise as follows:

R307.1 (Supp) Space required. Fixtures shall be spaced in accordance with Figure R307.1, and in accordance with the requirements of Section P2705.1.

Exception: Lavatories installed in vanities, cabinets, or countertops.

Reason: The proper installation for lavatories installed in vanities or counter tops requires the lavatory to be centered in the cabinet and with some of the oval and wider styles available in today's market place, there are cases where the 4 inch space cannot be maintained to a side wall or from lavatory to lavatory.

If the reason for the four inch clearance is accessibility or usability, the requiring of an individual to install a smaller lavatory into the same size vanity or cabinet is not going to change the accessibility to the center of the lavatory. In addition, in many hall bathroom installations the vanity or cabinet is already as large as can fit in the space and still maintain the other required fixture clearances. If the reason for the four inch clearance is sustainability, the smaller rim and lip of a counter mounted lavatory does not require four inches to properly clean where free standing lavatories use deep sides that would require additional space to maintain.

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

Committee Action: **Disapproved**

Committee Reason: Committee wanted to be consistent with the action taken on RB32-07/08 and felt that no guidance was provided for the items as to what the exception takes out of the charging statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bob Gardner, City of Thornton, CO, representing Colorado Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R307.1 (Supp) Space required. Fixtures shall be spaced in accordance with Figure R307.1, and in accordance with the requirements of Section P2705.1.

Exception: ~~Lavatories installed in vanities, cabinets, or countertops~~ in countertops are exempt from the 4-inch clearance requirements in Figure R307.1.

Commenter's Reason: The first reason stated by the committee for their disapproval was to be consistent with the action taken on RB32-07/08. RB32-07/08 is a proposal to completely remove the lavatory clearance requirements from figure R307.1 where RB33-07/08 simply added an exception for lavatories installed in a vanity, cabinet or countertop. RB33-07/08 would still require the 4" clearance requirements for pedestal or wall mounted lavatories for necessary maintenance along the adjacent wall or another fixture. Counter top mounted lavatories are almost exclusively self sealing and normally have less than a ½ " side requiring cleaning or other maintenance making the 4" required clearance unnecessary, where the 3" or 4" side of any free standing lavatory requires this space to adequately maintain a sanitary surface.

The second reason for disapproval stated by the committee was they felt that no guidance was provided for what the exception takes out of the charging statement. The modification removes the exception from Section R307.1 and adds specific language to Figure R307.1; this should clarify any confusion as to what the exception was trying to accomplish.

Final Action: AS AM AMPC____ D

RB36-07/08
R308.4

Proposed Change as Submitted:

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in swinging doors except jalousies.
2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
3. Glazing in storm doors.
4. Glazing in all unframed swinging doors.
5. ~~Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any part of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.~~

~~6.~~ 5. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.

~~7.~~ 6. Glazing in an individual fixed or operable panel, other than those locations described in Items 5 and 6 above, that meets all of the following conditions:

- ~~7.1.~~ 6.1. Exposed area of an individual pane larger than 9 square feet (0.836 m_2).
- ~~7.2.~~ 6.2. Bottom edge less than 18 inches (457 mm) above the floor.
- ~~7.3.~~ 6.3. Top edge more than 36 inches (914 mm) above the floor.
- ~~7.4.~~ 6.4. One or more walking surfaces within 36 inches (914 mm) horizontally of the glazing.

~~8.~~ 7. All glazing in railings regardless of an area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.

~~9.~~ 8. Glazing comprising a wall, in ~~walls and fences~~ a wall or in a fence enclosing or adjacent to indoor and outdoor swimming pools, hot tubs, ~~and~~ spas, whirlpools, saunas, steam rooms, bathtubs and showers where the bottom edge of the glazing is less than 60 inches (1524 mm) above a standing or walking surface ~~and within 60 inches (1524 mm) horizontally of the water's edge~~. This shall apply to single glazing and all panes in multiple glazing.

Exception: Glazing more than 60 inches (1524 mm) measured horizontally and in a straight line of the water's edge for hot tubs, whirlpools, bathtubs, and swimming pools.

~~10.~~ 9. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

~~11.~~ 10. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread.

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. through 10. (No change to current text)

Reason: There is much unnecessary duplication in these two sections. This proposal editorially combines the two sections into one section to reduce confusion and improve uniformity. The proposal also recognizes new designs involving glass walls (sometimes the glazing isn't in the wall, it is the wall) and glazing in a wall adjacent to a pool, hot tub, and other water basins but that do not enclose the basin. The revised first sentence would then read: "Glazing comprising a wall, in a wall, or in a fence enclosing or adjacent to indoor and outdoor swimming pools, hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, and showers where the bottom edge of the glazing is less than 60 inches (1524 mm) above a standing or walking surface."

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

Committee Action: **Disapproved**

Committee Reason: The committee felt that it was important to keep the current text so that the hazardous locations for glazing for hot tubs, whirlpools, bathtubs and swimming pools remains consistent in both the *International Residential Code* and the *International Building Code*.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials requests Approval as Submitted.

Commenter's Reason: The current code regulating doors, walls, enclosures, compartments, etc., near or adjacent to tubs, spas, saunas, steam rooms and other uses involving bathing, recreational or otherwise, contains many conflicting and confusing statements.

In #5, for example, the first sentence says glazing in doors and enclosures for hot tubs, whirlpools, saunas, etc must be safety glazed period. There are no qualifications for height or distance meaning all glazing in these locations must be safety glazed. Then the second sentence introduces the term "building wall" and states that when a building wall encloses these "compartments", a term not used in the first sentence, the glazing must be safety glazed if the glazing is less than 60 inches above a standing or walking surface. So we have one sentence that says all glazing must be safety glazing and the second that says if the glazing is in a "compartment" (Is a "compartment" different than an "enclosure"?) and it is within 60 inches of a standing surface it must be safety glazed. Different terms and different standards are applied to what could be the same scenario. This causes lack of uniformity.

Then we go to item #9. The first sentence says glazing in "walls and fences enclosing" (versus enclosures and walls enclosing compartments in #5) must be safety glazed for swimming pools, hot tubs, and spas if the glazing is less than 60 inches above a walking surface (not walking or standing as in #5) and if it is within 60 inches of the waters edge.

If we have a hot tub, #5 says glazing in enclosures for hot tubs must be safety glazed or glazing in building walls enclosing a compartment housing a hot tub must be safety glazed if the glazing is within 60 inches vertically of a standing or walking surface. And #9 says walls enclosing hot tubs must be safety glazed if the glass is less than 60 inches above a walking surface and within 60 inches of the waters edge.

So it appears we have three different standards for glazing for hot tubs.

The same argument can be made for "whirlpools" in #5 and "spas" in #9. Webster defines "spa" as "a hot tub with a whirlpool device". "Whirlpool" is defined as "a therapeutic bath in which all or part of the body is exposed to forceful whirling currents of hot water". So what is the difference in the hazard imposed by glazing adjacent a "spa" versus a "whirlpool"? It doesn't appear that there should be any yet different rules apply. And if the same installation is ruled by one code official to be a spa and the other to be a whirlpool, there will be a lack of uniformity.

Both of these sections also seem to apply to glazing contained within the walls. In many new designs, the glazing is the wall.

Also, the current language does not clearly address the issue of a large bath tub, sometimes called a soaking tub, that is not in an enclosure but near a window. Some code officials say that the room is an enclosure and require all windows to be safety glazed. Others say the tub isn't in an enclosure at all. Again there is a lack of uniformity. This proposal corrects that conflict by regulating glazing within 60 inches horizontally of the water basin.

The proposed amendment combines the two sections into one section that requires safety glazing in all windows comprising a wall or within a wall within 60 inches vertically of a standing or walking surface. Furthermore, it requires any glazing within 60 inches of the water's edge to be safety glazed resulting in consistency across the board.

The IRC Committee, in disapproving this code change, cited that this proposal will result in a lack of consistency between the IRC and IBC. The two codes are stand alone codes. Perhaps those folks that work on the IBC can use this proposal as a model for amending the IBC.

Final Action: AS AM AMPC____ D

RB39-07/08
R308.4

Proposed Change as Submitted:

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

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in swinging doors except jalousies.
2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
3. Glazing in storm doors.
4. Glazing in all unframed swinging doors.
5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any part of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.
6. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.
7. Glazing in an individual fixed or operable panel, other than those locations described in Items 5 and 6 above, that meets all of the following conditions:
   7.1. Exposed area of an individual pane larger than9 square feet (0.836 m^2).
   7.2. Bottom edge less than 18 inches (457 mm) above the floor.
   7.3. Top edge more than 36 inches (914 mm) above the floor.
   7.4. One or more walking surfaces within 36 inches (914 mm) horizontally of the glazing.
8. All glazing in railings regardless of an area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
9. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs and spas where the bottom ledge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm) horizontally of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
10. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.
11. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread.

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. Openings in doors through which a 3-inch (76 mm) sphere is unable to pass.
2. Decorative glass in Items 1, 6 or 7.
3. Glazing in Section R308.4, Item 6, when there is an intervening wall or other permanent barrier between the door and the glazing.
4. Glazing in Section R308.4, Item 6, in walls perpendicular to the plane of the door in a closed position, other than the wall toward which the door swings when opened, or where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in these applications shall comply with Section R308.4, Item 7.
5. Glazing in Section R308.4, Items 7 and 10, when a protective bar is installed on the accessible side(s) of the glazing 36 inches ± 2 inches (914 mm ± 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in height.
6. Outboard panes in insulating glass units and other multiple glazed panels in Section R308.4, Item 7, when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.

7. Louvered windows and jalousies complying with the requirements of Section R308.2.
8. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
9. Safety glazing in Section R308.4, Items 10 and 11, is not required where:
   9.1. The side of a stairway, landing or ramp has a guardrail or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1013 and 1607.7 of the *International Building Code* or when a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the floor and the construction at the top of wall or panel is capable of withstanding the same horizontal load as the protective bar; and
   9.2. The plane of the glass is more than 18 inches (457 mm) from the railing; or
   ~~9.3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm)to 36 inches (914 mm)above the floor and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as the protective bar.~~
10. Glass block panels complying with Section R610.

Reason: This code change will fix an unanticipated problem with the original code change that was brought through for the 2006 IRC. The original code change was a good one that recognized that having a solid wall or panel adjacent to glazing gave similar protection from falling through non safety glazing but the way the wording ended up by adding subsection 9.3 was that the requirement that the glazing still be at least 18 inches away is only tied to subsection 9.1. This code change will move the wording from 9.3 into 9.1 so that the option to use either a guardrail/handrail or a solid wall/panel would be listed in one spot and then it would be clear that no matter which one you use you would still have to have glazing at least 18 inches away.

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

Committee Action: **Disapproved**

Committee Reason: The committee did not support the combination of 9.1 and 9.3 as 9.3 addresses issues other than stairs, landings and ramps and therefore should be kept as a separate item.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Tim Pate, City & County of Broomfield Building Department, representing Colorado Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. through 11. (No change to current text)

Exception: The following products, materials and uses are exempt from the above hazardous locations:

5. Glazing in Section R308.4, Item~~s~~ 7 ~~and 10~~, when a protective bar is installed on the accessible side(s) of the glazing 36 inches +/- 2 inches (914 mm +/- 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1 ½ inches (38 mm) in height.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Code change RB15-00 added exception 9 (9.1 and 9.2) which allowed the protective bar but also required the glazing to be at least 18" away from the stair and bar. Code change RB16-00 was also approved in the same code change cycle which added the reference in exception #5 which would allow the protective bar but not require the 18" separation. This created a direct conflict between the two exceptions in the 2003 IRC and the 2006 IRC.

Code change S101-03/04 added exception 9.3 which allows the use of a solid wall instead of the protective bar which would be equivalent but did not say that you would still need the 18" separation.

My original code change moved the wording in exception 9.3 into the body of exception 9.1 so as to allow either method but still need the 18" separation distance away from the wall or bar. My added modification deletes the reference in Exception 5 to item 10 and will clear up the discrepancy created in the 2000 code cycle.

Stairs are inherently more dangerous for tripping hazards than normal walking surfaces. It does not make sense to allow a solid wall 34" to 36" high or a 1 ½" wide bar directly adjacent to stairs and landings and think this gives adequate protection for someone falling into glazing that is not safety glazing. Requiring the glazing to be at least 18" away would provide better protection if someone trips and falls.

The committee reason states that exception 9.3 should be left separate since it addresses issues other than stairs, landings and ramps but this does not make sense since it is clearly an exception to items 10 and 11 which deal strictly with stairs, landings and ramps.

The 2006 IRC Commentary also supports the concept that even when using the wall design you would need to be at least 18" away.

Finally this would make the IBC and IRC safety glazing sections match (except that the IBC does not allow the wall design).

Final Action: AS AM AMPC____ D

RB42-07/08
R308.4

Proposed Change as Submitted:

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. through 11. (No change to current text)

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. through 11. (No change to current text)
12. Glazing in Section R308.4, item 6, that is adjacent to the fixed panel of patio doors.

Reason: This is not so much a code change as it is a clarification for uniformity of application.

This proposal was submitted and approved by the ICC IRC Committee in Orlando with the following Committee comment: "This proposal to add an exception for glazing adjacent to the fixed panel of sliding door assemblies adds practicality to the code. It is unlikely that sliding doors will be reversed by the owner and people are familiar with their home environments. Therefore, this new language helps to clarify the code text." The Committee was right.

The proposal was challenged and overturned in Rochester with the argument that the fixed and moveable panels of a patio door could be reversed. The membership should know better.

There are swinging patio doors and there are sliding patio doors. A swinging patio door is not unlike any other swinging door with a sidelight. Sidelights don't extend the hazard posed by a door. The same is true for sliding doors which can have panels up to four feet in width.

Patio doors are almost always manufactured as right or left. Doors that are manufactured as right handed cannot be installed as left handed and vice versa, except as pointed out below by machining the door, changing the hardware, patching existing holes and creating new ones. For those very few that can be installed as right or left handed, the manufacturers installation instructions indicate they would be very hard to reverse once installed. They are typically assembled prior to installation in the rough opening. The fixed sash is secured to the frame with screws and other attachments. In order to reverse the operation of these doors, the entire frame would need to be removed, the door disassembled, reassembled in a different configuration, and reinstalled in the rough opening. Is this something the average homeowner is likely to attempt? The answer is no.

However, if one were to assume that a homeowner possessed the skills to modify a patio door so that it worked from the opposite side, could not that same homeowner reverse the swing of other doors in his home on which the requirement for safety glazing are based on the direction the door swings?

The following text is found in Section R308 as it applies to glazing adjacent a swinging door: "4. Glazing in Section R308.4, Item 6, in walls perpendicular to the plane of the door in a closed position, other than the wall toward which the door swings when opened…" A homeowner can purchase a pre-hung entry door, in many cases for less than $100, and remove their existing door and replace it with a new one that might swing in the opposite direction putting existing glazing in violation. Should we impose regulations on the construction of a home based on the anticipation of difficult or extraordinary repairs that might occur to that home in 20, 30, or 40 years or perhaps never, of course not? In this example, glazing that would be immediately adjacent the latch side of the door in a perpendicular wall would be exempt from safety glazing yet some building officials would require glazing in a window up to six feet away to be safety glazed if this door was a patio door!

To determine the possibility of reversing the operation of patio doors, manufacturers listed on the WDMA web site were contacted and the following question was posed to them: Can your sliding and swinging patio doors be reversed or must they be ordered right or left? Following are their responses. Most of the major patio door manufacturers in the country replied and indicated that their doors were manufactured as right or left handed.

Sorry, they need to be ordered that way.

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

Committee Action: **Approved as Submitted**

Committee Reason: Glazing that is located adjacent to a fixed panel of a door or a pair of patio doors is an adequate distance away from a hazard so as not to be considered in a hazardous location. This would apply whether the glazed panel is adjacent to either a swinging or fixed type patio door as long as the window in question is adjacent to the fixed glazed panel.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

William E. Koffel, PE, Koffel Associates, Inc., representing Glazing Industry Code Committee, requests Disapproval.

Commenter's Reason: The Committee Action assumes that a panel next to a fixed panel is an adequate distance from the operating door panel and therefore the risk does not warrant safety glazing. The proposal was not accompanied by any research indicating this to be the case. There are two concerns with this assumption.

First, as stated during the hearings the occupants in the dwelling are familiar with the building and therefore the fixed panel or panel next to it will not be mistaken. This assumption may not take into account all possible occupants in the dwelling unit such as guests and young children.

Secondly, the assumption does not consider replacement door installations. Such replacements may typically be done without a building permit. If the occupant of the dwelling decides to change the side of the operating panel or if a patio door is replaced with two active leafs, the owner of the dwelling may not consider the fact that the adjacent glazing is not safety glazing. It should be noted that the proposal this cycle did expand the application from sliding doors to anything referred to as a patio door.

Final Action: AS AM AMPC____ D

RB49-07/08
R311.4

Proposed Change as Submitted:

Proponent: Tim Nogler, Washington State Building Code Council, representing Washington Association of Building Officials

Revise as follows:

R311.4 (Supp) Vertical egress. Egress from habitable levels and basements not provided with an egress door in accordance with Section R311.2 shall be by a ramp in accordance with Section R311.7 or a stairway in accordance with Section R311.6.

> **Exception:** Stairs or ladders within an individual dwelling unit used for egress from areas of 200 square feet (18.6 m^2) or less, and not containing the primary bathroom or kitchen.

Reason: This code change proposal will add an exception to the stairway and ramp requirements in the IRC. Efficient use of space and energy conservation is a critical element in creating affordable housing. This proposal allows an alternate means of egress from small, limited areas in private residential dwelling units. In small, space efficient units, lofts or similar areas are integral to the use of the space and necessary to make the space habitable. To require a code compliant stair is impractical, as the stair takes up as much space than the loft area provides. The private resident is familiar with the space and knows how to negotiate and protect access to the loft space. This exception has been in effect in the state of Washington for over ten years with no reported problems regarding injuries or other safety issues.

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

Committee Action: **Disapproved**

Committee Reason: The committee felt that, while loft spaces and other similar spaces in efficiency type units need to be accessed, this proposal fails to limit the total number of these spaces to be allowed and offers no guidance as to how the ladder should be built.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Tim Nogler, Washington State Building Code Council, representing Washington State Association of Building Officials, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R311.4 (Supp) Vertical egress. Egress from habitable levels and basements not provided with an egress door in accordance with Section R311.2 shall be by a ramp in accordance with Section R311.7 or a stairway in accordance with Section R311.6.

> **Exception:** ~~Stairs or ladders~~ Egress from one area of 200 square feet (18.6 m^2) or less within an individual dwelling unit ~~used for egress from areas of 200 square feet (18.6 m^2) or less,~~ and not containing ~~the primary~~ a bathroom or kitchen is not required to meet Section R311.6.

Commenter's Reason: The modifications address the comments made by the committee in Palm Springs. Only one area would be exempt from the stair provisions, and the area could not contain bathroom or kitchen. The means of egress is not specified. The code would not regulate the type of stair or ladder or other means of egress. Thus, an alternating tread device, a ship's ladder, or a ladder conforming to R310.2.1 (window wells at egress windows) could be used. The exception allows use of small areas in a space efficient manner, thereby making dwelling units more affordable and energy efficient. The state of Washington has allowed this exception for over ten years.

Final Action: AS AM AMPC____ D

RB50-07/08
R311.3

Proposed Change as Submitted:

Proponent: Thomas B. Zuzik, Jr., Artistic Railings, Inc., representing himself

Revise as follows:

R311.3 (Supp) Floors and landings at doors. There shall be a landing or floor or landing on each side of each exterior door. The width of each landing shall not be less than the door served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel. Exterior landings shall be permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent).

Exception: Exterior doors that are not to serve as a means of egress.

Reason: The current code does not allow the use of false or small personal size viewing balconies with less than 36 inches of projection inside or outside exterior doors. This exception is intended to fill a gap in the code to allow the use of small personal size viewing balconies and guards to block off exterior doors intended more for use as a full height window rather than a door for exiting the premises.

1. The intention of the minimum landing size for exterior doors is based on that the door is to serve the means of egress for leaving the home and being a common path of travel, when the door is more intended for viewing rather than exiting this exception allows additional options.
2. With homeowners and designers now looking to add full height doors as windows and at the same time keep the cost down, the required landing projection of 36 inches is not needed at every door through out the home unless that door is serving the exit path requirements for the structure.

The use of small size personal viewing balconies are intended to allow minimum cost and size to enhance the home. The following 2 pictures show locations on second floor levels of homes were small projection balconies serve there use and requiring 36 inches of projection would be a very high cost thus removing a viable and safe option for homeowners.

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

Committee Action: **Disapproved**

Committee Reason: The committee indicated that providing an exception for all landings sizes was an issue and specifically the wording, "doors that are not to serve as a means of egress" was vague and somewhat confusing as to how it was to be applied.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Thomas B. Zuzik, Jr., Artistic Railings, Inc., representing himself, requests Approval as Modified by this public comment.

Modify proposal as follows:

R311.3 (Supp) Floors and landings at doors. There shall be a landing or floor on each side of each exterior door. The width of each landing shall not be less than the door served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel. Exterior landings shall be permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent).

Exception: ~~Exterior doors that are not to serve as a means of egress.~~ Exterior balconies less than 60 square feet and only accessible from a door are permitted to have a landing less than 36 inches (914 mm) measured in the direction of travel.

Commenter's Reason: Purpose: The current code does not allow the use of false or small personal size viewing balconies with less than 36 inches of projection outside exterior doors. This exception is intended to fill a gap in the code to allow the use of small personal size viewing balconies and guards to block off exterior doors intended more for use as a full height window rather than a door for exiting the premises.

1. The intention of the minimum landing size for exterior doors is based on that the door is to serve the means of egress for leaving the home and being a common path of travel, when the door is more intended for viewing rather than exiting this exception allows additional options.
2. With homeowners and designers now looking to add full height doors as windows and at the same time keep the cost down, the required landing projection of 36 inches is not needed at every door through out the home unless that door is serving the exit path requirements for the structure.
3. The less than 60 square foot is given as a limit. This limit is intended to require the 36 inch projection for any balcony that is over this size and the pictures listed in the substantiation section below are noted with the landings square footage to provide installation and location context for the relief this code proposal is intending to provide and the 60 square foot maximum limit.
4. The requirement of only being accessible from a door eliminates question that stairs or walkways can serve this type of unit. The intent is that the area is only accessible from the interior of the home through a door to the balcony. The term door is used to mean a door, twin door/ French door, sliding door or other types of doors.
5. When this proposal was heard by the committee in Palm Springs they indicated two concerns 1. The original wording was to broad covering all landings, and 2. They felt the wording "doors that are not to serve as a means of egress" is confusing and somewhat vague. For these two reasons, the proposal was reworded to stay within the intent of the code change and address both the concerns of the committee reasons for disapproval.

The use of small size personal viewing balconies are intended to allow minimum cost and size to enhance the home. The following 5 pictures show locations on homes were small projection balconies or guards serve their use and requiring 36 inches of projection would be a very high cost thus removing a viable and safe option for homeowners.

Landing size is 7 square feet service by a French door

Landing size 10.5 square feet service by a French door

Landing Size 2.5 square feet service by a French door

Landing Size 1.75 square feet service by a French door

Landing size 57 square feet serviced by one French door in the center and two windows.

Final Action: AS AM AMPC____ D

RB57-07/08
R311.6.1

Proposed Change as Submitted:

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R311.6.1 Maximum slope. Ramps shall have a maximum slope of one unit vertical in ~~twelve units horizontal (8.3-percent slope)~~ eight horizontal (12.5 percent slope).

> **~~Exception:~~** ~~Where it is technically infeasible to comply because of site constraints, ramps may have a maximum slope of one unit vertical in eight horizontal (12.5 percent slope).~~

Reason: IBC Section 1010.2 reads as follows:

> **1010.2 Slope.** Ramps used as part of a means of egress shall have a running slope not steeper than one unit vertical in 12 units horizontal (8-percent slope). The slope of other pedestrian ramps shall not be steeper than one unit vertical in eight units horizontal (12.5-percent slope).
>
> **Exception:** An aisle ramp slope in occupancies of Group A shall comply with Section 1025.11.

Since the IBC allows residential ramps with slopes of 1:8, the IRC should not be more restrictive. The IRC Committee disapproved this code change in Orlando on a 6-5 vote with the chair breaking the tie however the discrepancy between the IRC and IBC was not pointed out.

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

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proposed code language which allows a maximum slope of one unit vertical in 8 units horizontal for ramps because it provides a useful option in instances where space is restricted and a ramp is required.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Corey Birkholz, Options: Interstate Resource Center for Independent Living, requests Disapproval.

Commenter's Reason: Per discussion with Edward Steinfield, and review of the "Accessible Building for People with Walking and Reaching Disabilities" 1978 section on Ramps (produced under direction of Edward Steinfield), along with a review of the "A Review of Technical Requirements for Ramps" completed by Jon A. Sanford in 1996, and personal and professional experience in working with people with mobility limitations and designing ramps for people with mobility limitations since 1999, the ICC proposal to set the minimum slope for residential ramps for the IRC at 1:8 should be disapproved.

Per the research and my own professional experience, a 1:8 sloped residential ramp will be too steep for many people who use manual wheelchairs to negotiate because of limited upper body strength, hemiplegia or stamina. The majority of individuals I design ramps for are elderly and live in the northern climate of North Dakota and Minnesota. In the fall, winter and spring months, snow and ice makes negotiating a ramp with a less than 1:12 slope additionally difficult and sometimes unsafe for people using manual or power wheelchairs, persons using scooters, or persons using walkers or other mobility devices.

Public Comment 2:

Roger Borgenicht, ASSIST Inc. – A Community Design Center, requests Disapproval.

Commenter's Reason: In 2006 the International Residential Code (IRC) was amended to clarify that even though access ramps are not required on single family homes, when they are needed, they should be built to the same usable and safe slope standard required in other building and accessibility codes of 1 unit vertical in 12 units horizontal (1:12). Previously, the 2003 IRC allowed a 1:8 slope but was referring to utility or service ramps, and not ramps used for ingress or egress. The standard for ramps used as a part of an accessible route is 1:12 in the ADA Accessibility Guidelines, ICC/ANSI A117.1 Standard for Usable and Accessible Buildings, Fair Housing Technical Requirements, International Building Code (IBC) and almost all state and local building codes. Access ramps at 1:8 slope are allowed by the IBC in existing or historic buildings when the total rise is less than 3 inches.

Recognizing that unsafe and unusable ramps were being built due to the 1:8 slope allowance for service ramps as referenced in the 2003 IRC, ASSIST Inc, a nonprofit Community Design Center in Salt Lake City, teamed up with the Utah Chapter of the International

Code Council to clarify that slopes for access ramps in homes should be consistent with the 1:12 ramp slope standard because it has been determined over time to be the steepest safe slope for the vast majority of wheelchair users. Because site conditions and accessibility needs can sometimes vary, an exception was permitted in situations where it is technically infeasible to meet the 1:12 standard. In that case a ramp could be no steeper than 1:8.

Relaxing the building code to 1:8 will jeopardize the safety of many users. The maximum slope is limited for an access ramp "to facilitate the ease of ascent and to control the decent of persons with or without mobility impairment." (2006 International Building Code Commentary, page 10-68). The universal design standard for of 1:12 for safe and usable access ramps should provide the same measure of safety for ramps on homes.

We urge the ICC Assembly to maintain the 1:12 standard for access ramps on homes in the 2009 IRC by rejecting and disapproving the RB57-07/08 revision to IRC 2006 (R311.6.1 Maximum Slope) that would allow a 1:8 standard for access ramps in homes which will prevent independent use by most wheelchair users and be dangerous for people with mobility impairments.

Public Comment 3:

Richard Castino, Watertown, WA, representing himself, requests Disapproval.

Commenter's Reason: A ramp pitch of greater than 1 in 12 is dangerous. 1 in 8 pitch is no good.

Public Comment 4:

Margot Imdieke Cross, Minnesota State Council on Disability, requests Disapproval.

Commenter's Reason: One vertical to twelve horizontal (1:12) is the long established maximum slope for an accessible route. It is clear that the proponent has misread the exception allowing a 1:8 slope.

Public Comment 5:

Jacqueline Dobson, Solutions for Accessibility, requests Disapproval.

Commenter's Reason: This is to propose that the IRC change as proposed by Rick Davidson, requesting that the current maximum slope requirement of 1:12 (8.3 percent slope) NOT be changed to 1:8 (12.4 percent slope), I submit that the slope must remain as the tried and true 1:12 (8.3 percent slope) for the safety and well-being of all homeowners and visitors.

A 1:8 (12.4percent slope) is an extremely dangerous slope that will cause many injuries to individuals who use manual wheelchairs, motorized wheelchairs, walkers, canes, those assisting those individuals and even those who use no mobility device at all. A 1:12 ramp, as is, can be a barely functional ramp for many individuals.

For an individual who uses a manual wheelchair, a significant amount of arm strength is required to push their wheelchair and body up a ramp with a 1:8 slope. Depending on the balance of their wheelchair, the initial strong push to get started with each new stroke as one moves up the ramp, can cause the wheelchair to tip backwards. This could cause innumerable injuries, not the least of which would be a head injury. This of course then has a myriad of ramifications to the individual and family in ways too many to mention, but that include medical, psychological, financial ramifications. Going down a ramp too steep can cause the footrests to "bottom-out" thus catapulting a person forward out of their chair.

For an individual who uses a motorized wheelchair, should they, for instance have an oxygen tank on the back of their chair, they too are "back-heavy", and especially in inclement weather, with the weight of the front tires somewhat lifted due to an angle so steep, may not have the gripping power necessary to get up a ramp. Otherwise independent in all other ways, this could even leave someone stranded outside their home in a storm. Going down a ramp too steep can cause the footrests to "bottom-out", thus, potentially catapulting a person out of their chair.

For seniors who use walkers, a 1:12 can already be a challenge due to the weight shifting and balance compensation one must do. To propose a 1:8 would be the recipe for disaster and for falls. Fractures in seniors are a major concern:

> Can Med Assoc J. 1971 July 10; 105(1): 47-51, 62.
> PMCID: PMC1931080
> The Probability of Death Following a Fracture of the Hip
> Peter C. Gordon
> "Over-all, it was estimated that only 63.8% would be alive by one year post-fracture. This is 70% of the survival rate expected in the general population of corresponding age and sex. The period of greatest mortality was within the first 12 weeks. Patients surviving to one year could be considered "cured", for after that their survivorship was at least as favorable as that of the "normal" population."

With a background in occupational therapy we focus on functional task analysis. I've now been assisting homeowners with home accessibility for over 20 years. I've seen individuals with all levels of abilities and needs. Be it a 90 year old wife who has to push her husband who uses a wheelchair up a ramp, a 9 year old little girl who must help her mom who has MS and uses a wheelchair, up a ramp, or even a 30 year old who uses no mobility devices but could slip while walking down the (proposed steep) ramp with the light glaze that has formed on the surface during the night.

People already feel that 1:12 is a proper ramp, when in actuality, a 1:14 or 1:18 is even better. If a 1:8 ramp is considered the "acceptable" slope, there will be extensive problems that will affect the medical system, individuals and families financially, insurance companies financially, the safety and well being of many individuals. It will "trap" people in their homes. There could be many slip and fall injuries to visitors. It will require significant cost to rebuild ramps that are functionally found to be too steep for an individual or family member to handle.

In our strife for independence for all, this would cause dependence, bodily injuries, be psychologically damaging, put stress on the medical systems and so very many far-reaching but related problems. Fractured hips, traumatic brain injuries, fractured arms, broken knees….

I plead that the maximum slope in R311.6.1 is NOT changed. The maximum slope should remain at 1:12.

Public Comment 6:

Roger R. Evans, Park City Municipal Corporation, representing Utah Chapter of ICC, requests Disapproval.

Commenter's Reason: The International Residential Building/Energy Code Committee erred in its decision to approve the code change to allow a maximum slope of 1:8. The intent of the code change (Section R311.6.1) in the 2006 IRC was to make the 1:12 ramp standard between the IRC and the IBC. Table 3409.8.5 of the IBC allows for ramps of 1:10 and 1:8 for existing buildings. The current language in the IRC has an exception that is technically infeasible based on site constraints. The IRC does not require ramps, but if you have a ramp, the universal standard is 1:12. Changing the code back to 1:9 sends the wrong message to the disabled community. The proponent of the code change cites the exception for pedestrian ramps and tries to use this reasoning for the code change. Please read the 2006 IBC Commentary (pages 10-68) for the explanation on this issue. I would urge the assembly to take action to disapprove this code change.

Public Comment 7:

Nicholas Hammer, Help Yourself Designs, Inc., requests Disapproval.

Commenter's Reason: Changing the allowable slope from 12:1 to 8:1 is extremely unsafe. Many small motorized wheelchairs can not negotiate such steep slopes and manually operated chairs face even greater difficulties. Considering that the *recommended* slope is 20:1, this suggested change to the code can be seen to serve no one. A simple demonstration with the reviewers attempting to wheel themselves up a 8:1 incline of more than 4 feet would be sufficient to put the quietus to this.

Public Comment 8:

Cheryl Kent, U.S. Department of Housing and Urban Development (HUD), requests Disapproval.

Commenter's Reason: HUD believes the action taken by the Committee to approve RB 57 should be reversed, and the proposal disapproved. This proposal, if it remains in the code, will have a significant negative impact on accessible single-family homes or single-family homes designed to be Type A dwelling units. We do not believe it is appropriate or safe to permit an accessible ramp that is part of a single family home to have a slope in excess of 1:12 (8.33 percent). While there may be a few situations where a steeper slope is necessary, such situations should be written as exceptions and not as the general rule. Further, we believe the proponent's reason statement is incorrectly interpreting a provision in the IBC that is NOT related to accessibility. The proponent appears to be saying that because the exception to IBC 1010.2 allows an aisle ramp slope in occupancies of Group A to comply with Section 1025.11, that this is also acceptable for an accessible ramp serving a residence. We interpret this exception in Section 1010.2 to be applying to ramps that are not required to be accessible. We recommend that the approval of this change be reversed to ensure that ramps provided for accessibility in a single-family home are, in fact, accessible and do not exceed the maximum slope of 1:12 for an accessible ramp.

Public Comment 9:

Susan Lasoff, Susan Lasoff, OTR, representing Company and Clients, requests Disapproval.

Commenter's Reason: This proposed code change will create a standard for ramps that is too steep for most people to use effectively and safely. An individual with insufficient upper extremity strength would find it difficult to propel themselves up such a steel incline. A person using a motorized wheelchair could tip over backwards on a steel 1:8 incline. Older caregivers may be unable to push a partner in a wheelchair up such a steep incline.

I have worked as an Occupational Therapist & Accessibility Specialist for over 25 years. I work primarily with adults, disabled veterans and other persons with disabilities. It is important to properly evaluate the person-environment fit. I have trained my clients to properly control/maneuver wheelchairs on both level and inclined surfaces.

The Minnesota State Accessibility Code, Chapter 1341 (dated 2007), Section 405.2 Slope states, "Ramp runs shall have a running slope no steeper than 1:12." This code requires that ramps be on the interior of facilities, because of their steepness. It is important that they not be exposed to inclement weather. Although this code does not apply to private residences, contractors and builders who are inexperienced in accessible construction sometimes view a minimum state code or federal standard as the guideline to follow.

The Design/Build Solutions for Aging and Accessibility Student Guide (2007 edition) was developed by the National Association of Home Builders and AARP for their Certified Aging in Place Course. This document states, "To determine the slope of a ramp, the ratio of the rise to length should range between a minimum of 1:12 and 1:20."

The Occupational Therapy Practice Guidelines for Home Modifications (2005 edition) was developed by the American Occupational Therapy Association, Inc. and states in Appendix A, Glossary of Terms and Definitions, "Ramp: The maximum allowable slope for ramps is 1" vertical for 12" of horizontal run."

Public Comment 10:

Jordana Maisel, IDEA Center, representing herself, requests Disapproval.

Commenter's Reason: I believe that 1:8 is a seriously unsafe slope that will likely lead to runaway wheelchairs and serious injuries. 1:12 should be the maximum allowable slope for ramps for which people in wheelchairs are among the intended users. In addition, the proposed change in slope could also lead to runaway or tipped power mobility devices. The specifications for power chairs and scooters usually state a maximum incline of 8.7% for safe operation. Steeper inclines pose the risk of tipping (either forward or backward). The braking mechanism may also be inadequate on steeper slopes.

Public Comment 11:

Paul Marchand, United Cerebral Palsy, requests Disapproval.

Commenter's Reason: Ramps constructed for a single family home provide accessibility for the occupants. Repeated testing has shown that a slope of 1:8 will not work for persons with disabilities. It can reduce maneuverability, inhibit independence and cause injury.

Proponents have misread the exception allowing a 1:8 ramp slope in Group A occupancies. The excessive slope referenced is not permitted on ramps serving accessible locations. Please note that the ANSI A117.1 Standard permits ramp slopes at 1:8 ONLY in existing buildings when overcoming an elevation difference of 3 inches or less.

Thank you for helping us protect the safety and independence of individuals living with disabilities.

Public Comment 12:

Dominic Marinelli, United Spinal Association, requests Disapproval.

Commenter's Reason: Every ramp that I have seen constructed for a single family home has been to provide accessibility for the occupants. Repeated testing has shown that 1:8 will not work for persons with disabilities.

Proponent has misread the exception allowing a 1:8 ramp slope in Group A occupancies. The excessive slope referenced is not permitted on ramps serving accessible locations. Please note that the ANSI A117.1 Standard permits ramp slopes at 1:8 ONLY in existing buildings when overcoming an elevation difference of 3 inches or less.

Public Comment 13:

William Rudolph, Independent Lifestyles Inc., representing himself, requests Disapproval.

Commenter's Reason: As a person who has worked all phases of construction for many years, the last two at my current accessibility position. I feel qualified to comment on this l code change request, which in my opinion, should not be approved.

That said, I urge you to leave the 1 to 12-ramp slope as it is in the current IRC R311.6.1. A wording change such as proposed in RB57-07/08 is likely to convince many people, including some building officials and architects, that the code recommended ramp slope is 1 to 8 (12.3 %), which if built will result in a dangerous and, in many cases, an unusable ramp that possibly will need removal and reconstruction to the workable 1 to 12 slope.

If any change were to be made to the IRC it would be to allow steeper ramps inside of homes, similar to the commercial IBC section1025.11. This proposal as I interpret it will change the current and time tested 1 to 12 (8.3%) maximum ramp slope requirement to a very unfavorable and dangerous 1 to 8 (12.5%) maximum requirement.

The proposed change cites language in the *International Building Code* (IBC), Section 1010.2 **(**Ramps used as part of a means of egress shall have a running slope not steeper than one unit vertical in 12 units**).**This standard is appropriate for most people. The proposal then cites IBC Section 1025.11, which has nothing to do with residential construction. It deals with commercial construction and interior ramps. The 1 to 8 standard is inappropriate and too steep for use in residential exterior construction.

Having worked in construction for around 40 years, mainly supervision, I have been involved in many projects that have ramps. I have also been a certified Class II MN state building official (1986-93 +- MN-1061). This has allowed me to work with many ramp situations in both residential, commercial and government projects. I prefer leaning towards the 1 to 20slope for ramps, however because of site limitations many times 1 to 12 is all that fits.

The last 2 years I have been working at my current accessibility position, which has placed me in a hands-on position to see the problems caused by steep and/or improperly constructed ramps.

Again, I urge you to leave this code R311.6.1 as is.

Public Comment 14:

Eleanor Smith, Concrete Change, requests Disapproval.

Commenter's Reason: During the past 20 years of my work as director of a national group concerned with housing access, I have worked with literally thousands of wheelchair users, from children to elderly people. I believe that 1:8 is a seriously unsafe slope that will be likely to lead to runaway wheelchairs and serious injuries. 1:12 should be the maximum allowable slope for ramps for which people in wheelchairs are among the intended users.

Public Comment 15:

Edward Steinfeld, IDEA Center, School of Architecture and Planning, State University of New York at Buffalo, requests Disapproval.

Commenter's Reason: The current accessibility code requirement for 1:12 max. slope on ramps is based on a research study completed in 1978 under my direction and funded by the U.S. Dept. of Housing and Urban Development. This study is available at http://www.ap.buffalo.edu/idea/Publications/Articles%20and%20Publications%20-%20see%20alex%20with%20questions/Accessible%20Buildings%20PDF/AccessBldgs.pdf See p. 49. The usability of ramps is related to many factors, particularly slope and length. The steeper the slope, the less distance is manageable due to strength and stamina. We found that over 40% of our sample of wheelchair users could not manage a slope of 1:12 for 30 feet of length. All of our sample (N=57 wheelchair users) could manage a 1:20 slope for that distance. So, based on that research, the current code requirements for accessibility to ramps are very minimum. This suitability of the 1:12 slope was confirmed by a more recent study by Jon Sanford and his colleages funded by the U.S. Access Board. Their report is available at http://www.accessboard. gov/research/Ramps/report.htm/ They found that 25% of their sample (N= 20 manual wheelchair users) could not manage a 1:8 slope for 30 feet. Note that our sample was larger and more diverse. In particular, we had a lot more participants over 65 years of age.

John Templer, at Georgia Tech completed research on short ramps funded by the U.S. Dept. of Transportation. They found that short steep ramps were manageable for wheelchair users but they also found that wheelchairs bottom out at steep slopes. The footrests can hit the floor or ground as the user comes down the ramp, causing very dangerous conditions. Thus, for new construction, they recommended 1:12 slopes. For existing construction, 1:8 slope makes some sense but only to accommodate short level changes. Thus, accessibility codes (see ICC/ANSI A117.1 (2003)) allow a 1:8 slope for only 3 in. and between 1:10 and 1:12 for up to 6 in. max. I support these exceptions to the 1:12 rule.

It is important to note that many ramps have more than one run. They can be very taxing for people with low stamina and strength, even those who can walk. Increasing the slope to 1:8, other than for more than a few inches to overcome thresholds or small grade changes, will create very difficult or impossible conditions for many manual wheelchair users and many other people with low stamina and walking difficulties as well.

Public Comment 16:

Rae Stewart, Center for Independent Living, requests Disapproval.

Kimberly A. Tyler, Hibbing, MN, representing herself, requests Disapproval.

Commenter's Reason: The proposal cites IBC Section 1025.11 which has nothing to do with residential construction. It deals with commercial construction and interior ramps. The 1 to 8 standard is inappropriate and too steep for use in residential exterior construction, especially in the snow.

Public Comment 17:

Karen Thielman, Independent Lifestyles, Inc., requests Disapproval.

Commenter's Reason: Please keep the ramp specifications at the 1 to 12 requirements and do NOT change it to the 1 to 8 proposed requirements. Here in Minnesota, the steeper ramp would be impossible and/or very dangerous to use in the winter. Persons with disabilities also may not have the strength to wheel a chair on a ramp that steep. Please keep our current standards for ramp construction.

Public Comment 18:

Joel Ulland, National Multiple Sclerosis Society, requests Disapproval.

Commenter's Reason: On behalf of the National Multiple Sclerosis Society, representing more than 400,000 people with MS in the United States, I strongly oppose the proposed code change to modify ramping for residential buildings from 1:12 to 1:8. This change significantly impacts people with disabilities and especially people with multiple sclerosis. I request the code be left unchanged.

MS is a chronic disease of the central nervous system. Symptoms may be mild, such as numbness in the limbs, or severe, such as paralysis or less of vision. The progress, severity and specific symptoms of MS vary and are unpredictable. One of the most common symptoms of MS is fatigue. For people with MS who use a manual wheelchair, pushing themselves up a 1:8 ramp can be a significant challenge, if not impossible, for some. The grade of the incline is so steep that it can be difficult for a person with MS to gain enough momentum to bring themselves to the top of the ramp.

In my 12 years with the organization, I have seen this play out numerous times as the 1:8 is a common grade for ramps to platforms temporarily constructed for special events, most commonly in hotel ballrooms. What will happen is the person in the wheelchair will build up some momentum as they approach the ramp and then run out of energy about halfway up, get stuck and either have to go back down the ramp or ask for assistance.

Of course, the ramps that are impacted by this proposal are for residential settings where assistance may not always be readily available. A main purpose of a ramp is to increase accessibility into a home and is likely to be used several times a day. If a person in a manual wheelchair is likely to get "stuck" on the ramp, it defeats a main purpose of the ramp and makes that residential setting unlivable. As the baby boom generation gets older, we see the increased demand for fully accessible residential settings. A ramp can be the difference between full independence and being confined to their own home.

Finally, as the National MS Society was one of may organizations who were leaders in the passage of the Americans with Disabilities Act, this proposal is very disappointing as it does not seem to take into account the mobility needs of people with disabilities. Please oppose this proposal. Thank you.

Public Comment 19:

Charles Willmarth, American Occupational Therapy Association, requests Disapproval.

Penny Moyers, President, American Occupational Therapy Association, requests Disapproval.

Shoshanna Shamberg, AOTA Representative to ANSI 117.2 Committee.

Commenter's Reason: On behalf of the American Occupational Therapy Association, Inc. (AOTA), which represents the professional interests of more than 38,000 occupational therapists and occupational therapy assistants throughout the United States, we are writing to submit comments on proposed changes to the International Code Council's (ICC) International Residential Code (IRC), specifically the changes to RB57-07/08 R311.6.1.

The acceptance of a 1:8 slope instead of the previous 1:12 slope for ramps in private homes may present problems not apparent to the owner who is able bodied. However, since anyone can sustain a temporary or permanent injury or illness during their lives, safe access to all environments, especially those with ramps must be considered. Here are some collective comments from our knowledgeable members who are working with people who may or may not use wheelchairs and walkers.

> "The proposed change in slope could also lead to runaway or tipped power mobility devices. The specs for power chairs and scooters usually state a maximum incline of 8.7% for safe operation. Steeper inclines pose the risk of tipping (either forward or backward). The braking mechanism may also be inadequate on steeper slopes. I've also seen some homemade ramps with a 1:8 ratio where the power wheelchair or scooter did not make it up the ramp, even at full power."

AOTA recommends that when the construction of a 1:12 (8.3%) or better slope is feasible in any residential setting, the ramp must be constructed no steeper than 1:12. When not feasible due to site constraints that are unsolvable, only then would a steeper slope be allowed up to a maximum slope of 1:8. For most people a 1:8 (12.5%) slope is too steep and unsafe for walking or pushing a baby carriage, as well as propelling a wheelchair due to the greater risk of tipping or destabilizing the movement of the wheelchair.

AOTA requests that due consideration be given to this request. Should you have any questions or comments, please contact AOTA Staff member Chuck Willmarth at (301) 652-6611 extension 2019 or via email at cwillmarth@aota.org.

Public Comment 20:

Robert Zimmerman, State of Minnesota Rehabilitation Services Independent Living Program, representing Minnesota Ramp Project, requests Disapproval.

Commenter's Reason: I strongly urge you to disapprove the RB57-07/08 revision to the IRC (R311.6.1 Maximum Slope). Relaxing the code will jeopardize the safety of mobility device users, their families and anyone who visits their home. I have designed over 3,000 ramps for people in the Minneapolis/St Paul area and I know that relaxing the slope requirement will greatly increase the number of difficult to use and dangerous ramps that are built. Please go to www.wheelchairramp.org, click on the VIDEOS button and watch the 5 minute 20 second video "Design Considerations". This video shows a variety of people using a steep slope and a gentle slope. Videos speak louder than words and this video is compelling evidence that 1:8 slopes can not meet the ease of use and safety needs of most people who use mobility devices.

In 2000, the Disability Statistics Center at the University of California, San Francisco reported that "Just over 6.8 million community–resident Americans use assistive devices to help them with mobility". 1.7 million use a wheelchair or scooter and 6.1 million use of other mobility devices, such as canes, crutches and walkers. The report also states the majority of people using mobility devices are elderly. Maintaining the current code language for maximum slope provides a safe and easily usable standard for home access ramps for this large group of people.

The proponent states the IRC should not be more restrictive than the IBC regarding maximum ramp slope AND IT IS NOT. Both the IBC and IRC set a maximum slope of 1:12 for egress ramps and ramps for homes are almost always used for egress. It is not appropriate to use the IBC maximum slope requirement of 1:8 for indoor "other pedestrian ramps" and "assembly aisle walking surfaces" to justify a 1:8 slope for ramps at homes. Most egress ramps are built outside and need to be designed to be functional in a wide variety of weather conditions and they need to be designed to meet the needs of multiple users. Family, friends, pizza and mail delivery personnel will be using ramps at homes as well as the person who uses a mobility device. Relaxing the IRC slope code so it is consistent with IBC language for indoor ramps is unreasonable.

The committee agreed with the proposed change to 1:8 "because it provides a useful option in instances where space is restricted and a ramp is required." This "useful option" already exists in IRC R311.6.1 . Restricted space is one of the reasons it can be technically infeasible to build a 1:12 ramp. Changing the code is not necessary and doing so will change most people's perception of what is the right ramp to build for a home. I have designed thousands of ramps and I know the maximum slope requirement does not restrict people from building ramps with more gentle slopes. I also know that most people do not have the experience needed to make this subtle distinction. The code is seen as the "the right thing to do" and it is common for architects, designers and code officials to use the current 1:12 as the guideline to be followed. Changing the code to 1:8 will mean that anyone confronted with the sudden need to have a ramp at their home will be led to believe that a ramp with a 1:8 slope is right for them. Building contractors will confidently "build ramps to code" and be surprised by unhappy customers who struggle to use 1:8 slopes. Luckily for the contractor, the ramp is built to code so he has no further responsibility. Unluckily for the customer, they are stuck with a ramp that does not meet their needs.

The power of code language is illustrated in the proponent's RB101-06-07 attempt to revise the maximum slope requirement. He made the statement that "Since the exception would allow a 1:8 slope, it can only be assumed this slope is considered safe" Apparently all of the evidence he needed to prove that 1:8 slopes are safe is provided by the fact that 1:8 slopes are allowed as an exception in the code. Anyone seeking guidance to build a ramp at a home can be assured that 1:8 will be safe for them because it's in the code. The proponent's assumption of safety is not a valid basis to set a 1:8 slope requirement that will be seen as the right slope for ramps at homes.

People who are familiar with access needs know the reason for the exception to allow slopes steeper than 1:12 at homes is because 1:8 is usually safer than being carried up and down the steps to your home. 1:12 slopes are safe and easy to use for the large majority of people who use wheelchairs, but there are circumstances that require shorter ramps. The exception does not "prove 1:8 is "safe". The exception allows people to have a safer alternative to being carried and that that may be a ramp with a 1:11, 1:10, 1:9 or 1:8 slope. Code language can be a bit confusing, but that is not reason to set maximum 1:8 slope standard that will be interpreted by many as the right ramp to build.

People who have little or no knowledge of access needs easily dismiss the importance of proper slope and assume 1:8 is safe slope. They assume that because an electric wheelchair has the power to go up a 1:8 slope, it is "safe". Anyone with impaired balance using an electric wheelchair to go down a ramp is at far greater risk of slumping forward in their chair on a 1:8 ramp than on a 1:12 ramp. It is also assumed that having a helper propel the wheelchair on a 1:8 ramp makes it "safe". Risk to the person in the wheelchair is diminished, but the possibility of back injuries to the helper increases greatly. Walking on a 1:8 slope when it is dry can be "safe", but that slope is very treacherous if ¼" of snow has fallen on it. Safety for all users, in all conditions has to be considered and there is no doubt 1:12 slopes are safer than 1:8 slopes.

"People helping people build a safer world" is a wonderful motto. It is a helpful reminder that this issue is about people who happen to use mobility devices. They have the same right to safely and easily enter and leave their homes whenever they want for whatever reason they want. Going for a stroll with the grand kids, grabbing a cup of coffee with a friend, having friends over for a party, going to church and getting to work are important activities for everyone. Ramps that are too steep restrict those activities for people who use mobility devices. Physical safety is important, but ramps also affect mental health. The importance of knowing that you can safely and easily get out of your home, with out being dependent on anyone else can not be overestimated. It is the freedom we all deserve.

Please disapprove the RB57-07/08 revision to the IRC (R311.6.1 Maximum Slope) because millions of Americans should have the safety and ease of use created by the current code language that requires a maximum slope of 1 vertical in 12 horizontal.

Bibliography

"Designs Considerations" a five minute twenty second video showing people using two different ramps Available at www.wheelchairramp.org in the "video" section

" Mobility Device Use in the United States" Report 14 June 2000
Kaye, Kang and LaPlante
Disability Statistics Center University of California, San Francisco
Available at http://www.dsc.ucsf.edu/publication.php?pub id=2&section id=1

Final Action: AS AM AMPC____ D

RB61-07/08

R312.1, Figure R312.1 (New)

Proposed Change as Submitted:

Proponent: Michael G. Morse, Brookeville, MD, representing himself

1. Revise as follows:

R312.1 (Supp) Guards. Guards shall be provided on all decks, landings, porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below. Required guards shall not be less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads. Guard posts shall be installed as to meet or exceed the performance requirements stated in

Table R301.5 Minimum Uniformly Distributed Live Loads. The guard post connection shall be permitted to be installed in accordance with Figure R312.1(1). Each guard post shall be supported by a minimum of one approved lateral anchor. Lateral anchors shall be tested and approved as an assembly that shall meet the performance requirements of this code.

Porches and decks which are enclosed with insect screening shall be equipped with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

2. Add new figure as follows:

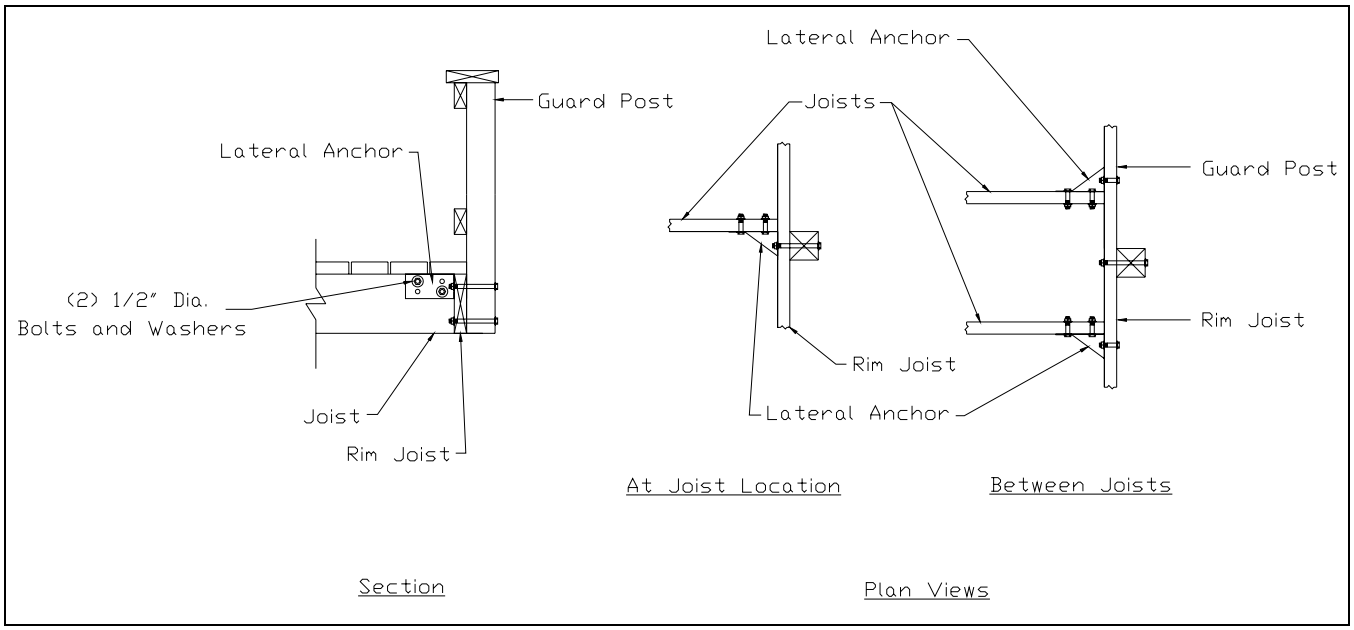


FIGURE R312.1
GUARDS

Reason: Failure of the deck guard system produces devastating injuries and places the public at tremendous risk. Conventional connection methods for attaching wood and composite guard posts to the deck have not tested to the code required loads. This connection weakness necessitates the development of a prescriptive detail to support existing guard performance code. Currently, the IRC does not show how to attach guard posts to decks. This purpose of this revision is to add a prescriptive detail for guard attachment.

Researchers at Virginia Tech University, Washington State University and numerous industry concerns have tested techniques for attaching guard posts to decks to quantify the load capacity of these assemblies. The testing also attempted to identify a connection detail that would provide consistent performance and would meet the current IRC live load requirement of 200lbs with a safety factor of 2.5. Current industry connection methods, as tested, failed to meet this load requirement.

Post attachment methods that rely on nails, screws, blocking, and bolts have been tested and have failed to meet the target load capacity. However, guard post assemblies that incorporate a lateral anchor have consistently achieved results that met or exceeded the target load values as established by the ICC. Lateral anchors have been shown to effectively transfer load and the associated moment to the deck floor joists. This code revision prescribes a method of post-to-deck attachment that will provide guard systems the capacity to meet or exceed code prescribed performance levels.

Bibliography:

1, M. Morse, D. Walsh, 2005. Alternative Hardware for Guardrail to Post Connection, Professional Deck Builder, Vol. 4, (2). 51,59
2. M. Morse, B. Corwin, R. Morse, A. Johnson, 2007. Safety Alert: Study Reveals Sharp Increase in Deck Failures, ICC Safe
3. R. Tichy, 2005. Wood Materials and Engineering Laboratory Report No. WMEL 07-019, Washington State University
4. J. Loferski, F. Woeste, D. Albright, 2005. Load Tested Guardrail Post Connections, Professional Deck Builder, Vol. 4, (2). 48-50,52-56

Cost Impact: The code change proposal will increase the cost of construction. Since the use of lateral anchors will increase the load capacity of the guard system, fewer posts will be required. Therefore, the cost of the lateral anchors and hardware will be offset by the reduction in the number of posts and by the reduced labor costs associated with installing fewer posts.

Committee Action: **Disapproved**

Committee Reason: The committee indicated that certain materials, means and methods of construction would be eliminated if this proposal passed. Further, the committee felt that both parallel and perpendicular systems need to be addressed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Michael G. Morse, Brookeville, MD, representing himself, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R312.1 (Supp) Guards. Guards shall be provided on all decks, landings, porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below. Required guards shall not be less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads. ~~Guard posts shall be installed as to meet or exceed the performance requirements stated in Table R301.5 Minimum Uniformly Distributed Live Loads. The guard post connection shall be permitted to be installed in accordance with Figure R312.1(1). Each guard post shall be supported by a minimum of one approved lateral anchor. Lateral anchors shall be tested and approved as an assembly that shall meet the performance requirements of this code.~~ The guard connection shall be permitted to be installed in accordance with Figure R312.1.

Porches and decks which are enclosed with insect screening shall be equipped with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

Delete proposed Figure R312.1 and replace with new Figure R312.1 as follows:

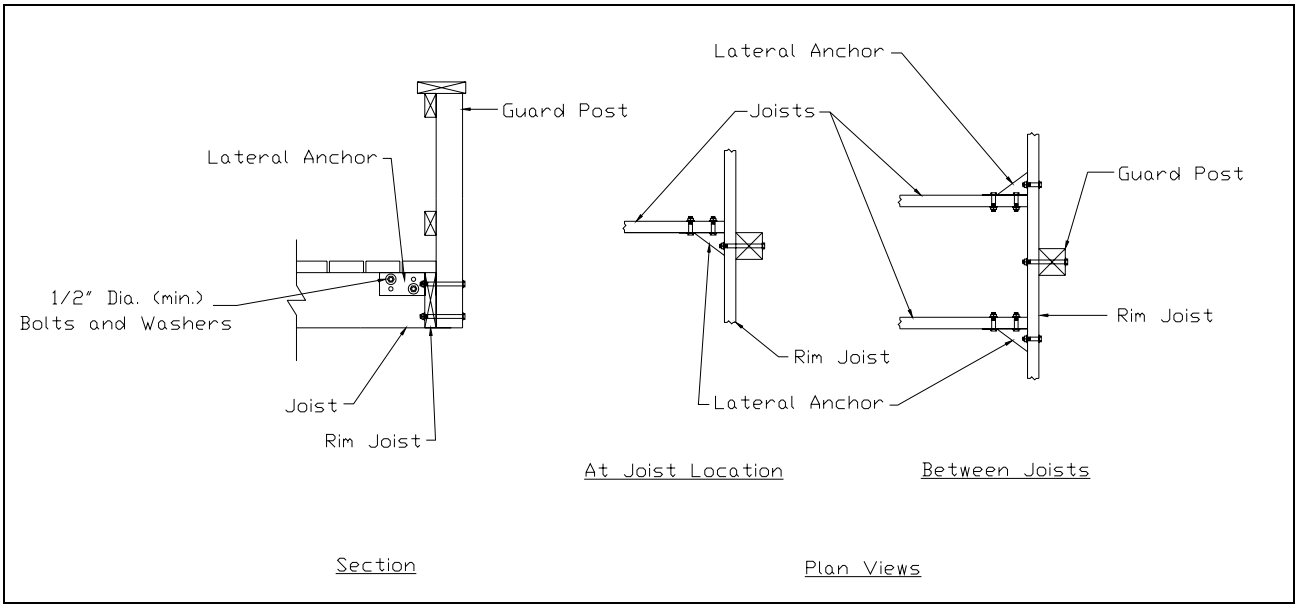


FIGURE R312.1
GUARD CONNECTION DETAIL

Commenter's Reason: At the 2007/2008 Code Development Hearings in Palm Springs, the IRC Building/Energy Code Committee heard testimony on proposal RB61. While the proposal was not accepted, there was recognition that a code change was needed to provide prescriptive guidance for the connection of guards. This public comment is written to address the concerns to RB61 as follows:

- ***RB61 refers to a proprietary product rather than describing a generic prescriptive construction detail.*** **This public comment includes a figure that includes a generic lateral anchor. Any similar device may be used to provide the lateral resistance for the guard post.**
- ***RB61 provided details for attaching a post in only one scenario; more scenarios should be included.*** **The figure in this public comment includes several scenarios for attaching the post.**
- ***RB61 limits the attachment of a guard system to only one method. Alternative construction methods and materials are excluded.*** **This public comment allows for unlimited variation of materials and construction techniques to attach guards to structures. This public comment does not change current code performance requirements. Any attachment method or alternative material that is currently allowable would remain allowable. The purpose of this public comment is to detail one code compliant connection method.**
- ***RB61 included reference to Table R301.5 which is redundant and unnecessary*****. This public comment omits specific reference to this table.**

Public Comment 2:

Randall Shackelford, PE, Simpson Strong Tie Company, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

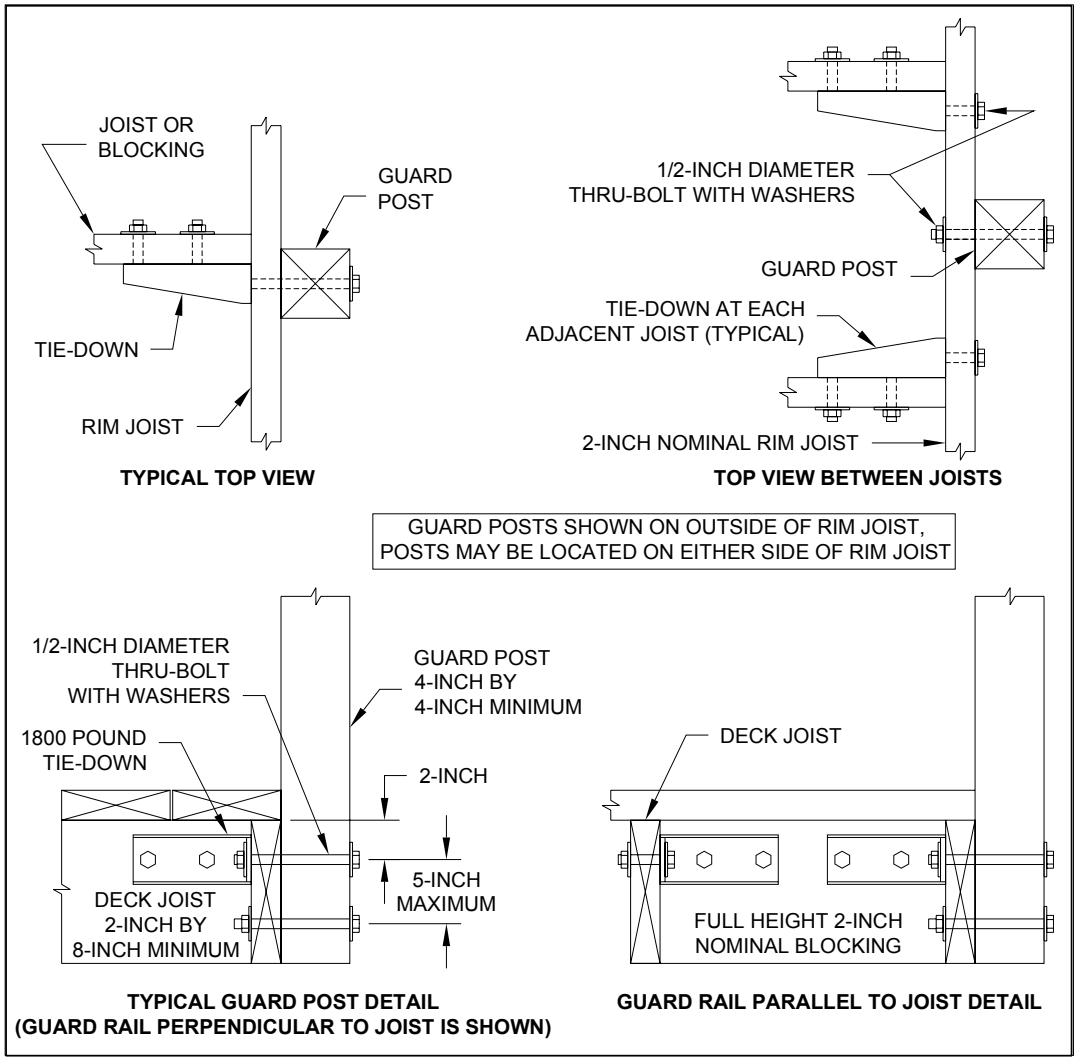
R312.1 (Supp) Guards. Guards shall be provided on all decks, landings, porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below. Required guards shall not be less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured

vertically from the nosing of the treads. ~~Guard posts shall be installed as to meet or exceed the performance requirements stated in Table R301.5 Minimum Uniformly Distributed Live Loads. The guard post connection shall be permitted to be installed in accordance with Figure R312.1(1). Each guard post shall be supported by a minimum of one approved lateral anchor. Lateral anchors shall be tested and approved as an assembly that shall meet the performance requirements of this code.~~ Guard posts shall resist the live loads listed in Table R301.5 for guardrails and handrails in accordance with one of the following:

1. Deck guard post installed in accordance with Figure R312.1.
2. Deck guard post shall be a minimum 4-inch by 4-inch (102 mm by 102 mm) nominal wood post that is continuous from the guard rail to the footing. A 4-inch by 4-inch (102 mm by 102 mm) nominal post may not be notched, a 6-inch by 6-inch (152 mm by 152 mm) nominal post may be notched a maximum of 3 inches (76 mm) in depth. The post shall be restrained to prevent lateral displacement at the deck and the footing.
3. Installed in accordance with manufacturers' installation instructions approved by the building official.
4. Alternative design or method of construction approved by the building official. The design shall be in accordance with accepted engineering practice.

Porches and decks which are enclosed with insect screening shall be equipped with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

Delete proposed Figure R312.1 and replace with new Figure R312.1 as follows:



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

FIGURE R312.1
GUARD POST TO DECK JOIST ASSEMBLY

Commenter's Reason: During consideration of RB61 in Palm Springs, the IRC Building/Energy Code Committee and those testifying both in favor and opposition agreed that a code change to provide safe guard rails is needed. The IRC is supposed to be a prescriptive code, and it contained no prescriptive suggestions on how to construct a guard post assembly that meets the performance requirements of Table R301.5. Common construction methods had been tested as shown in the proponent's bibliography. This testing showed that common methods do not resist the required load. The original proponent proposed one specific method that had been tested and shown to safely support the code required loads.

However it was determined that RB61 had too many problems and should be fixed in the public comment phase. This public comment addresses the three concerns voiced at the hearings:

1. *RB61 provides only one solution and may eliminate certain materials and alternate means and methods*: This PC lists two prescriptive solutions as well as manufacturers' solutions, approved alternate methods, and engineered designs.
2. *RB61 provides a prescriptive solution only when the guardrail was perpendicular to the joists*: This PC provides details for both parallel and perpendicular to joist orientations as well as guard posts that are between joists or on the inside of the rim joist.
3. *RB61 requires a proprietary product and does not indicate what performance criterion is required for this application. Proprietary products can be evaluated as alternate means and methods and do not belong in a prescriptive code*: This PC permits any tie-down that meets a minimum capacity that is derived from static equations. The tie-down reference is similar to those used elsewhere in the IRC. The details included in this PC are consistent with the recommended details in the AF&PA/ICC *Prescriptive Residential Deck Construction Guide*. Prescriptive method 2 (continuous post) permits guard post construction without hardware. The 4x4 and notched 6x6 sizes are sufficient to resist the bending forces due to the 200 pound point load. The "restrained to prevent lateral displacement" language is consistent with existing language in R401.3 for columns.

This public comment provides several options to construct a guardrail to meet the 200 pound load that the IRC has always required but not prescribed a method to do so. These proven methods of construction result in safer deck guard systems.

Public Comment 3:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufacturers Association, requests Disapproval.

Commenter's Reason: This proposal does not account for other well-known methods of attachment of guards to structures. This proposal would be overly restrictive, as would be any modifications of it that do not deal with all the possible methods of attachment of guards to structures and the materials used. It would affect both interior and exterior applications. Furthermore this proposal shows only one solution for the mounting of 4 x 4 solid wood posts on deck structures based on limited testing of the same and restricts other possible methods and hardware options. It also requires the use of posts in all guards effectively eliminating guards that might transfer loads through the top rail or through the balusters. The substantiation for the change further misrepresents the structural performance requirements for guard ***systems*** to transfer live loads to the structure. This would allow a possible post in compliance but failure of the guard system. It is therefore impossible to conceive that the guard system will comply if a particular piece of hardware is used to mount but one element of the guard system. The issue here is one of changing the way wood decks are framed and whether or not that is needed as that is all that the supporting evidence relates. This is not an issue that requires restriction of guard design or post attachment or the possible limitation of materials. Please support the committee's decision to disapprove.

Public Comment 4:

Diana Hanson, North American Deck and Railing Association, Inc. (NADRA), representing NADRA Codes and Standards Committee, requests Disapproval.

Commenter's Reason: R312.1

As relates to Guards, the intent of Table R301.5 Minimum Uniformly Distributed Live Loads is to prescribe load resistance for a Guard, which is defined in the IRC to be "a building component or a system of components". RB61 does not factor in the other design elements of construction that lend strength and stability to a guard system of which a "guard post" is only one component. RB61 only addresses performance of one aspect of a guard system, to the neglect of attaching members and/or infill between or across posts. No one component of a guard system is expected to meet the load resistance required by the Table on its own. [See References 1, 2]

Further, not all guard systems contain the "guard posts" referred to by RB61. By singling out one *potential* component of a guard system, and then further limiting it in size to a 4 x 4 post, RB61 narrows the definition of what a guard may be, to the exclusion of other equally recognized methods of construction. [See References 3, 4]

Figure 312.1

The proposed Figure 312.1 adds needless complexity to the code, its enforcement, and application and is potentially prone to misinterpretation. Experience shows such figures have a propensity for taking precedent over actual code language, resulting in commonly accepted construction practices being overlooked, and onerous methods being mistakenly understood to be required by both the contractor and the code official, raising likelihood of increased costs to both materials and labor. [See References 3, 4]

References:

1. IRC 2006, R202, Definitions. "Guard. *A building component or a system of building components* located near the open sides of elevated walking surfaces that minimizes the possibility of a fall from the walking surface to the lower level." *[Emphasis added]*
2. IRC 2006 as modified by 2007 Supplement - Table 301.5 now reads *in pertinent part*:

TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
Balconies (exterior) and decks[e]	40
Guardrails and handrails[d]	200[i]
Guardrails and in-fill components[f]	50[i]

d. A single concentrated load applied in any direction at any point along the top.
e. See Section R502.2.2 for decks attached to exterior walls.
f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.
i. Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

3. IRC 2006, Preface, Development, Page iii, 3rd paragraph "This code is founded on principles intended to establish provisions consistent with the scope of a residential code that adequately protects public health, safety and welfare; *provisions that do not unnecessarily increase construction costs*; provisions that do not restrict the use of new materials, products or methods of construction; and *provisions that do not give preferential treatment to particular types or classes of materials, products or methods of construction." [Emphasis added]*
4. IRC 2006, R101.3 Purpose. "The purpose of this code is *to provide minimum requirements* to safeguard the public safety, health and general welfare through affordability, structural strength, means of egress facilities, stability, sanitation, light and ventilation, energy conservation and safety to life and property from fire and other hazards attributed to the built environment. *[Emphasis added]*

Final Action: AS AM AMPC____ D

RB62-07/08
R313.1 (New), Appendix P, Chapter 43

Proposed Change as Submitted:

Proponent: Sandra Stanek, Fire Code Consultants LLC, representing herself; John C. Dean, National Association of State Fire Marshals (NASFM)

1. Add new text as follows:

SECTION R313
~~SMOKE ALARMS~~ FIRE SPRINKLER SYSTEMS

R313.1 General. An approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings and townhouses in accordance with NFPA 13D.

(Renumber subsequent sections)

2. Delete appendix without substitution:

~~APPENDIX P~~
~~FIRE SPRINKLER SYSTEM~~

~~*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 903.3.1 of the *International Building Code*.~~

3. Add standard to Chapter 43 as follows:

NFPA
13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason (Stanek): All new houses should have fire sprinklers. The majority of the members attending the Rochester ROC meeting in May 07 were in favor of residential sprinklers in all new one & two family dwellings. I believe the will of the majority of ICC members as shown in Rochester should be upheld.

There are many reasons why NOW is the time to change the IRC and establish residential sprinklers as part of the minimum safety package set forth in the national model code for residential construction. Substantial justification was offered last cycle, and additional substantiation is offered in this proposal, primarily focusing on the issues raised in opposition.

1. System freeze-ups in cold climates: Opponents of residential sprinklers assert that system freeze-ups will cause problems in cold climates. However, a sprinkler system poses no greater risk of freezing than domestic plumbing if the system is properly designed and installed. Freeze-ups result from design or installation errors that can occur with any plumbing system, and it is incorrect to suggest that sprinkler systems in cold climates are predisposed to freezing. In fact, on the contrary, there are many jurisdictions with severely freezing climates that have adopted residential sprinkler ordinances, which would surely have been repealed if freezing problems were widespread. This simply hasn't happened. There are many options available to sprinkler homes in freezing climates to combat the risks of frozen piping. These include, among others:

- Using sidewall sprinklers supplied by pipes running in walls, soffits, closets and crawl spaces to keep sprinkler piping out of unheated attics, or
- Properly installing piping beneath the insulation in attics to protect the piping from the unheated attic space. This technique has been used in climates as cold as Wrangle, Alaska to successfully sprinkler single family homes.

The Residential Fire Safety Institute documents that hundreds of jurisdictions in at least 25 states have adopted residential sprinkler legislation, including mountainous states and Northern states ranging from New York to Alaska. In addition, sprinkler systems are required in all residential occupancies governed by the IBC, which include group homes and townhouses exceeding 3-stories in height. The bottom line is that residential sprinkler systems have been installed in homes located in freezing climates for many years, and if freeze concerns are being addressed in these cases, as they must be, then homes sprinklered in accordance with the IRC can and will be handled in the same manner.

2. Cost impact of inflated water tap fees: Opponents of residential sprinklers argue that sprinklers costs will skyrocket in jurisdictions where local water purveyors inflate the cost of larger water taps. Obviously, this is not a building code issue, and local fees should not serve as an impediment to national policy established by the IRC. Nevertheless, an experienced designer can avoid the use of a larger meter, and associated fee increases, by applying alternative design approaches that are already permitted by NFPA 13D. Such alternatives include:

- Using reduced sprinkler spacing in rooms protected by more than one sprinkler. UL listed sprinklers are already on the market for reduced spacing that only require 9 gpm per sprinkler. Given that NFPA 13D requires that a maximum of two sprinklers be calculated for dwelling systems, this yields a total demand of 18 gpm, which can be supplied by many municipal systems using a standard 5/8-inch meter. With this design approach, extended coverage sprinklers can still be used in rooms requiring only a single sprinkler. Although this design approach may not be the best choice for every case, it is particularly suited to smaller homes at the entry/affordable housing level.
- If the tap fees for larger supplies are substantially out of line, there is always an option available to install a small tank/pump system supplied by a standard size water tap. Obviously, this option comes with its own associated cost, but it does provide an upper limit to the potential impact of high tap fees.

The options listed above are available today, and they meet NFPA 13D. Obviously, the most effective approach to fighting unfairly high tap fees is to encourage that the fees be reduced when increased meter sizes are being used to support the installation of a fire sprinkler system. Mandating sprinklers will put builders and code officials on the same side of this issue, trying to get affordable sprinklers, rather than arguing over whether sprinklers should be provided. The home building industry could be using its powerful political contacts to reduce the costs of tap fees rather than resisting the efforts to install fire sprinklers.

For such an effort to be successful, water purveyors will need to understand that increasing meter/tap sizes to supply residential sprinklers does not increase the demand on a public water system. On the contrary, residential sprinklers actually reduce demand because sprinklers only flow water when a fire occurs, and the amount of water used by a residential fire sprinkler system is only a fraction of what firefighters use to extinguish fires in unsprinklered properties. This argument has already successfully resolved tap fee issues in some jurisdictions.

3. Cost of sprinklers and impact on affordable housing. Before specifically addressing the cost of sprinklers, there is a basic question that has to be asked when it comes to the price of housing in America, "What drives the price of a new home?" In many markets, the answer to this question is not "construction costs." Instead, prices are established based on an analysis of what the market will bear. In these markets, sales prices will continue to rise as long as there are buyers who are willing to pay the asking price, and in these markets, it would be disingenuous, at best, to suggest that the cost of fire sprinklers would price buyers out of the market.

In other segments of the home building industry, new home pricing does follow the "cost plus" model, and in these cases, the added cost of a sprinkler system is an important consideration. Such costs will be a function of many variables, including but not limited to, the availability of a public water supply, the size of the home, the level of competition in the local market, the design approach, the climate and enhancements that may be desired by the owner, such as custom colored cover plates for sprinklers.

One source of cost data associated with the widespread installation of residential sprinklers is available from Scottsdale, Arizona. Scottsdale, which became one of the first major U.S. jurisdictions to require residential sprinklers roughly 20 years ago, serves as an excellent demonstration case to show the effects of a community's decision to require residential sprinklers on system cost, life safety, property protection and the local fire-protection infrastructure. With respect to cost, residential sprinkler systems in Scottsdale were recently quoted as costing $0.55 to $0.75 per square foot, and there are now well over 40,000 sprinklered homes in the city. No one is suggesting that every other jurisdiction where residential sprinklers are required will match Scottsdale's cost structure, but Scottsdale's experience clearly demonstrates that a competitive marketplace greatly reduces sprinkler costs.

Technology, creative design approaches and labor charges also impact these costs. Multipurpose systems, which are already permitted by NFPA 13D, have been shown to be particularly well suited to certain types of homes because they add minimal cost to the plumbing installation. Recent surveys of sprinkler costs for affordable homes in the 1,000 to 1,200 square foot range showed that the added cost of materials related to sprinkler protection was in the $0.25 to 0.30 per square foot range, and the sprinkler installation required less than 8 hours of additional labor. While no cost increase is inconsequential when dealing with affordable housing, the significant fire safety benefits gained by installing sprinklers for such a small cost (in the $4/month range on a 30-year mortgage, not including any insurance or tax credit) certainly appears to be money well invested.

With respect to the cost of sprinklers in larger homes, the actual impact of sprinkler costs on the owner's monthly payment isn't much different. Figuring the cost of a hypothetical $3,000 sprinkler system in a $300,000 home with a 6.5% mortgage, a 5% credit on a $2,000/year insurance bill, and a combined Federal/State income tax rate of 33%; the net cost of fire sprinklers, after mortgage related tax deductions, would be $4.37 per month. This represents a 0.23% increase in the monthly payment and roughly equates to the cost of a premium beverage at Starbucks. The total cost on an annual basis would be $52.44, which would easily be offset by insurance reductions.

With all of the foregoing information in mind, it seems fair to say that the true impact on the housing market associated with requiring residential sprinklers will be far less than what opponents of residential sprinklers would like code officials to believe. It has been demonstrated many times in the many jurisdictions throughout the country where residential sprinklers are required that housing markets are not affected by fire sprinklers. These local experiences show us that, once the IRC requires residential sprinklers, home building will continue as it always has. Home prices will fluctuate based on the law of supply and demand; home builders will adjust their products to meet consumer preferences and trends; and home buyers will continue to buy homes.

For a full cost/benefit analysis of the impact of sprinklers on society, see the article, "Cost/Benefit to Society for Having Sprinklers in One and Two Family Dwellings – A Pessimistic Analysis", written by Kenneth E. Isman, P.E. for *SQ Magazine* in the Fall 2005 issue. It should be noted that the article is not designed to show what the fire sprinkler industry thinks will happen if all one and two family dwellings are sprinklered. Instead, the article was written to show that sprinklers still make sense, from a cost/benefit perspective, even if all of the pessimistic assumptions of the homebuilders are correct such as the assumption that fires only occur in older homes. If a more realistic approach is taken, then the benefits for fire sprinklers far outweigh the costs.

4. Does the public want residential sprinklers? Opponents of residential sprinklers have suggested that the general public, which isn't well represented at code hearings, would oppose residential sprinklers, but a recent national poll conducted by Harris Interactive indicates that this claim misrepresents public opinion. The survey of over 1,000 adults revealed that:

- 45% of homeowners said that a sprinklered home is more desirable than an unsprinklered home,
- 69% of homeowners said that having a fire sprinkler system increases the value of a home, and
- 38% of homeowners said that they would be more likely to purchase a home with fire sprinklers than without. The reason that this number isn't higher appears largely tied to an unfounded fear of water damage. 48% of homeowners cited water damage as the reason they would not want to install a sprinkler system. Clearly, this indicates a need for public education on the operation and reliability of sprinkler systems as being a major component in enhancing public support and demand for sprinklers.

The results of this survey support the assertion that the general public has become aware of and has warmed up to the concept of residential sprinklers. Certainly, this is due, at least in part, to the fact that many homeowners live in multifamily occupancies before they own a one- or two-family dwelling. Now that the IBC requires all new multi-family dwellings to be sprinklered, it is fair to say that the home-buying public will continue to become more familiar with residential sprinklers and that public support for residential fire sprinkler systems will continue to grow.

5. Correlation between a home's age and fire risk…aren't homes built to the IRC already safe enough? Opponents of residential sprinklers would like to convince us that residential fire deaths are a function of a home's age and that new homes, built in accordance with the IRC, are safe. Many people buy these arguments because, on the surface, they seem to make sense. However, further analysis paints a different picture.

First, most residential fires deaths result from fires caused directly or indirectly by people. Compliance with the IRC doesn't prevent these types of fires or many other common fire causes, and once a fire starts, compliance with the IRC will not slow its spread. The speed by which a fire spreads in a home is instead a function of contents and room geometry.

Second, a simplistic correlation of residential fire deaths with the age of homes ignores several variables that tend to vary based on the age of a home. These include the socioeconomic status of the occupants, the density of occupants, the age of the occupants, and the presence or omission of smoke detectors (discussed separately below), among others. Fire safety experts know that these factors are far more likely to be contributory factors in fire deaths than the age of a structure. In addition, the fact that more fire deaths occur in "older" homes than newer homes may also be related to the fact that the median age of homes in the U.S., according to a recent HUD study, is 32 years. By sheer numbers, a lot of people live in older homes.

6. Since only a small percentage of fire department responses are for actual structure fires, does the fire service really need residential sprinklers? With respect to residential fire losses, the statistics submitted with last cycle's proposal clearly demonstrated the scope and magnitude of the residential fire problem in the United States. Although the percentage of emergency responses to residential structure fires is a small fraction of overall fire department responses, a shocking 45 percent of firefighter deaths that occur on the fire ground occur at residential occupancies, almost always 1- and 2-family dwellings. Dwelling fires have three characteristics that present disproportionate risks as compared to fires in other occupancies:

- First, they are typically well developed, post-flashover fires by the time the fire department arrives.
- Second, they often occur at night, and
- Third, they often involve a real or perceived need to perform search and rescue operations.

In short, dwelling fires represent a small percentage of our emergency responses but account for a very large percentage of firefighters who are killed in the line of duty.

It is also important to point out that the ability of the fire service to protect our communities by responding to residential fires has declined significantly in recent years, and the situation isn't getting better. The public has a relatively simple expectation with respect to the fire department when a fire happens…they call 911, and the fire department responds to rescue trapped occupants and put out the fire. Unfortunately, that expectation isn't being effectively met in many parts of the country because of dwindling resources.

Nationally, volunteer firefighters, who comprise 73% of the American fire service and protect the vast majority of the geographic area of the United States, are becoming harder and harder to retain. In New York alone, the ranks of volunteer firefighters have declined from 110,000 in the early 1990s to approximately 85,000 today. Considering that all-volunteer fire departments protect 95% of New York communities with a population of less than 10,000, what will happen when there are no longer enough firefighters to respond to 911 calls? This situation is national. It is not unique to New York.

Long after many home builders leave a community, the homes that they leave behind and the people who live in them continue to place demands on the fire service. While the fire service will always strive to meet those demands, it is unrealistic to expect that our volunteers will always be able to do so. Therefore, the fire services' message is simple…if the public is going to be protected from home fires; it's time that we build that protection into new construction.

7. Aren't smoke alarms enough? Homebuilders often suggest that smoke alarms are good enough to protect the public and that residential sprinklers aren't justified. Everyone can agree that smoke alarms save lives and that they are largely responsible for a reduction in the fire death rates that occurred over the past 30 years. Nevertheless, smoke alarms on their own do nothing to stop the spread of fire, protect property or protect firefighters.

Two other issues related to reliance on smoke alarms are of concern. First, as smoke alarms age, their reliability declines. This concern prompted smoke alarm manufacturers and testing laboratories to begin stamping an expiration date on each unit indicating a 10-year replacement cycle. How many alarms will actually be replaced at 10-year intervals, and what will happen to the reliability of alarms that are not replaced? Although an estimated 96% of U.S. homes with telephones now have at least one smoke alarm, in ¼ of reported fires in smoke alarm equipped homes, the devices didn't work.

The second issue related to the effectiveness of smoke alarms in further reducing fire death rates has to do with their performance and waking effectiveness. In a study that was just completed in 2006, only 58% of a test group of children ages 6-12 awakened when a standard smoke alarm sounded, and only 38% of the test group successfully evacuated. The median time to awaken was 3 minutes, and the median time to escape was the maximum allowed 5 minutes.

Another study revealed that a surprising 34% of fire deaths in one- and two-family dwellings during the 2000-2004 period occurred in homes with a working smoke detector. Perhaps this statistic correlates with the fact that fire death rates for the young and the elderly, those who are least likely to be capable of self-preservation even if they are awakened by a smoke detector, are roughly double those for individuals in the central age group. Smoke detectors are good, but they can only go so far in reducing the nation's fire death and injury rates. We need residential sprinklers.

8. What about homes without a public water supply? Opponents of residential sprinklers have suggested that it is impractical and too expensive to require sprinklers in homes that will use a well as the water supply. However, design options are available that make wells a viable water supply for both sprinklers and domestic service. Wells essentially fall into two categories, deep and shallow. With a shallow well, the well will likely be designed to provide a direct feed to the home, with no intervening tank. With these types of systems, pumps can be selected at reasonable costs that are capable of supplying both the domestic and sprinkler demands. Constant pressure, variable speed pumps are an excellent choice for this type of application.

One question that is frequently raised with respect to direct feed well systems involves the "recharge" rate, or the rate at which water can keep up with the required flow. Wells may not be capable of keeping up with the demand associated with a sprinkler system, which will typically be 20 gallons per minute or more. Many automatically assume that a tank and a secondary pump are necessary in these cases, greatly increasing the cost of the sprinkler system, but a lesser known yet simple approach called "developing the well" is a much better solution.

Developing a well essentially creates an underground cistern that replaces the need for a tank. The approach involves digging the well substantially below the water table and allowing the hole to fill with water, retaining the needed capacity underground. By using an appropriate pump with a developed well, an interior tank and pump arrangement can be avoided, and the water supply costs can be limited.

For deeper wells, there are two options. First, there are constant pressure, variable speed pumps suited for these applications. For installations utilizing this approach, a "developed well" as described above can also be used to accommodate needed water retention to satisfy the sprinkler demand.

The second alternative involves a tank and pump, which can be installed between the well pump and the plumbing system. This approach is the common arrangement utilized for deep wells supplying domestic service. To supply sprinklers simply requires that the size of the domestic supply tank be increased to something in the range of 200-300 gallons, and the secondary pump needs to have an increased flow rating. Both of these enhancements can be made at modest cost.

Some have suggested that the IRC should not require homes on wells to have fire sprinklers, yet homes in rural areas, usually corresponding to homes served by wells, are the homes that are least likely to survive a fire because of long or inadequate responses by the fire service. The solution is instead educating contractors on cost-efficient design options for well systems.

9. Impact of residential sprinklers on public and private water systems: It was suggested by one builder last cycle that the operation of residential sprinklers connected to a small water system resulted in the jurisdiction having to drain and decontaminate the entire water system. Subsequent identification and review of the cited event revealed that the concern regarding contamination of the water supply, which was a private system, was linked to the use of fire hydrants during suppression activities, not the sprinkler system. This clearly makes more sense, and for the record, the fire actually started outside of this building, spread to the interior, and sprinklers still helped to stop the fire's progress.

To suggest that the water demand caused by operation of a one- or two-family dwelling or townhouse sprinkler system will lead to contamination of an entire community water system is absurd and demonstrates a complete lack of understanding regarding residential sprinkler systems. The same logic would suggest that a single broken residential pipe, which would flow more water than operating sprinklers, would have the same result. Any water system that is this feeble has much bigger concerns than residential sprinklers.

The truth is that residential sprinklers actually result in a significantly decreased demand on water systems because residential sprinklers use far less water than firefighters to extinguish a fire. Scottsdale, Arizona's experience provides data to support this claim. Scottsdale found that the average estimated sprinkler flow per residential fire incident was 341 gallons, as compared to an estimated manual suppression flow for unsprinklered residential fire incidents of 2,935 gallons.

10. Wait for more cost-effective approaches to residential sprinkler protection before adopting a requirement in the IRC. Opponents of residential sprinklers suggest that we should hold off on requiring such systems in dwellings until improvements in technology make the systems more cost effective. The truth is that many recent improvements in sprinkler technology have largely improved cost effectiveness already. The real problem isn't a lack of cost effective design and installation options.

Instead, the problem appears to stem from a lack of communication within the supply, design and installation communities regarding these efficient design options and the fact that momentum often drives us to continue doing things the way we've done them in the past. To drive the industry toward more innovative solutions, more competition is needed, and changing the IRC to require residential sprinklers will create the demand that will increase competition and motivate cost efficient designs.

Market demand will also drive the creation of design tools that will simplify the exercises of locating sprinklers and sizing pipe. These tools, which will present design requirements in prescriptive, cookbook formats, have already been developed, and are being used in communities like Prince Georges County, Maryland, with a great deal of success for well over ten years. It is expected that they can easily become national in scope as more communities adopt the IRC.

11. Required maintenance: Opponents of residential sprinklers have stated that residential sprinkler systems need regular maintenance and questioned who would perform this service. Someone suggested that local fire departments will have to perform or verify maintenance, potentially raising concerns regarding right of entry.

The fact is that residential sprinkler systems are essentially maintenance free. The owner just needs to be taught what NOT to do. Don't close the valve, don't paint the sprinklers and don't hang clothes from sprinklers. Multipurpose systems are essentially tested every time the domestic water is used. For systems with water flow alarms (not required by NFPA 13D, but installed on some systems) the alarm can easily be tested by the homeowner by turning a valve to create some flow and seeing if the alarm sounds. The test is hardly rocket science and is no more complicated than testing a burglar alarm or replacing a furnace filter, operations that homeowners perform regularly. None of this maintenance would need to be performed or witnessed by the fire department.

12. Trained labor/inspectors: Opponents of residential sprinklers have suggested that, if the IRC were to require residential sprinklers, there would be a shortage of trained labor and trained inspectors to install and inspect these systems. This subject is not a legitimate concern. The fire sprinkler industry has always responded to the increased demand created by code requirements. In the seven years between 1992 and 1999, the fire sprinkler industry doubled in size (going from approximately 20 million sprinklers installed each year to 40 million sprinklers installed). During this time, the industry kept pace with demand, adding additional people to the labor force. There is no doubt that the sprinkler industry can continue to respond to the increase in demand. Once the IRC has been revised, it will take several years for jurisdictions to begin to adopt and enforce the 2009 edition. Some jurisdictions will not choose to adopt the sprinkler requirements, so the impact on the industry will be gradual. There is no question that the demand will be met by the industry as the IRC is changed, adopted and implemented at the local level.

Preliminary discussions have already taken place with the ICC and other certification bodies regarding the possibility of having specific certification programs for installers of residential sprinkler systems and local inspectors that would review and approve the installations. Training programs are underway to take people with a general knowledge of pipe fitting and teach them the additional important requirements for residential fire sprinkler systems, so that all of the installations meet NFPA 13D.

13. Leakage and mold damage: Opponents of residential sprinklers have expressed fear that sprinklers would leak and cause mold damage, which could make a home uninsurable. In response, it should be pointed out that residential sprinkler systems are no different than residential plumbing. If quality products are used and the system is properly installed, it won't leak.

With respect to sprinkler systems, sprinkler piping and fittings, and sprinklers themselves, are subject to rigorous testing to ensure quality. Unquestionably, sprinklers are far higher quality and more thoroughly tested than domestic piping and fixtures. Sprinkler tests required for listing include, among other requirements, a 700 psi hydrostatic strength test, a 500 psi leakage resistance test, a 100,000 cycle water hammer resistance test, a 35-125°F temperature cycling test, and a freeze performance test to -20°F for 24 hours. Also, sprinkler piping and components are rated for a pressure of 175 psi, while plumbing water supply systems are rated for only 80 psi.

14. Appendix P, good enough for now? Opponents of residential sprinklers have suggested that the IRC Appendix P is fairly new and that we should wait to see what happens with it. Unfortunately, this dodges the issues at hand.

When a local jurisdiction goes to adopt Appendix P, the first statement that the local homebuilders make during the hearings is, "Appendix P isn't necessary or important. After all, if sprinklers were really necessary, they would have put them in the body of the code rather than the Appendix." So, the homebuilders end up playing both sides of the fence. At the IRC hearings, they point to Appendix P and use that as justification to keep the requirements for sprinklers out of the code. Then, at the local hearings, they point to the fact that the requirements are in the Appendix as a reason not to mandate sprinklers.

Another reason that we need sprinklers in the body of the standard rather than the Appendix is that the benefits to society become significantly greater when all homes are sprinklered. With the rule in the Appendix, there will be some jurisdictions that don't pass the requirement, leaving these communities unprotected and the public will not be able to reap the benefits (in fact, they may never even know what they are missing). But with the requirements in the body of the IRC, people may debate removing them when they adopt the IRC, but at least they will have some sense of what they are losing.

A third reason that we need the requirements for sprinklers in the body of the IRC rather than the Appendix is that the fire service and the fire sprinkler industry can't bring experts to the debate in every local jurisdiction. There are tens of thousands of jurisdictions where this debate might occur and the homebuilders are going to have their local representatives loaded for these hearings. The fire service and the fire sprinkler industry just don't have the money or the personnel to compete with the homebuilders on a dollar-for-dollar basis. The debate as to the right level of fire protection for a home should be at the national level, with all of the national experts. The right decision (to put sprinklers in homes) should be done at the national level in the body of the code. Then, if people want to modify the code at the local level and take sprinklers out, they do so at their own peril and without the recommendations of the national experts.

Putting the sprinkler requirement into the body of the IRC certainly won't end the local debate, but it will at least put the burden on the home building industry to justify making an amendment to take sprinklers out. Other codes including the Uniform Fire Code, the NFPA Building Code and the Life Safety Code have already set a moral precedent by adding mandatory dwelling sprinkler requirements in their 2006 editions. The IBC and IFC have also done their parts by now requiring all residential occupancies within their respective scopes to be protected by fire sprinklers. Now it is time for the IRC to catch up.

Conclusion: Unlike many issues that we face at code hearings, THIS change strikes directly at the heart of America's fire problem. Opponents of residential sprinklers have a record of fighting just about every initial effort to improve dwelling safety. The same groups initially fought against smoke detectors, ground fault interrupters and mandatory sprinklers in multi-family residential occupancies. On each of these topics, code officials heard the same predictions of gloom and doom, but once the codes moved forward to require these features, the home building industry proceeded without so much as a detectible bump in the road. As years passed, prices for all of these features declined, some dramatically, and technology advanced to create better, yet less expensive products.

Reason (Dean): The life safety hazards in one- and two-family occupancies are clear: Between the years of 2000 and 2004 there was an average of 375,200 reported home structure fires resulting in 2,970 civilian deaths, 14,390 civilian injuries and $5.6 billion dollars in direct property damage per year[i] These losses and deaths far exceed any of the other occupancy types. 75% of reported home structure fires and 87% of total fire deaths occurred in the one- and two-family dwelling environment[ii]

The ICC documents provide much more onerous code requirements for occupancy types other than the one- and two-family dwelling. These other occupancy types have significantly less fire death and loss history, yet they are provided with greater protection. Based on the current code requirements, the protection levels in the IRC do not match the life safety hazards in the one and two-family dwelling environment.

In the year 2006, 39% of all fireground firefighter deaths occurred in dwellings and apartments[iii] At the 2006 Code Development Hearing in Orlando, the Committee disapproved the original proposal put forward and at the May 2007 Rochester Final Action Hearing, the membership heard many of the same arguments. The following paragraphs identify and respond to the concerns raised at both hearings. With these issues addressed, NASFM encourages the support of all code officials in supporting this code change.

1. Does the public want residential sprinklers? Opponents of residential sprinklers suggested in Orlando that the general public, which isn't well represented at code hearings, would oppose residential sprinklers, but a recent national poll conducted by Harris Interactive indicates that this claim misrepresents public opinion. The survey of over 1,000 adults revealed that:

- 45% of homeowners said that a sprinklered home is more desirable than an unsprinklered home, • 69% of homeowners said that having a fire sprinkler system increases the value of a home, and
- 38% of homeowners said that they would be more likely to purchase a home with fire sprinklers than without. The reason that this number isn't higher appears largely tied to an unfounded fear of water damage. 48% of homeowners cited water damage as the reason they would not want to install a sprinkler system. Clearly, this indicates a need for public education on the operation and reliability of sprinkler systems as being a major component in enhancing public support and demand for sprinklers.

The results of this survey support the assertion that the general public has become aware of and has warmed up to the concept of residential sprinklers. Certainly, this is due, at least in part, to the fact that many homeowners live in multifamily occupancies before they own a one- or two-family dwelling. Now that the IBC requires all new multi-family dwellings to be sprinklered, it is fair to say that the home-buying public will continue to become more familiar with residential sprinklers and that public support for residential fire sprinkler systems will continue to grow.

2. **Correlation between a home's age and fire risk…aren't homes built to the IRC already safe enough?:** Opponents of residential sprinklers would like to convince us that residential fire deaths are a function of a home's age and that new homes, built in accordance with the IRC, are safe. Many people buy these arguments because, on the surface, they seem to make sense. However, further analysis paints a different picture.

First, most residential fires deaths result from fires caused directly or indirectly by people. Compliance with the IRC doesn't prevent these types of fires or many other common fire causes, and once a fire starts, compliance with the IRC will not slow its spread. The speed by which a fire spreads in a home is instead a function of contents and room geometry.

Second, a simplistic correlation of residential fire deaths with the age of homes ignores several variables that tend to vary based on the age of a home. These include the socioeconomic status of the occupants, the density of occupants, the age of occupants, and the presence or omission of smoke detectors (discussed separately below), among others. Fire safety experts know that these factors are far more likely to be contributory factors in fire deaths than the age of a structure. In addition, the fact that more fire deaths occur in "older" homes than newer homes may also be related to the fact that the median age of homes in the U.S., according to a recent HUD study, is 32 years. By sheer numbers, a lot of people live in older homes. In summary, we do not debate that a home built in accordance with the IRC is safe, but that changes when people move in.

3. Since only a small percentage of fire department responses are for actual structure fires, does the fire service really need residential sprinklers? With respect to residential fire losses, the statistics submitted clearly demonstrate the scope and magnitude of the residential fire problem in the United States. Although the percentage of emergency responses to residential structure fires is a small fraction of overall fire department responses, a shocking 45 percent of firefighter deaths that occur on the fire ground occur at residential occupancies, almost always 1- and 2-family dwellings. Dwelling fires have three characteristics that present disproportionate risks as compared to fires in other occupancies. First, they are typically well developed, post-flashover fires by the time the fire department arrives. Second, they often occur at night, and third, they often involve a real or perceived need to perform search and rescue operations. In short, dwelling fires represent a small percentage of our emergency responses but account for a very large percentage of firefighters who are killed in the line of duty.

It is also important to point out that the ability of the fire service to protect our communities by responding to residential fires has declined significantly in recent years, and the situation isn't getting better. The public has a relatively simple expectation with respect to the fire department when a fire happens…they call 911, and the fire department responds to rescue trapped occupants and put out the fire. Unfortunately, that expectation isn't being effectively met in many parts of the country because of dwindling resources.

Nationally, volunteer firefighters, who comprise 73% of the American fire service and protect the vast majority of the geographic area of the United States, are becoming harder and harder to retain. In New York alone, the ranks of volunteer firefighters have declined from 110,000 in the early 1990s to approximately 85,000 today. Considering that all volunteer fire departments protect 95% of New York communities with a population of less than 10,000, what will happen when there are no longer enough firefighters to respond to 911 calls? This situation is national

and is not unique to New York. Long after many home builders leave a community, the homes that they leave behind and the people who live in them continue to place demands on the fire service. While the fire service will always strive to meet those demands, it is unrealistic to expect that our volunteers will always be able to do so. Therefore, the fire services' message is simple…if the public is going to be protected from home fires, it's time that we build that protection into new construction.

4. Aren't smoke alarms enough? Homebuilders who testified at the Orlando hearing suggested that smoke alarms are good enough to protect the public and that residential sprinklers aren't justified. Everyone can agree that smoke alarms save lives and that they are largely responsible for the dramatic reduction in fire death rates that has occurred in the U.S. over the past 30 years. Nevertheless, smoke alarms are only life-safety devices. On their own, they do nothing to stop the spread of fire, protect property or protect firefighters.

Two other issues related to reliance on smoke alarms are of concern. First, as smoke alarms age, their reliability declines. This concern prompted smoke alarm manufacturers and testing laboratories to begin stamping an expiration date on each unit indicating a 10-year replacement cycle. The questions before us are how many alarms will actually be replaced at 10-year intervals, and what will happen to the reliability of alarms that are not

replaced? Although an estimated 96% of U.S. homes with telephones now have at least one smoke alarm, in ¼ of reported fires in smoke alarm equipped homes, the devices didn't work.

In contrast, residential sprinkler systems have a life expectancy of 50-years, and they require essentially no maintenance, particularly for multipurpose systems. With these systems, if the domestic water is turned on, sprinklers are on as well. With the combination of sprinklers and smoke alarms, homeowners will have the best of both technologies. The second issue related to the effectiveness of smoke alarms in further reducing fire death rates has to do with their performance and waking effectiveness. In a study that was just completed in 2006, only 58% of a test group of children ages 612 awakened when a standard smoke alarm sounded, and only 38% of the test group successfully evacuated. The median time to awaken was 3 minutes, and the median time to escape was the maximum allowed 5 minutes. Another study revealed that a surprising **34% of fire deaths in one- and two-family dwellings during the 2000-2004 period occurred in homes with a working smoke detector**. Perhaps this statistic correlates with the fact that fire death rates for the young and the elderly, those who are least likely to be capable of self-preservation

even if they are awakened by a smoke detector, are roughly double those for individuals in the central age group. Smoke detectors are good, but they can only go so far in reducing the nation's fire death and injury rates. We need residential sprinklers.

5. **What about homes without a public water supply?** Opponents of residential sprinklers have suggested that it is impractical and too expensive to require sprinklers in homes that will use a well as the water supply. However, design options are available that make wells a viable water supply for both sprinklers and domestic service. Wells essentially fall into two categories, deep and shallow. With a shallow well, the well will likely be designed to provide a direct feed to the home, with no intervening tank. With these types of systems, pumps can be selected at reasonable costs that are capable of supplying both the domestic and sprinkler demands. Constant pressure, variable speed pumps are an excellent choice for

this type of application.

One question that is frequently raised with respect to direct feed well systems involves the "recharge" rate, or the rate at which water can keep up with the required flow. Wells may not be capable of keeping up with the demand associated with a sprinkler system, which will typically be 20 gallons per minute or more. Many automatically assume that a tank and a secondary pump are necessary in these cases, greatly increasing the cost of the sprinkler system, but a lesser known yet simple approach called "developing the well" is a much better solution. Developing a well essentially creates an underground cistern that replaces the need for a tank. The approach involves digging the well substantially below the water table and allowing the hole to fill with water, retaining the needed capacity underground. By using an appropriate pump with a developed well, an interior tank and pump arrangement can be avoided, and the water supply costs can be limited.

For deeper wells, there are two options. First, there is constant pressure, variable speed pumps suited for these applications. For installations utilizing this approach, a "developed well" as described above can also be used to accommodate needed water retention to satisfy the sprinkler demand. The second alternative involves a tank and pump, which can be installed between the well pump and the plumbing system. This approach is the common arrangement utilized for deep wells supplying domestic service. To supply sprinklers simply requires that the size of the domestic supply tank be increased to something in the range of 200-300 gallons, and the secondary pump needs to have an increased flow rating. Both of these enhancements can be made at modest cost. Some have suggested that the IRC should not require homes on wells to have fire sprinklers, yet homes in rural areas, usually corresponding to homes served by wells, are the homes that are least likely to survive a fire because of long or inadequate responses by the fire service. The solution is instead educating contractors on cost-efficient design options for well systems.

6. Impact of residential sprinklers on public and private water systems: It was suggested by one builder during testimony at the Orlando hearing that operation of residential sprinklers connected to a small water system in a Michigan jurisdiction resulted in the jurisdiction having to drain and decontaminate the entire water system. Subsequent identification and review of the cited event revealed that the concern regarding contamination of the water supply, which was a private system, was linked to the use of fire hydrants during suppression activities, not the sprinkler system. This clearly makes more sense, and for the record, the fire actually started outside of this building, spread to the interior, and sprinklers still helped to stop the fire's progress.

To suggest that the water demand caused by operation of a one- or two-family dwelling or townhouse sprinkler system will lead to contamination of an entire community water system is absurd and demonstrates a complete lack of understanding regarding residential sprinkler systems. The same logic would suggest that a single broken residential pipe, which would flow more water than operating sprinklers, would have the same result. Any water system that is this feeble has much bigger concerns than residential sprinklers.

The truth is that residential sprinklers actually result in a significantly decreased demand on water systems because residential sprinklers use far less water than firefighters to extinguish a fire. Scottsdale, Arizona's experience provides data to support this claim. Scottsdale found that the average estimated sprinkler flow per residential fire incident was 341 gallons, as compared to an estimated manual suppression flow for unsprinklered residential fire incidents of 2,935 gallons.

7. Wait for more cost-effective approaches to residential sprinkler protection before adopting a requirement in the IRC. Opponents of residential sprinklers suggest that we should hold off on requiring such systems in dwellings until improvements in technology make the systems more cost effective. The truth is that many recent improvements in sprinkler technology have largely improved cost effectiveness already. The real problem isn't a lack of cost effective design and installation options. Instead, the problem appears to stem from a lack of communication within the supply, design and installation communities regarding these efficient design options and the fact that momentum often drives us to continue doing things the way we've done them in the past.

To drive the industry toward more innovative solutions, more competition is needed, and changing the IRC to require residential sprinklers will create the demand that will increase competition and motivate cost efficient designs.

Some have suggested that we should wait for NFPA 13D or the IRC to permit the use of a single operating sprinkler as a design basis, as opposed to the currently required two sprinklers, before requiring sprinklers in the IRC. Some have also suggested that we should revisit whether sprinklers are really needed everywhere NFPA 13D requires them before requiring residential sprinklers in the IRC. The best way to encourage research and discussion on both of these ideas is to pass the IRC requirement now. Market demand will drive the research and interest in residential sprinklers will grow.

Market demand will also drive the creation of design tools that will simplify the exercises of locating sprinklers and sizing pipe. These tools, which will present design requirements in prescriptive, cookbook formats, are already being developed, and it is expected that they will be published prior to publication of the 2009 IRC.

8. **Required maintenance:** Opponents of residential sprinklers stated in Orlando that residential sprinkler systems need regular maintenance and questioned who would perform this service. Someone suggested that local fire departments will have to perform or verify maintenance, potentially raising concerns regarding right of entry.

The fact is that residential sprinkler systems are essentially maintenance free. Multipurpose systems have no maintenance requirements at all, and stand-alone systems only require an occasional test of the water flow alarm, if provided (not required by NFPA 13D or the IRC when the sprinkler pipe is copper, CPVC, or PEX) and the backflow preventer, if provided (again, not required by NFPA 13D). None of this maintenance would be performed or witnessed by the fire department. The alarm test can be conducted by the owner, in the same way the owner may periodically test a burglar alarm, and a plumber is required to test a backflow preventer. This test, which is a public health issue, is not associated with functionality or reliability of the sprinkler system, and therefore, it is not a fire safety concern.

9. Trained labor/inspectors: Opponents of residential sprinklers suggested in Orlando that, if the IRC were to require residential sprinklers, there would be a shortage of trained labor and trained inspectors to install and inspect these systems. While that is true today, there is no doubt that industry and code officials will respond once the IRC has been revised, and there will be several years to ramp up before the 2009 IRC begins to have an impact. This is exactly what has happened in the many local jurisdictions that have passed sprinkler ordinances.

Preliminary discussions have already taken place with ICC regarding the possibility of having ICC oversee a certification program for residential sprinkler installers and inspectors. Other organizations have also expressed interest in handling installer training and certification. It is expected that, in some jurisdictions, plumbers will become trained and certified to install residential sprinklers and sprinklers will be installed as part of the plumbing

system. Likewise, it is expected that, in some jurisdictions, plumbing inspectors will be trained and certified to inspect these systems. This model is not unlike the approach taken with smoke alarms. They are located and installed by electricians and they are inspected by the electrical or building inspector.

10. Leakage and mold damage: In Orlando, opponents of residential sprinklers expressed fear that sprinklers would leak and cause mold damage, which could make a home uninsurable. In response, it should be pointed out that residential sprinklers systems are no different than residential plumbing. If quality products are used and the system is properly installed, it won't leak. If substandard products are used or workmanship is faulty, leaks will occur.

With respect to sprinkler systems, sprinkler piping and fittings, and sprinklers themselves, are subject to rigorous testing to ensure quality. Unquestionably, sprinklers are far higher quality and more thoroughly tested than domestic piping and fixtures. Sprinkler tests required for listing include, among others, 700 psi hydrostatic strength, 500 psi leakage resistance, 100,000 cycles water hammer resistance, 35-125°F temperature cycling, and freeze performance to 20°F below for 24 hours. Also, sprinkler piping and components are rated for a pressure of 175 psi, while plumbing water supply systems are rated for only 80 psi.

11. Appendix P, good enough for now? Opponents of residential sprinklers suggested in Orlando that, with the IRC having just accepted Appendix P, maybe it would be best to leave the sprinkler requirements in the appendix for a while to see what happens with it. This approach will certainly be appealing to some because it delays the sprinkler issue and gives home builders a leg up in fighting sprinklers at the local level.

However, isn't it time that we give local code officials the leg up? Code officials who have been through the local adoption process will certainly understand that it's much easier to justify taking something controversial out of the code than to add something new during an adoption review. With respect to residential sprinklers, code officials know all too well that arguing them into the code at the local level is a very uphill climb given local politics and the strength of local home builder associations.

Putting the sprinkler requirement into the body of the IRC certainly won't end the local debate, but it will at least put the burden on the home building industry to justify making an amendment to take sprinklers out. Local code officials would then have a respectable chance of keeping the sprinkler requirement. Other codes including the Uniform Fire Code, the NFPA Building Code and the Life Safety Code have already set a moral precedent by adding mandatory dwelling sprinkler requirements in their 2006 editions. The IBC and IFC have also done their parts by now requiring all residential occupancies within their respective scopes to be protected by fire sprinklers. Now it is time for the IRC to do the same.

i Ahrens, 2007, p. 2
ii Ibid.
iii Fahy & Leblanc, 2007, p. 24

Cost Impact (Stanek): The code change proposal will have the effect of a minor increase in the cost of construction in the short term that will be recouped in the long run due to other savings that more than offset the costs. See the Cost/Benefit analysis submitted with this proposal.

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

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. An approved automatic fire sprinkler system shall be installed, repaired, operated and maintained in new one-and two-family dwellings and townhouses in accordance with NFPA 13D when required by the *International Fire Code*. Separate permits shall be obtained for installation, repair, operation and maintenance when required by the *International Fire Code*.

(Renumber subsequent sections)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification places the authority for permitting and enforcement of residential sprinklers in the Fire Code. It seems appropriate that sprinkler requirements be placed in the code of those who most support their installation. They are in the best position to defend their inclusion in the code when it comes to local adoption.

Analysis. Section 101.2 of the IBC refers to the IRC as a stand alone code. As such, the provisions of the IRC are self-contained, and the provisions for a building constructed in accordance with the IRC are contained solely within the scope of the IRC and not within the scope of any other I-Code. Therefore the modification proposed is outside the scope of the International Fire Code. Additionally, the proposed text in the modification cannot be applied, as there are no provisions in the International Fire Code that are applicable to the IRC. The requirements for sprinkler systems contained in the IFC are keyed to occupancy groups. Since a building built in accordance with the IRC has no occupancy classification, there is no linkage to buildings built in accordance with the IRC.

Public Comment 2:

John C. Dean, National Association of State Fire Marshals (NASFM), requests Approval as Modified by this public comment.

Sean DeCrane, International Association of Firefighters (IAFF), requests Approval as Modified by this Public Comment

Modify proposal as follows:

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. 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* NFPA 13D.

(Renumber subsequent sections)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification addresses the approval of proposal RP3 by the IRC Committee which provides for either an NFPA 13D sprinkler system or a dwelling sprinkler system installed in accordance with new provisions in IRC Section P2904.

Final Action: AS AM AMPC____ D

RB64-07/08

R313 (New), Appendix P, Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Ronny J. Coleman, Retired California State Fire Marshal, representing IRC Fire Sprinkler Coalition

1. Add new section as follows:

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. Effective January 1, 2011, an approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings and townhouses in accordance with NFPA 13D.

(Renumber subsequent sections)

2. Delete IRC Appendix P without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*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 903.3.1 of the *International Building Code*.~~

3. Add standard to Chapter 43 as follows:

NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

Reason: This proposal is submitted as part of a package of three proposals that were developed in cooperation with the International Association of Fire Chiefs with input from code officials, home builders, fire chiefs and other interested parties. During last year's code development cycle, many ICC members stated that the preferred way to advance fire sprinklers into new home construction is through a comprehensive approach that involves:

1. A schedule for implementation,
2. Reasonable and appropriate design and construction incentives, and
3. A simple, prescriptive methodology for designing systems.

In response, representatives of the IRC Fire Sprinkler Coalition (IRCFSC) and the International Association of Fire Chiefs have developed and submitted three proposals for this code cycle, one addressing each topic.

This proposal addresses the first issue, "a schedule for implementation." It requires new homes constructed after January 1, 2011 to have fire sprinklers. The delayed implementation date provides a time buffer that will allow for development of infrastructure, such as trained installers and inspectors, prior to the residential sprinkler requirement becoming effective. While the approach of delaying a code requirement may be unfamiliar to some, it is entirely appropriate, and it is already used by the IRC in Chapter 38, as follows:

> ***E3802.12 Arc-fault protection of bedroom outlets.*** *All branch circuits that supply 120-volt, single-phase, 15- and 20-ampere outlets installed in bedrooms shall be protected by a combination type or branch/feeder type arc-fault circuit interrupter installed to provide protection of the entire branch circuit.* ***Effective January 1, 2008, such arc-fault circuit interrupter devices shall be combination type.*** *(emphasis added).*

It is common knowledge that fires in one- and two-family dwellings are the root of America's fire problem, and a substantial majority of ICC members who voted at last year's final action hearing, 56%, agreed that residential sprinklers are the right solution. To truly address America's fire problem, ICC members know that we must, at some point, begin to mainstream fire sprinklers into new home construction, and this proposal provides a rational way to make the transition by fixing a future date for the requirement to become effective.

During last year's debate, the IRCFSC provided detailed responses that addressed all of the concerns cited in testimony as a basis for opposing residential sprinklers. These concerns, which included the use of wells to supply sprinklers, freezing, leakage and cost, among others, were addressed in our public comment to proposal RB114-06/07 and in testimony offered at the final action hearing in Rochester. They were also addressed in a Web cast aired by the IRCFSC in May 2007, copies of which are now available on a free DVD that can be ordered at www.IRCFireSprinkler.org.

As a result of this outreach effort, opposition to sprinklers based on myths and misinformation has largely dissipated, and the debate has largely become focused on two issues; First, whether the requirement for fire sprinklers in dwellings should be determined at a local level, and second, whether the residential fire problem is limited to older homes. The remainder of this reason statement focuses on these two issues.

1. Should the requirement for fire sprinklers in dwellings be a local issue? Several speakers in Rochester who spoke in opposition to RB114 conveyed an opinion that requirements for fire sprinklers in dwellings should be decided at the local level. The question is why? By including Appendix P, the IRC has already acknowledged fire sprinklers as a basic safety feature that should be included in new homes. There is no premise for the IRC to promote residential fire safety on community-by-community basis. The IRC, as a model code, should promote safety and regulatory consistency among all jurisdictions, as opposed to creating a local "shopping list" of safety requirements.

No other ICC code treats sprinkler requirements or residential fire safety as a local choice to be made at the time of code adoption. The IBC establishes a baseline that ALL residential occupancies must be protected by fire sprinklers, including one- and two-family dwellings and townhouses. Some argue that it's appropriate for IBC to be more restrictive than the IRC because use of the IBC is only mandatory for dwellings exceeding three stories in height, but that argument disregards one very important fact; most residential fire deaths occur in one- and two-story homes. To have an impact on fire deaths in one- and two-story homes, we need a fire sprinkler requirement in the IRC.

A newly published study by the National Institute of Standards and Technology (NIST) entitled "Benefit-Cost Analysis of Residential Fire Sprinkler Systems," reports that, out of almost 2,000 fire incidents in homes equipped with fire sprinklers during the 4-year period 2002 to 2005, there were no fire-related fatalities. This statistic clearly demonstrates the potential for sprinklers to save thousands of lives that would otherwise be lost in residential fires. With the knowledge that residential fire sprinklers are a proven, life-saving technology, it is clear that the IRC should establish a model that sprinklers are a minimum safety feature that should be included in all new homes.

2. Is the residential fire problem limited to older homes?

According to a recent HUD study, the median age of homes in the U.S. is 32 years. With this in mind, it makes perfect sense that more fires and fire deaths occur in "older" homes, simply because there are many more of them. However, the residential fire problem is certainly not limited to older homes, and it is has not been correlated with home age.

To evaluate the relationship between the age of a home and fire risk, it is necessary break the concept of fire risk into its two components, the probability of a fire event occurring and the associated consequence once the event occurs. The probability of a fire event occurring equates to the risk of fire ignition. With respect to the age of a home, only those ignition sources that are permanently affixed to a home, such as central heating systems or electrical distribution systems, might be directly correlated to home age, but to date, there are no known studies demonstrating increased fire risk as these systems age. Such a study would be difficult to perform because heating and electrical systems are often replaced when a home is remodeled, breaking any correlation that might otherwise exist between the age of a home and the age of fixed systems installed therein. Nevertheless, because most fire deaths are associated with ignition scenarios related to human behavior, which are independent of home age, it is clear that home age has little to do with the probability of a fire event.

With respect to consequences associated with a fire event, assuming that an ignition has occurred, it is again difficult to establish any correlation with home age, except to the extent that the probability of safe evacuation is increased based on the possible presence of working smoke alarms and/or escape windows. On the contrary, some design and construction methods commonly used in new homes actually reduce fire safety. These include the use of lightweight trusses (now used in more than 60% of new homes according to the Wood Truss Council of America), which are known to become unstable and collapse more quickly in fire situations than conventional construction; and open floor plans, which reduce compartmentation and allow a fire to quickly spread throughout a home.

The truth is that fire growth in a home is largely dependent on contents, not the structure itself, and contents are independent of home age. Although smoke alarms and escape windows associated with newer homes are beneficial in some fire incidents, statistics show that the value of these features is declining over time, as fire deaths in homes that have working smoke alarms are becoming increasingly common. The most recent data (for the period 2000 to 2004), shows that 34% of fire deaths occurred in homes that had WORKING smoke alarms. This is up from 24% in the previous period, and as smoke alarms age, we can only assume that their reliability will continue to decline unless they are periodically replaced, which seems to be wishful thinking when one considers that we have a problem even getting people to change batteries in smoke alarms on a regular basis.

In summary, a simple risk analysis demonstrates that home age is largely independent of either the risk of ignition or the consequences of a fire, if ignition occurs. Therefore, it is clear that home age has little to do with the residential fire problem or the need for residential sprinklers.

Conclusion:

The outpouring of support for residential sprinklers has been building for many years, and today, all U.S. model building codes require fire sprinklers in residential occupancies, including one- and two-family dwellings, with the exception of the IRC. It is only logical that the IRC should finally acknowledge the value of residential sprinklers in preventing deaths, injuries and property loss by making sprinklers a standard feature in new home construction.

Although some in the IRC arena have argued that “big government” shouldn’t intrude into American homes by requiring fire sprinklers, those of us who have been around for a while will recall that this same argument was made 30-years ago when smoke alarms were first required in dwellings. Today, it’s hard to imagine any reasonable individual arguing that the IRC requirement for smoke alarms constitutes a “government intrusion” into the American home, largely because smoke alarms are viewed as cost-effective safety devices. Sprinklers should be viewed the same way.

Given the proposed incentive package and prescriptive design option for multipurpose fire sprinkler systems being advanced this year in a proposal by the International Association of Fire Chiefs, it is entirely feasible that it will be cheaper to build some homes with fire sprinklers than without. For those cases where there is a net cost to sprinklers, NIST’s newly published “Benefit-Cost Analysis of Residential Fire Sprinkler Systems” report concludes that multipurpose residential fire sprinkler systems are still a good investment, yielding a positive present value of net benefits (PVNB) for every home type studied, including ranch-style homes, colonial-style homes and townhouses.

This proposal provides a reasonable and justified approach for advancing fire sprinklers into the body of the IRC, and the time has come to for the IRC to include fire sprinklers as part of the model for residential construction.

ABOUT THE IRC FIRE SPRINKLER COALITION: The IRC Fire Sprinkler Coalition is an organization that represents national, state and regional groups of code officials and other associations focused on public safety. The Coalition has been active in presenting training programs to code officials and others aimed at conveying facts and debunking myths and misinformation about residential sprinklers. At the time of submittal of this proposal, groups who pledged to support the IRC Fire Sprinkler Coalition’s mission of mainstreaming fire sprinklers into new home construction included:

NATIONAL AND REGIONAL COALITION MEMBERS

* International Association of Fire Chiefs – Fire and Life Safety Section
* Center for Campus Fire Safety
* ICC Joint Fire Service Review Committee
* Institution of Fire Engineers, US Branch
* International Fire Marshals Association
* National Association of State Fire Marshals
* New England Association of Fire Marshals
* New England Division of the International Association of Fire Chiefs
* Safe Buildings Coordinating Committee
* Society of Fire Protection Engineers
* Southeastern Association of Fire Chiefs
* Uniform Fire Code Association
* Western Fire Chiefs Association

STATE AND LOCAL COALITION MEMBERS

Alaska
* Alaska Fire Chiefs Association

Arizona
* Arizona Fire Chiefs Association
* Arizona Fire Marshals Association
* Arizona: Society of Fire Protection Engineers, Arizona Chapter
* Arizona: Yuma County, AZ Fire Officer’s Association

California
* California: California Fire Chiefs Association
* California: Northern California Fire Prevention Officers Section
* California: Orange County Fire Chiefs Association
* California: Southern California Fire Prevention Officers Section

Colorado
* Colorado: Fire Marshals Association of Colorado

Connecticut
* Connecticut: Capitol Region Fire Marshals Association of Connecticut

Delaware
* Delaware: Fire Marshals Association of Delaware Valley

Florida
* Florida Fire Marshals and Inspectors Association
* Florida Fire Chiefs Association
* Florida: Northeast Florida Fire Prevention Association

Idaho
* Idaho Fire Chiefs Association
* Idaho Fire Prevention Officers Association

Illinois
* Illinois Fire Inspectors Association
* Illinois Fire Chiefs Association
* Illinois: Lake County Fire Chiefs Association

Indiana:
* Indiana: Fire Inspectors Association Of Indiana

Iowa
* Iowa: Hawkeye State Fire Safety Association, Iowa
* Iowa Fire Marshal's Association

Louisiana
* Louisiana Association of Fire Prevention Chiefs

Maryland
* Maryland Building Officials Association
* Maryland State Firemen's Association

Maine
* Maine Fire Chiefs Association

Massachusetts
* Massachusetts: Fire Chiefs Association of Massachusetts

Michigan
* Michigan Association of Fire Chiefs
* Michigan Fire Inspectors Society
* Michigan: Macomb County Fire Chiefs Association

Missouri
* Missouri: Tri-Lakes Fire Chiefs Association

Minnesota
* Minnesota: Fire Marshals Association of Minnesota

Nebraska
* Nebraska Municipal Fire Chiefs Association

Nevada
* Nevada: Fire Prevention Association of Nevada

New Jersey
* New Jersey Fire Prevention and Protection Association
* New Jersey: Northern Ocean Fire Chiefs Association
* New Jersey: Uniform Fire Prevention/Protection Officials Assn. of Ocean County

New Mexico
* New Mexico Fire Marshals Association

New York
* New York: Association of Fire Districts of the State of New York
* New York: Career Fire Chiefs' Association of New York State
* New York: Fire Marshals Association of Suffolk County
* New York: Firemen's Association of the State of New York
* New York: Monroe County, NY Fire Marshals & Inspectors Association
* New York State Association of Fire Chiefs
* New York State Building Officials Conference
* New York State Code Coalition to Protect and Preserve our Communities:
* New York State Fire Marshals and Inspectors Association
* New York: Suffolk County Fire Chiefs Association

North Carolina
* North Carolina State Firemen's Association

Ohio
* Ohio Fire Officials Association

Oregon
* Oregon Fire Code Committee
* Oregon Fire Marshals Association

Pennsylvania
* Pennsylvania Fire and Emergency Services Institute

Rhode Island
* Rhode Island Association of Fire Marshals

Tennessee
* Tennessee Fire Safety Inspectors Association

Texas
* Texas Fire Marshals Association
* Texas: Fire Prevention Association of North Texas

Virginia
* Virginia: Central Virginia Fire and Arson Association
* Virginia Fire Chiefs Association
* Virginia Fire Prevention Association

Washington
* Washington Fire Chiefs Association
* Washington State Assn of Fire Marshals

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

Analysis: This proposal includes an "effective date" which is typically not included in the I-Codes. Typically, the provisions in the code become effective when the code is adopted.

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: The committee felt that putting language into the code that mandated sprinklers on a future date, January 1, 2011, was a problem. The committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Julius Ballanco, PE, CPD, President, American Society of Plumbing Engineers, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

SECTION R313
SPRINKLER PROTECTION

R313.1 Sprinklers. Effective January 1, 2011, all dwelling units shall be protected with an automatic residential fire sprinkler system.

Exception: Sprinkler protection shall not be required for additions or alterations of existing buildings that do not have an automatic residential fire sprinkler system installed.

R312.2 Design and installation. Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.

(Renumber subsequent sections)

Delete IRC Appendix P without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*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 903.3.1 of the *International Building Code*.~~

Add standard to Chapter 43 as follows:

NFPA 13D-07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

Commenter's Reason: As stated in the original proposal, ASPE is a firm believer that residential sprinkler systems should be installed in all residential buildings to provide life safety. The fire deaths and statistic regarding the performance of NFPA 13D systems clearly justifies the requirements for residential sprinklers for all new residential buildings.

ASPE can agree with the IRC Fire Sprinkler Coalition regarding the delay in enactment of the code requirement. While we believe this should happen immediately, it is recognized that it could take time to complete the training and education of all parties involved. Therefore, we in effect are suggesting the combination of the two proposed code changes RB63 and RB64.

The purpose of the code is to provide life safety protection to everyone. To provide this protection, residential sprinklers are a necessary component in building construction.

Public Comment 2:

Ronny J. Coleman, Retired California State Fire Marshal, representing Fire Sprinkler Coalition, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

SECTION R313
SPRINKLER PROTECTION

R313.1 Required Installation. Effective January 1, 2011, a residential fire sprinkler system shall be installed in one- and two-family dwellings and townhouses.

Exception: A residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with a residential fire sprinkler system.

R312.2 Design and Installation. Residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.

(Renumber subsequent sections)

Delete IRC Appendix P without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*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 903.3.1 of the *International Building Code*.~~

Add standard to Chapter 43 as follows:

NFPA 13D-07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

Commenter's Reason: It is important to point out that there was no comprehensive debate on this proposal at the hearing in Palm Springs. The IRC Fire Sprinkler Coalition (www.IRCFireSprinkler.org) and many others chose to forgo debate since it was clear, based on committee actions on prior proposals, that the committee would not accept any proposal having to do with residential sprinklers.

When RB64 was called to the floor, there were only 10 committee members present (other than the chairman), and 4 of these individuals were appointed by the National Association of Home Builders. Given NAHB's well-known policy of opposing residential sprinklers, passage of RB64 would have required a unanimous vote of the remaining 6 members. Such a requirement, the threshold of unanimity among committee members who don't have a pre-determined vote, to pass a code change is inconsistent with the concept of consensus code making, and it depreciates ICC's code-making process. Accordingly, the committee vote lacks merit and should be ignored.

We ask the ICC membership to support this public comment based on the overwhelming evidence that has been presented in support of residential sprinklers over the past few years. The reason statement provided with the original RB64 proposal and the reason statements provided with many other proposals this year clearly make the case that residential sprinklers represent the best way to achieve a sustainable and long-term reduction in residential fire losses.

We know that: 1) the residential fire problem is not limited to older homes, 2) the residential fire problem cannot be solved with smoke alarms, 3) more firefighters are killed fighting fires in dwellings than in any other occupancy, and 4) residential sprinklers represent a cost effective solution to America's residential fire problem. These conclusions are clearly documented in publicly available reports.

We also know that consumers are accepting residential sprinklers as an important feature in new home construction in increasing numbers. This comes as no surprise because the IBC requires EVERY other residential occupancy built today to have sprinklers, and it simply makes sense that renters who live in sprinklered apartments will want to move into sprinklered homes.

While NAHB suggests that sprinklers should remain a "choice" for new homeowners, the concept of choice has two significant flaws. First, it's common knowledge that major home builders won't offer sprinklers even if the owner wants them installed, so home buyers who want sprinklers are simply told that they're not offered as an option. Second, why should the first home buyer be given the right to choose whether a home gets a fire sprinkler system, on behalf of all future homeowners, their families, and the community who ultimately assumes responsibility for providing fire protection for unsprinklered properties? This simply makes no sense.

The fact that the National Association of Home Builders is the only national organization to oppose the adoption of residential sprinklers as a mainstream feature in new home construction is very telling, and we are optimistic that ICC's membership will make the decision that the time has finally come for all homes to be sprinklered. It seems that everyone agrees that we'll eventually get there, so what are we waiting for?

Final Action: AS AM AMPC____ D

RB65-07/08

R325 (New), Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Jim Jorgensen/Greg Reed, City of Lenexa, KS

1. Add new section as follows:

SECTION R325
AUTOMATIC SPRINKLER SYSTEM

R325.1 Fire protection systems. An automatic residential fire sprinkler system shall be installed in new townhouses in accordance with NFPA 13D.

2. Add standard to Chapter 43 as follows:

NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason: Townhouses present a unique fire protection and property protection issues for fore departments and owners of connected townhouses. With separate ownerships townhouses are uniquely affected by fires in adjacent units even if the fire does not breach the two hour walls separating the units. After a severe fire the structure is open to the elements and subject to damage from water intrusion and other effects. These detrimental effects contribute to ongoing damage of adjacent townhouses since the process for repair may take an extended period of time. Legal issues may further complicate the repair process. Adding sprinklers will minimize the extent of damage so that repairs are easier to complete and the time of exposure of adjacent units to adverse affects is minimized.

Significant documentation was provided RB114-06/07 to show that non-sprinkled dwellings are a major contributing factor to the amount of property damage and loss of life from fires. Sprinkling is now required for all multi-family dwellings and townhouses should be treated in a similar manner.

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

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now. The committee agreed that if the code is going to mandate sprinklers for new construction that is should apply to all structures in the scope of the *International Residential Code* not just townhouses in a piecemeal approach.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful.

Final Action: AS AM AMPC____ D

RB66-07/08

R101.2, R301.1.3.1 (New), R313 (New), R317.2, R317.2.4, R310.1, AP102 (New), Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Rick Morris, AvalonBay Communities, Inc.

1. Revise as follows:

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

The provisions of this Code shall also apply to the construction, alteration, enlargement and replacement of townhouses not more than 4 stories above grade plane that are equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

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

2. Add new text as follows:

R301.1.3 Engineered design. When a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the International Building Code is permitted for all buildings and structures, and parts thereof, included in the scope of this code.

R301.1.3.1 Townhouses four stories above grade plane. For structural design of townhouses four stories above grade plane, the structural provisions of the *International Building Code* for Group R-3 shall apply

3. Rename section and add new R313.1 as follows:

R313
FIRE PROTECTION SYSTEMS AND SMOKE ALARMS

R313.1 Fire protection systems. An approved automatic fire sprinkler system shall be installed in new townhouses in accordance with NFPA 13D, except as follows:

1. Where townhouses have separation walls designed based on R317.2, Exception 2, sprinklers shall be provided to protect exterior combustible balconies, decks, porches and ground floor patios located under such combustible projections. Exterior sprinklers and supply piping shall be protected from freezing where freeze protection is required by P2603.6. Where sidewall sprinklers are installed beneath exposed wood joists, sprinklers shall be permitted to be installed with deflectors located 1 inch (25 mm) to 6 inches (152 mm) below the joists, not to exceed a maximum distance of 14 inches (356 mm) below the deck.
2. Where townhouses with private garages have separation walls designed based on R317.2, Exception 2, fire sprinkler protection shall be provided in the garage. Sprinklers in garages shall be connected to a system that complies with NFPA 13D. 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 as obstructions with respect to sprinkler placement.

(Renumber subsequent sections)

4. Revise as follows:

R317.2 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 for exterior walls.

Exceptions:

1. A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section R317.3.
2. A common 1-hour fire-resistance rated wall is permitted for townhouses equipped throughout with an automatic sprinkler system installed in accordance with R313.1. 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. Where roof surfaces adjacent to the wall are at different elevations, the rated wall shall continue to the upper roof sheathing.

5. Revise as follows:

R317.2.4 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 coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common ~~2 hour~~ fire-resistance-rated wall as provided in Section R317.2.

6. Revise as follows:

R310.1 (Supp) Emergency escape and rescue required. Basements and every sleeping room shall have at least one operable emergency escape and rescue opening. Such opening shall open directly into a public street, public alley, yard or court. 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 NFPA 13D.

7. Add new text as follows:

AP102 Fire flow. The fire-flow requirements for townhouses specified by IFC Appendix B, where adopted, shall be permitted to be reduced by 75% for buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

Reason: This proposal would add a requirement for residential sprinkler systems to be installed in all new townhouses constructed under the *International Residential Code*, and it includes a package of sprinkler incentives that will help offset the added cost of sprinklers, as well as improve design flexibility. If a reasonable package of incentives can be offered by the code, it simply makes sense for multifamily developers to provide these systems to protect new townhouses.

It is well known that sprinklers are the best tool for providing firesafety in residential occupancies, and the concept of the code providing incentives to encourage the use of these systems in residential occupancies is already in use in the IBC. In fact, the IBC's incentive package provided a basis for major multifamily builders to not oppose the IBC requirement for all residential occupancies to be sprinklered when that issue was considered several years ago.

By accepting this code change, sprinkler protection for townhouses would become reasonably affordable to the builders who build townhouses and to the homeowners who buy them. As a result, we could take a significant step forward in improving life safety and reducing property losses in residential occupancies for decades to come.

The following is an explanation of each new proposed section relating to this sprinkler alternative for dwellings:

1. *Revise Section R101.2:* Typical townhouse construction is no more than 4 stories above grade plane. Presently when a developer goes from 3 to 4 stories above grade, the project is then required to be designed under the IBC. Covering townhouses up to 4 stories above grade plane in the IRC provides a significant incentive for developers. The impact on 4-story buildings would be significant enough to warrant installing sprinklers in 2- and 3-story buildings, which will gain far less benefit from this change, when one considers the overall package. The overall gain of having all townhouses equipped with fire sprinklers makes the allowance of 4-story townhouses under the IRC a worthwhile investment in safety.
2. *Add new Subsection R301.1.3.1 to the "Engineered design" requirement*. This new subsection will address the structural design requirements for townhouses built under the IRC that are 4 stories above grade. The existing structural requirements in the IRC are based on a maximum 3 stories above grade, and by referencing the IBC, proper design is assured.
3. *Rename Section R313 and add new Section R313.1:* This provides a charging requirement for providing residential sprinklers in accordance with NFPA 13D for townhouses. The two exceptions deal with issues not addressed by NFPA 13D, one is outside combustible decks and the other is private garages. The combustible deck sprinkler requirement is consistent with a similar provision to IBC Section 903.3.1.2.1, "Balconies and decks". Most likely a dry sidewall sprinkler supplied by a wet pipe sprinkler system would be used to comply with this exception. The garage sprinkler criteria are based on NFPA 13R Section 6.8.3.3. Dry pendent sprinklers supplied by a wet pipe sprinkler system would most likely be used to protect garages.

4. & 5. *Add new Exception#2 to R 317.2 and revise Exception #5 to R317.2.4:* This is a similar one hour exception that was in BOCA Code Section 310.5 Exception #2 for multiple single-family dwellings. That section of Code read: "In multiple single-family dwellings that are equipped throughout with an approved automatic sprinkler system installed in accordance with Section 906.2.3 (NFPA 13D), the fire-resistance rating between each dwelling unit shall not be less than 1 hour and shall be constructed as a fire partition."

6. *Add new Exception to Section R310.1:* The IRC already allows elimination of escape windows in Groups R-1, R-2, R-4 and I-1 occupancies (IBC Section 1026, Exception 1) based on the installation of fire sprinklers. NFPA Life Safety Code, also contains an NFPA 13D related exception to the escape window requirement for one- and two-family dwellings in Section 24.2.2.1.2(2).
7. *Revise Appendix P101:* The reduction in fire flow is similar to allowances granted by the IFC.

Cost Impact: The code change proposal may increase or decrease the cost of construction, depending on the value of sprinkler incentives versus the cost of adding sprinklers to a particular building.

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now. The committee agreed that if the code is going to mandate sprinklers for new construction that is should apply to all structures in the scope of the International Residential Code not just townhouses in a piecemeal approach. The issues of fire flow and not wanting a direct reference to the International Fire Code were also issues in the committee's decision.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

George Martin, Howard County, Department of Licenses & Permits, representing Maryland Building Officials Association (MBOA), requests Approval as Modified by this Public Comment.

Steven L. McDaniel, CPCA, New York State Building Officials Conference, requests Approval as Modified by this Public Comment.

Rick Morris, AvalonBay Communities, Inc., requests Approval as Modified by this Public Comment.

Replace proposal as follows:

1. Add new section as follows:

R313
FIRE SPRINKLER SYSTEM FOR TOWNHOUSES

R313.1 Townhouse Fire Sprinklers. An automatic residential fire sprinkler system shall be installed in townhouses.

Exception: A sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have a fire sprinkler system installed.

R312.2 Design and installation. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with P2904.

(Renumber subsequent sections)

2. Modify AP101 as follows:

AP101 Fire sprinklers. An approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings ~~and townhouses~~ in accordance with P2904 ~~NFPA 13D~~.

3. Modify exception as follows:

R317.2 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 for exterior walls.

Exception: A common ~~2~~ 1-hour fire-resistance rated wall 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 33 through 42. Penetrations ~~of electrical outlet boxes~~ shall be in accordance with Section R317.3.

4. Modify exception 5 as follows:

R317.2.4 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 coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common ~~2~~ 1-hour fire-resistance-rated wall as provided in Section R317.2.

Commenter's Reason (Martin): In 1989 the State of Maryland enacted House Bill 658, "Sprinkler Systems – Installation in New Construction", that required dormitories, hotels, lodging or rooming houses, multifamily residential dwellings **and townhouses** to be sprinklered. Therefore, since 1990, townhouses in Maryland have been sprinklered and being so has not been detrimental to the homebuilding industry, but has been a major success to saving lives over the past 18 years.

To address reasonable fire protection and affordable housing, many Maryland jurisdictions over the years have permitted townhouse separation of one hour with sprinklers installed in accordance with NFPA 13D. Therefore, based on our past success with sprinklered townhouses with one hour separations between the townhouses, MBOA is in support of mandatory sprinklers in townhouses with one hour dwelling unit separations.

The modifications in Items #1 & #2 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (McDaniel): Our Building Officials Association believes that fair and reasonable sprinkler package should be provided in the IRC to encourage the installation of residential sprinkler systems in townhouse in the IRC. This public comment provides a good beginning with a sprinkler alternative that we believe meet these criteria.

To address reasonable fire protection and affordable housing, many other jurisdictions throughout the country over the years have permitted townhouse separation of one hour with sprinklers installed in accordance with NFPA 13D. Therefore, based on these past successes with sprinklered townhouses with one hour separations between the townhouses, our building officials association is in support of mandatory sprinklers in townhouses with one hour dwelling unit separations.

The modifications in Items #1 & #2 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (Morris) AvalonBay originally submitted RB66-07/08 because we believe that a fair and reasonable sprinkler package should be provided in the IRC to encourage the installation of residential sprinkler systems in townhouses in the IRC. Contrary to the Committee's published reason for disapproval of RB66, there are numerous state and local building code amendments to the IRC throughout the U.S. where townhouses are require to be sprinklered, whereas detached single family homes are not, because it is considered the "first step" in eventually getting all residential uses sprinklered. In fact, even though the committee also disapproved RB65 for the same reason as this code proposal (RB66), there was an assembly vote on RB65 and it passed, over the disapproval of the committee. Therefore, clearly the ICC membership does see merit in the rationale for mandatory sprinkling of townhouses.

This public comment simplifies the original RB66. It provides a good beginning for a townhouse sprinkler requirement that AvalonBay believes would meet code officials' and townhouse builders/developers' criteria as fair, reasonable and economical.

To address reasonable fire protection and affordable housing, many other jurisdictions throughout the country over the years have permitted townhouse separation of one hour with sprinklers installed in accordance with NFPA 13D. Therefore, based on these past successes with sprinklered townhouses with one hour separations between the townhouses, AvalonBay is in support of mandatory sprinklers in townhouses with one hour dwelling unit separations.

The modifications in Items #1 and #2 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Final Action: AS AM AMPC____ D

RB67-07/08

R302.1, Table R302.1, Table R302.1(2) (New), R317.2, R317.2.4, R317.2.5 (New), R309.7 (New), R313.2, R310.1, AP102 (New)

Proposed Change as Submitted:

Proponent: Tom Lariviere, Fire Department, Madison, MS, representing Fire & Life Safety Section of the International Association of Fire Chiefs (IAFC)

1. Revise as follows:

R302.1 (Supp) 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 NFPA 13D and 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) (Supp)
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour with exposure from both sides	0 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet
	(Not fire-resistance rated)	0	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 R317.3	< 5 feet
		None required	5 feet

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 with exposure to the fire from the outside	0 feet
	(Not fire-resistance rated)	0 hours	3 feet[1]
Projections	Fire-resistance rated	1 hour on the underside	2 feet[1]
	(Not fire-resistance rated)	0	3 feet
Openings	Not allowed	N/A	< 3 feet
	Unlimited	0	3 feet[1]
Penetrations	All	Comply with Section R317.3	< 3 feet
		None required	3 feet[1]

[1] For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with NFPA 13D, as amended by R309.7, 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. Revise as follows:

R317.2 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 for exterior walls.

Exceptions:

1. A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section R317.3.
2. A common 1-hour fire-resistance rated wall is permitted for townhouses equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D, as amended by R309.7 and R317.2.5, up to an aggregate floor area of 28,000 square feet per building. 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. Where roof surfaces adjacent to the wall are at different elevations, the rated wall shall continue to the upper roof sheathing.

R317.2.4 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 coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common ~~2-hour~~ fire-resistance-rated wall as provided in Section R317.2.

3. Add new text as follows:

R317.2.5 Fire sprinklers for balconies, decks, porches and ground floor patios. Where townhouses have separation walls designed based on R317.2, Exception 2, sprinklers shall be provided to protect exterior combustible balconies, decks, porches and ground floor patios located under such combustible projections. Exterior sprinklers and supply piping shall be protected from freezing where freeze protection is required by P2603.6. Where sidewall sprinklers are installed beneath exposed wood joists, sprinklers shall be permitted to be installed with deflectors located 1 inch (25 mm) to 6 inches (152 mm) below the joists, not to exceed a maximum distance of 14 inches (356 mm) below the deck.

4. Add new text as follows:

R309.7 Fire Sprinklers. Private garages shall be protected by fire sprinklers, where:

1. The garage is in a townhouse having separation walls designed based on R317.2, Exception 2.
2. A garage wall has been designed based on Table R302.1(b), Footnote 1.

Sprinklers in garages shall be connected to a system that complies with NFPA 13D. 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.

5. Revise as follows:

R313.2 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 NFPA 13D,

3. In a common area on each additional story of the dwelling, 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 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.

6. Revise as follows:

R310.1 (Supp) Emergency escape and rescue required. Basements and every sleeping room shall have at least one operable emergency escape and rescue opening. Such opening shall open directly into a public street, public alley, yard or court. 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 NFPA 13D.

7. Add new text as follows:

AP102 Fire flow. As provided in IFC Appendix B, where adopted, the fire-flow requirements for one and two family dwellings and townhouses shall be permitted to be reduced by 50% for buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

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 the International Association of Fire Chiefs (IAFC). Through this proposal, the IAFC hopes to encourage more widespread use of residential sprinklers by establishing a package of sprinkler incentives in the IRC that will appeal to homebuilders and consumers.

The use of incentives to encourage the installation of fire sprinkler systems is traceable in model building codes for at least 80 years, and today, these incentives are woven into the text of nearly every ICC code. Likewise, in communities throughout the United States where residential sprinklers are required, incentives play a critical roll in developing and maintaining community support for sprinklers. Nevertheless, sprinkler incentives 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. Many stakeholders in the residential construction industry have made it clear that this must change before we'll see residential sprinklers in the mainstream of new home construction, and as an organization dedicated to public safety, IAFC chose to undertake the challenge of assembling a reasonable IRC incentive package to motivate the use of sprinklers. To identify incentives that would be seen by the homebuilding industry as having value, input was sought and received from the National Association of Homebuilders, and although NAHB was unable to consider endorsing this proposal prior to the code change submittal deadline, their input is reflected in the proposed text.

Overall, IAFC believes that the package of incentives contained in this proposal will significantly enhance the safety of buildings constructed in accordance with the IRC, and ultimately, we expect to see more homes protected by fire sprinklers once these revisions are published in the IRC. Although individual items in this package may be viewed by some as too liberal, while others will say that they are not liberal enough, IAFC believes that each of the suggested changes is reasonable and justifiable for a sprinklered dwelling.

The following discussion provides justifications for each of the 7 parts of this proposal.

1. ***Modify existing Section R302.1 and add a new Table R302.1(b)****:* This change 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 firesafety perspective, the proposed requirements 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.
2. ***Revise the exceptions to R317.2 and R317.2.4****:* Because residential sprinklers will slow fire growth and often completely extinguish a fire, the fire challenge to townhouse separation walls is expected to be significantly delayed, reduced or eliminated. Precedent for this incentive exists in Section 310.5 Exception 2 of the BOCA code, which read: "In multiple single-family dwellings that are equipped throughout with an approved automatic sprinkler system installed in accordance with Section 906.2.3 (NFPA 13D), the fire resistance rating between each dwelling unit shall not be less than 1 hour and shall be constructed as a fire partition." Clearly, the overall level of safety and best chance for a favorable outcome in the event of a fire is through the use of fire sprinklers with a 1-hour wall versus no sprinklers and a 2-hour wall.
3. ***Add a new Section R317.2.5****:* This revision provides a limitation on the incentive described in Part 2 above. Because NFPA 13D systems are being recognized to a limited degree for property protection, as well as life safety, it was considered appropriate to ask for sprinklers to protect combustible exterior projections sometimes associated with outdoor fires, typically associated with a barbecue grill on a deck. Similar requirements are established by the IBC in Section 903.3.1.2.1 for NFPA 13R systems. Often, this type of protection is provided by dry sidewall sprinklers connected to a wet pipe sprinkler system.
4. ***Add a new Section R309.7****:* This revision provides a limitation on the incentive described in Part 2 above. Because NFPA 13D systems are being recognized to a limited degree for property protection, as well as life safety, it was considered appropriate to ask for sprinklers to protect sprinklers to protect garages. Design criteria suggested for sprinklers was derived from NFPA 13R Section 6.8.3.3, which addresses sprinkler protection for garages in buildings protected by NFPA 13R sprinkler systems. Often, this type of protection is provided by dry pendent sprinklers connected to a wet pipe sprinkler system.
5. ***Revise Section R313.2***: 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 as part of a package to gain sprinklers 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.
6. ***Add a new Exception to Section R310.1****:* This part of the proposal will, on its own, provide enough incentive to get a home sprinklered in some cases. Homebuilders and homeowners often want 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 IRC already allows elimination of escape windows in Groups R-1, R-2, R-4 and I-1 occupancies (IBC Section 1026, 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.
7. ***Add a new Section AP102****:* The reduction in fire flow simply calls attention to an allowance already permitted by the IFC.

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

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Disapproved**

Committee Reason: The committee felt that without mandatory language requiring sprinkler systems in the body of the code the trade off's offered by this code change don't belong. Further, the issues of outside wall protection and attic protection were a concern with this proposal. There was additional concern about trading off needed passive protection. Overall, he committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now. Keeping this in the appendix makes it available to jurisdictions that wish to take advantage of it and just because it is in the Appendix doesn't mean the provisions are hidden.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Robert F. Loeper, Jr., President, representing Region VII Chapter of ICC, requests Approval as Modified by this Public Comment.

George Martin, Howard County, Department of Licenses and Permits, representing Maryland Building Officials Association (MBOA), requests Approval as Modified by this Public Comment.

Steven L. McDaniel, CPCA, New York State Building Officials Conference, requests Approval as Modified by this Public Comment.

Rick Morris, AvalonBay Communities, Inc., requests Approval as Modified by this Public Comment.

Replace proposal 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>(1); or for dwellings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, Table R302.1(2)</u>. These provisions shall not apply to walls, projections, openings or penetrations in walls that are perpendicular to the line used to determine the fire separation distance. Projections beyond the exterior wall shall not extend more than 12 inches (305 mm) into the areas where openings are prohibited.

Exceptions:

1. 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.
2. 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).
3. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1<u>(1)</u>
EXTERIOR WALLS

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	(Fire-resistance rated)	1 hour with exposure from both sides	0 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet
	(Not fire-resistance rated)	0	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 R317.3	< 5 feet
		None required	5 feet

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 with exposure to the fire from the outside	0 feet
	(Not fire-resistance rated)	0 hours	3 feet[1]
Projections	Fire-resistance rated	1 hour on the underside	2 feet[1]
	(Not fire-resistance rated)	0	3 feet
Openings	Not allowed	N/A	< 3 feet
	Unlimited	0	3 feet[1]
Penetrations	All	Comply with Section R317.3	< 3 feet
		None required	3 feet[1]

1. 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.

R310.1 Emergency escape and rescue required. Basements and every sleeping room shall have at least one operable emergency and rescue opening. Such opening shall open directly into a public street, public alley yard or court. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room, but shall not be required in adjoining areas of the basement. 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 m2).
2. In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

Commenter's Reason (Bartell/Loeper): ICC Region 7 unanimously believes that fair and reasonable sprinkler alternatives should be provided in the IRC to encourage the installation of residential sprinkler systems. This public comment provides a good beginning with these two (2) sprinkler alternatives that we believe meet these criteria.

To address reasonable fire protection and affordable housing, there have been many jurisdictions over the years that have permitted the elimination of the bedroom emergency window (which is called the "secondary means of escape" under the NFPA 101, "life Safety Code") in accordance with NFPA 101 Section 24.2.2.1.2 without any detriment to the safety of the occupants in these sprinklered dwellings. This window exception for sprinklers in one and two family dwellings has been in the Life Safety Code since the 1981 edition (over 9 editions and 27 years). In fact, in those jurisdictions that have permitted the use of this exception the great majority of bedroom designs have included the use of windows that meet the emergency window criteria and this exception has typically been used to accommodate specific design features or unusual circumstance. This truly does afford additional flexibility to the homebuilder or homeowner to utilize other types of windows and design features without the encumbrance of the minimum opening and height above the floor requirements, and, without any detriment to the safety of the occupants of these sprinklered dwellings.

In addition, the exterior wall provisions for sprinklered dwellings, is also a reasonable fire protection compensatory feature to provide and also addresses the affordable housing issue.

Additionally, the modifications in this public comment referencing Section P2904 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (Martin): In 1989 the State of Maryland enacted House Bill 658, "Sprinkler Systems – Installation in New Construction", that required dormitories, hotels, lodging or rooming houses, multifamily residential dwelling **and townhouses** to be sprinklered. Therefore, since 1990, townhouses in Maryland have been sprinklered and being so has not been detrimental to the homebuilding industry, but has been a major success to saving lives over the past 18 years.

In addition to the sprinkling of the above-noted residential occupancies by the State of Maryland, as of this year 79 out of 157 Maryland jurisdictions have mandatory sprinkling of one-and two family dwellings.

To address reasonable fire protection and affordable housing, many Maryland jurisdictions over the years have permitted the elimination of the bedroom emergency window (which is called the "secondary means of escape" under the NFPA 101, "life Safety Code") in accordance with NFPA 101 Section 24.2.2.1.2 without any detriment to the safety of the occupants in these sprinklered dwellings. This window exception for sprinklers in one and two family dwellings has been in the Life Safety Code since the 1981 edition (over 9 editions and 27 years). In fact, just because jurisdictions permit this exception does not mean in the great majority of bedroom designs that no window is provided. It only provides additional flexibility to the homebuilder or homeowner to provide other types of windows that they desire without the encumbrance of the minimum opening and height above the floor requirement.

In addition, the exterior wall provisions for sprinklered dwellings, is also a reasonable fire protection compensatory feature to provide and also addresses the affordable housing issue.

Therefore, based on our past success with sprinkling one-and two dwellings in over half the jurisdictions in Maryland over the past 18 years, MBOA is in support of this public proposal to provide further incentives to encourage sprinkling of dwellings in the IRC.

The modifications in this public comment to reference Section P2904 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (McDaniel): Our Building Officials Association believes that fair and reasonable sprinkler alternatives should be provided in the IRC to encourage the installation of residential sprinkler systems in the IRC. This public comment provides a good beginning with two (2) sprinkler alternatives that we believe meet these criteria.

To address reasonable fire protection and affordable housing, there has been many jurisdictions over the years that have permitted the elimination of the bedroom emergency window (which is called the "secondary means of escape" under the NFPA 101, "life Safety Code") in accordance with NFPA 101 Section 24.2.2.1.2 without any detriment to the safety of the occupants in these sprinklered dwellings. This window exception for sprinklers in one and two family dwellings has been in the Life Safety Code since the 1981 edition (over 9 editions and 27 years). In fact, just because jurisdictions permit this exception does not mean in the great majority of bedroom designs that no window is provided. It only provides additional flexibility to the homebuilder or homeowner to provide other types of windows meeting the light and ventilation requirements under the IRC Code Section R303 without the encumbrance of the minimum opening and height requirement above the floor of Section R310.2.

In addition, the exterior wall provisions for sprinklered dwellings, is also a reasonable fire protection compensatory feature to provide and also addresses the affordable housing issue.

In addition, the modifications in this public comment to reference Section P2904 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (Morris): After reading the Committee's published reason for disapproval and then watching the video of the actual public testimony on RB67-07/08 at http://www.ircfiresprinkler.org/resources.htm, I find the Committee's reason for turning down this reasonable sprinkler alternative package that was submitted by the International Association of Fire Chiefs, illogical and without reasonable merit. Based on the IAFC's written supporting statement and the public testimony give in support of this code proposal vs. the opposing testimony, there was more than adequate justification to approve this code proposal. This code proposal (RB67) does NOT mandate sprinklers, but only provided fair and reasonable "trade-offs" when sprinklers are installed.

AvalonBay believes that fair and reasonable sprinkler alternatives should be provided in the IRC to encourage the installation of residential sprinkler systems in the IRC. This public comment provides a good beginning with two (2) sprinkler alternatives that we believe meet this minimum criteria.

To address reasonable fire protection and affordable housing, there have been many jurisdictions over the years that her permitted the elimination of the bedroom emergency window (which is called the "secondary means of escape" under NFPA 101, "Life Safety Code") in accordance with NFPA 101, Section 24.2.2.1.2 without any detriment to the safety of the occupants in these sprinklered dwellings. This window exception for sprinklers in one and two family dwellings has been in the Life Safety Code since the 1981 edition (over 9 editions and 27 years). In fact, just because jurisdictions permit this exception does not mean in the great majority of bedroom designs that no window is provided. It only provides additional flexibility to the homebuilder or homeowner to provide other types of windows that they desire without the encumbrance of the minimum opening and height above the floor requirement.

In addition, the exterior wall provisions for sprinklered dwellings, is also a reasonable fire protection compensatory feature to provide and also addresses the affordable housing issue.

In addition, the modifications in this public comment to reference Section P2904 will coordinate the IRC Committee approved code proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Public Comment 2:

Crystal Feiser, representing West Virginia Code Officials Association, requests Disapproval.

Commenter's Reason: The Committee's action to disapprove this and all proposals to mandate sprinklers in the body of the IRC is correct and should not be overturned. The decision to require sprinklers should be left up to state and local jurisdictions. Appendix P can be adopted, if so desired. West Virginia will be forced to amend or delete the fire sprinkler requirements for the following reasons: water line size, pressure and lack of water availability.

Final Action: AS AM AMPC____ D

RB68-07/08

R313.1 (New), Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Sean DeCrane, Fire Department, Cleveland, OH, representing International Association of Fire Fighters, Local 93

1. Add new text as follows:

R313.1 Fire protection systems. One and two family dwellings that incorporate lightweight truss or engineered lightweight material such as wooden I-beams, cold form steel or trusses in the floor or ceiling areas shall have the floors/ceilings assemblies protected by a thirty (30) minute fire-rated barrier.

Exception: Where the building is protected with a sprinkler system designed to NFPA 13D.

(Renumber subsequent sections)

2. Add standard to Chapter 43 as follows:

NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

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. 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 April, 2005, NIOSH released their report "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures". 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.

1. National Institute for Occupational Safety and Health Report F206-26. July, 2007.
2. National Institute for Occupational Safety and Health Alert, "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures".

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

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: The committee indicated that the proposed language lacked the proper technical definition of lightweight materials. Further, the committee raised some issues with crawl spaces as they applied to the proposed text as it addressed floor or ceiling areas. There was insufficient technical justification specifically no time differences provided as they apply to lightweight trusses and lightweight material including wooden I-beams and cold formed steel or trusses to support this proposal.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Sean DeCrane, Fire Department, Cleveland, OH, representing International Association of Fire Fighters, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R313.1 Fire protection systems: One Family and Two Family Occupancies incorporating designed lightweight materials such as trusses or engineered lightweight material (including but not limited to wooden I-Beams, cold-form steel or light gauge bar joist trusses) in the structural floor or ceiling areas, shall protect the floors/ceilings areas with a barrier exhibiting a thirty (30) minute fire resistance on the underside of the floor/ceiling system.

Exception: If the underside of a floor system is a crawl space where no combustible materials are stored.

(Renumber subsequent sections)

Commenter's 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. 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 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. 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. 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". 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.

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".

Final Action: AS AM AMPC____ D

RB71-07/08

R313, R313.1.1 (New), R313.1.2 (New), R313.1.3 (New), Chapter 43 (New)

Proposed Change as Submitted:

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

1. Revise section title as follows:

SECTION R313
~~SMOKE~~ ALARMS

2. Add new text as follows:

R313.1.1 Carbon monoxide alarms. In new construction, dwelling units within which fuel-fired appliances are installed shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).

R313.1.2 Where required-existing dwellings. In existing dwellings, where interior alterations, repairs, fuel-fired appliance replacements of additions requiring a permit occur, or where one or more sleeping rooms are added or created, carbon monoxide alarms shall be provided in accordance with Section 313.1.1.

R313.1.3 Alarm requirements. The required carbon monoxide alarms shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. 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.

(Renumber subsequent sections)

3. Add standard to Chapter 43 as follows:

UL

2034-96 Standard for Single and Multiple Station Carbon Monoxide Alarms

Reason: According to the Journal of the American Medical Association (JAMA), carbon monoxide is the leading cause of accidental poisoning deaths in America. Over 1,500 people die annually due to accidental carbon monoxide exposure and an additional 10,000 seek medical attention. www.homesafe.com

Cost Impact: The code change proposal will increase the cost of construction from between $50.00 to $300.00 per dwelling unit.

Analysis: Review of proposed new standard UL 2034-96 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria, Section 3.6.3.1.

Committee Action: **Disapproved**

Committee Reason: The committee felt that based upon the CTC recommendations and the insufficient amount of technical support on carbon monoxide detectors they still should not be mandated in the code. Further the committee urged industry to address the issues of reliability and false positive indications and bring the proposal back again.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Richard J. Roberts, Professional Alarm Services Organization of North America (PASONA), requests Approval as Submitted.

Commenter's Reason: The committee's reason for disapproving Code Change Proposal RB71-07/08 is they believed there was insufficient amount of technical data to support the mandatory installation of CO alarms and urged industry to address the issues of reliability and false positive indications. It should be noted there is a study dated 12/22/04 conducted by Underwriters Laboratory (UL) that provides technical data reliability and false alarm immunity of CO alarms. The five-year UL study, Carbon Monoxide (CO) Alarm Field Study, was designed to evaluate the effectiveness of CO alarms. The study concluded that CO alarms provide effective signaling protection to the users should there be a fatal concentration of CO and they generally do not false alarm in the field. A copy of the report is available from UL upon request.

The study involved the random collection of over 100 CO alarms from U.S retail stores and manufacturer locations by the UL Field Services staff and representing three types of sensor technologies: (1) electrochemical, (2) biomemetic, and (3) semiconductor. All CO alarms collected were UL Listed in accordance with the Standard for Single and Multiple Station Carbon Monoxide Alarms, UL2034. Initial sensitivity tests were recorded and the alarms were then distributed to UL staff for installation in their homes and the alarm's installed locations were noted. At the specified frequencies UL staff returned their assigned CO alarms for sensitivity testing. Throughout the entire survey program a few units experienced early/delayed signals during the sensitivity tests, but all of these CO alarms would provide effective signaling protection to the users should there be a fatal concentration of CO and they generally do not false alarm in the field. A copy of the report is available from UL..

The UL study provides the technical data requested by the committee. As such the committee should approve Code Change Proposal RB71-07/08 as submitted.

Public Comment 2:

Salvatore DiCristina, Code Solutions, Inc., requests Approval as Modified by this Public Comment.

Modify proposal as follows:

SECTION R313
ALARMS

R313.1.1 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).

R313.1.2 Where required-existing dwellings. In existing dwellings within which fuel-fired appliances exist or have attached garages, where ~~interior alterations, repairs, fuel-fired appliance replacements of additions~~ work requiring a permit occurs, ~~or where one or more sleeping rooms are added or created,~~ carbon monoxide alarms shall be provided in accordance with Section 313.1.1.

R313.1.3 Alarm requirements. ~~The required carbon monoxide alarms shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.~~ 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.

(Renumber subsequent sections)

UL

2034 ~~96~~ 2008 Standard for Single and Multiple Station Carbon Monoxide Alarms

Commenter's Reason: The industry has addressed the issue of reliability by updating the requirements of the UL 2034 standard. All carbon monoxide detectors available today meet the update requirements which eliminated the false positive indications that occurred when carbon monoxide detectors were first brought to market in the 1990's. The State of New Jersey has had regulations mandating the installation of carbon monoxide alarms in all new and existing residential occupancies since 1992. The state implemented a reporting program at that time to identify reliability and false positive indication problems and there have been no problems identified in over 10 years.

Carbon monoxide poisonings leading to injury or death is well documented and the only way to protect the occupants from this odorless and tasteless product of combustion is through the installation of detectors complying with today's standards.

The proposal has been modified to add the requirement for the installation of carbon monoxide alarms for dwelling units with attached garages, to simplify when existing dwellings need to comply, to allow the installation of single station carbon monoxide alarms and to reference the latest version of the UL standard.

Public Comment 3:

Ted A. Williams, American Gas Association, requests Disapproval.

Commenter's Reason: The Committee correctly disapproved this proposal. In addition to the Committee Reason cited, this proposal is inconsistent with the recommendation of the ICC Code Technology Committee (CTC) (http://www.iccsafe.org/cs/cc/ctc/Carbon.html):

"Recommendation: The CTC recommendation is: There has not been sufficient justification presented to the CTC to mandate carbon monoxide alarms in new and existing residential type occupancies…In making this recommendation, the CTC notes the importance of and the need for compliance with the applicable code provisions for equipment maintenance and compliance with equipment installation instructions to control the hazards associated with CO emissions."

No testimony was provided that would refute the CTC recommendation. If the proponents believe that this is a matter requiring ICC code coverage, they should take this up with the CTC for further consideration.

Final Action: AS AM AMPC____ D

RB72-07/08
R313.1

Proposed Change as Submitted:

Proponent: Shane M. Clary, Bay Alarm Company; Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.

Revise as follows:

R313.1 Smoke detection and notification. All smoke alarms 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.

Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms ~~in the event the fire alarm panel is removed or the system is not connected to a central station~~. Where a household fire warning system is installed, it shall become a permanent fixture of the occupancy and owned by the homeowner. The household fire warning system shall not be leased.

Reason: The current provisions of Section R313.1 regarding household fire warning systems are not technically possible. The smoke detectors and any notification appliances receive their power from the Fire Alarm Control Unit (FACU). Removing the FACU will completely disable the system. It is my understanding that this is indeed the concern by some on allowing the use of a systems approach as opposed to the use of smoke alarms. By requiring the system to become a permanent fixture of the occupancy and not be leased, will prevent the system from being removed due to nonpayment.

For larger homes, the only possible way to provide detection is through the use of a household fire warning system. NFPA 72, National Fire Alarm Code, has limits as to the number of smoke alarms that may be interconnected. Section 11.8.2.2 of the 2006 edition allows only twelve smoke alarms to be interconnected If the interconnecting means is not supervised. Up to forty-two smoke alarms may be interconnected if they are supervised.

A number of homeowners prefer that their household fire warning systems be monitored by a supervising station. The listing of UL 217 smoke alarms prohibits them from being monitored.

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

Committee Action: **Disapproved**

Committee Reason: The committee indicated that they preferred the existing code text over the proposed language. The committee felt that the proposal needed some work overall, however a fire warning system "owned by the homeowner" was considered to be a good beginning to a solution to issues with the smoke detection and notification code section.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Robert J. Davidson, Davidson Code Concepts, LLC, representing New Jersey Burglar and Fire Alarm Association, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R313.1 Smoke detection and notification. All smoke alarms 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.

Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms. Where a household fire warning system is installed using a combination of smoke detector and audible notification device(s), it shall become a permanent fixture of the occupancy and owned by the homeowner. ~~The household fire warning system shall not be leased.~~ The system shall be monitored by an approved supervising station and be maintained in accordance with NFPA 72.

Commenter's Reason: The proposed modification eliminates a technical flaw in the current language of Section R313.1. Currently the code allows the use of an NFPA 72 system employing a combination of smoke detectors and audible notification devices, but then requires that the system function if the fire alarm panel (FAP) is removed. The systems cannot function without the FAP, so in effect the existing language states you can use the NFPA 72 system, but you can't use it.

The modified language embraces the committee's recommendation that "owned by the homeowner" be a good beginning and adds additional language that will ensure system reliability by requiring the owner to have the system electronically monitored and maintained in accordance with the referenced standard.

It must be recognized that existing smoke alarms on the market have a limitation on how many devices can be connected together on a single circuit. As a result, larger homes being built cannot comply with the current code language mandating that smoke alarm technology be used. The option for a properly maintained NFPA 72 system comprised of smoke detectors and audible notification appliances is a necessary change to the code.

Public Comment 2:

Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc., requests Approval as Modified by this Public Comment.

Richard M. Simpson, representing National Fire and Burglar Association (NBFAA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R313.1 Smoke detection and notification. All smoke alarms 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.

Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms ~~in the event the fire alarm panel is removed or the system is not connected to a central station~~. Where a household fire warning system is installed as a primary form of smoke detection and notification, it shall be owned by the homeowner making it a permanent fixture of the occupancy and continue to provide smoke detection and notification at the premises if the remote monitoring function is disabled by the supervising station. Such systems shall be listed by a nationally recognized testing laboratory (NRTL) that is OSHA accredited to test and certify to ANSI/UL 268 and installed and maintained in accordance with NFPA 72.

Commenter's Reason: The committee's reason for disapproving Code Change proposal RB72-07/08 is they preferred the existing code text over the proposed language. The committee indicated that the proposal needed some work overall, however a fire warning system "owned by the homeowner" was considered to be a good beginning to a solution to issues with smoke detection and notification code section".

Concern has been raised by some AHJ's that household fire alarm systems may be remotely disabled by the central station or have the control panel physically removed if the homeowner fails to pay the monitoring fee thereby leaving the premises without smoke detection and notification. This may be true of leased systems, but is not true for household fire warning systems that are purchased and owned by the homeowner. If the household fire alarm system is owned by the homeowner and the homeowner fails to pay the supervising station for the remote monitoring function it will result in disablement of the remote monitoring function only. The smoke detection and notification at the premises including the control panel and interconnection of smoke detectors is fully maintained.

The effectiveness of nationally recognized industry consensus standards is that they are designed to ensure that products and technologies meet crucial product performance requirements and installation standard. The current provisions of section R313.1of the 2006 edition of the IRC preclude the reliable, proven and tested technologies of household fire alarm systems even though they meet three nationally recognized industry consensus standards:

1. ANSI/UL 268 (Standard for Smoke Detectors for Fire Alarm Signaling Systems)
2. ANSI/UL 985 (Standard for Household Fire Warning System Units)
3. ANSI/NFPA 72 (National Fire Alarm Code)

Household fire systems using ANSI/UL 268 smoke detectors connected to an ANSI/UL 985 control panel are required to be equipped with a rechargeable battery that keeps the household fire alarm system operating during a power outage and is monitored 24/7 by a supervising station. During a power outage condition the standby-by capability of the control panel permits it to communicate the power loss to the central station as well as providing smoke detection and notification at the premises. When the primary power is restored the control panel will fully recharge the standby battery. An added feature of a fire warning system is that the interconnecting wiring to smoke detectors and notification appliances is supervised such that a wiring fault results in a trouble signal at the premises and the remote monitoring station.

The performance and reliability of household fire alarm systems is extremely high if they are installed and maintained in accordance with the NFPA 72.

In that regard the current language of R313.1 needs to be amended to will allow household fire alarm systems to be installed as the primary form of smoke detection, if the household fire alarm system is owned by the homeowner as a permanent fixture and installed in accordance with nationally recognized product performance and installation standards.

Public Comment 3:

Richard M. Simpson, representing National Fire and Burglar Association (NBFAA), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R313.1 Smoke detection and notification. All smoke alarms shall be listed in accordance with UL 217 and 268 and installed in accordance with the provisions of this code and household fire warning equipment provisions chapter of NFPA 72

Household fire alarm systems installed in accordance with NFPA 72 that include interconnected smoke alarms, or a combination of smoke detector, control panel and audible notification device as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms ~~in the event the fire alarm panel is removed or the system is not connected to a central station~~. Where a household fire warning system is installed as a primary form of smoke detection and notification it shall be owned by the homeowner making it a permanent fixture of the occupancy and continue to provide smoke detection and notification at the premises if the remote monitoring function is disabled by the supervising station. Such system components shall be listed by a nationally recognized testing laboratory (NRTL) that is OSHA accredited to test and certify to ANSI/UL 268 and installed and maintained in accordance with NFPA 72.

Commenter's Reason: The committee's reason for disapproving Code Change proposal RB72-07/08 is they preferred the existing code text over the proposed language. The committee indicated that the proposal needed some work overall, however a fire warning system "owned by the homeowner" was considered to be a good beginning to a solution to issues with smoke detection and notification code section".

Concern has been raised by some AHJ's that household fire alarm systems may be remotely disabled by the central station or have the control panel physically removed. Industry practice is to allow the local functions of the systems to remain operational. The smoke detection and notification at the premises including the control panel and interconnection of smoke detectors is fully maintained.

The effectiveness of nationally recognized industry consensus standards is that they are designed to ensure that products and technologies meet crucial product performance requirements and installation standard. The current provisions of section R313.1of the 2006 edition of the IRC preclude the reliable, proven and tested technologies of household fire alarm systems even though they meet three nationally recognized industry consensus standards:

1. ANSI/UL 268 (Standard for Smoke Detectors for Fire Alarm Signaling Systems)
2. ANSI/UL 985 (Standard for Household Fire Warning System Units)
3. ANSI/NFPA 72 (National Fire Alarm Code)

Household fire systems using ANSI/UL 268 smoke detectors connected to an ANSI/UL 985 control panel are required to be equipped with a rechargeable battery that keeps the household fire alarm system operating during a power outage and is monitored 24/7 by a supervising station. During a power outage condition the standby-by capability of the control panel permits it to communicate the power loss to the central station as well as providing smoke detection and notification at the premises. When the primary power is restored the control panel will fully recharge the standby battery. An added feature of a fire warning system is that the interconnecting wiring to smoke detectors and notification appliances is supervised such that a wiring fault results in a trouble signal at the premises and the remote monitoring station.

The performance and reliability of household fire alarm systems is extremely high if they are installed and maintained in accordance with the NFPA 72. The reliability of household fire alarms is listed as 95% in NFPA 72.

In that regard the current language of R313.1 needs to be amended to allow household fire alarm systems to be again be installed as a primary form of smoke detection, if the household fire alarm system is owned by the homeowner as a permanent fixture and installed in accordance with nationally recognized product performance and installation standards.

Final Action: AS AM AMPC____ D

RB78-07/08

R314.5.3, R314.5.4

Proposed Change as Submitted:

Proponent: Michael P. Burnetter, PE, NY State Department of State, Codes Division

Revise as follows:

R314.5.3 Attics. The thermal barrier specified in Section 314.4 is not required where attic access is required by Section R807.1 and where the space is entered only for service of utilities and when the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
2. 0.25-inch-thick (6.4 mm) wood structural panels;
3. 0.375-inch (9.5 mm) particleboard;
4. 0.25-inch (6.4 mm) hardboard;
5. 0.375-inch (9.5 mm) gypsum board; or
6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).
7. Approved spray applied thermal barrier, intumescent, cementitious, cellulose, or Portland cement plaster materials.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

R314.5.4 Crawl spaces. The thermal barrier specified in Section R314.4 is not required where crawlspace access is required by Section R408.3 and where entry is made only for service of utilities and the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
2. 0.25-inch-thick (6.4 mm) wood structural panels;
3. 0.375-inch (9.5 mm) particleboard;
4. 0.25-inch (6.4 mm) hardboard;
5. 0.375-inch (9.5 mm) gypsum board; or
6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.41 mm).
7. Approved spray applied thermal barrier, intumescent, cementitious, cellulose, or Portland cement plaster.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

Reason: The new materials listed would still require the approval of the authority having jurisdiction and only apply to fully un-occupied spaces which are not finished and have very limited access for service of utilities. Given the nature of spray foam which can vastly improve the energy conservation of a building (due to the added benefit of air sealing) and the newer allowance for these efficient systems (see R806.4 Conditioned attic assemblies since the 2006 IRC) to save energy once sprayed into the various building cavities found in the unfinished attic or crawl space. Then considering the materials listed which may perform well as a thermal barrier can also be applied in the same fashion (spray) as the foam which this code section addresses in part. In other words, the labor savings and potential benefits from the combination of materials to perform both energy savings and then to provide a thermal barrier protection will greatly enhance the possibility that these spray foam applications will be safe.

Cost Impact: The code change proposal will not increase the cost of construction and would in fact reduce the costs compared to the current material allowances in the 2007 IRC supplement, due to the allowance for spray applications of proven material equivalents for a thermal barrier.

Committee Action: **Disapproved**

Committee Reason: The committee agreed that the proposed list of materials lacked justification and the thickness of the proposed material has not been indicated so there is no indication how much of the material has to be applied. Further, there was concern over the term approved as it applies to spray applied thermal barriers.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Michael Burnetter, PE, NY State Department of State, representing Codes Division, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R314.5.3 Attics. The thermal barrier specified in Section 314.4 is not required where attic access is required by Section R807.1 and where the space is entered only for service of utilities and when the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
2. 0.25-inch-thick (6.4 mm) wood structural panels;
3. 0.375-inch (9.5 mm) particleboard;
4. 0.25-inch (6.4 mm) hardboard;
5. 0.375-inch (9.5 mm) gypsum board; or
6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).
7. Approved ~~spray~~ applied thermal barrier, intumescent, cementitious, cellulose, or Portland cement plaster materials.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

R314.5.4 Crawl spaces. The thermal barrier specified in Section R314.4 is not required where crawlspace access is required by Section R408.3 and where entry is made only for service of utilities and the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
2. 0.25-inch-thick (6.4 mm) wood structural panels;

3. 0.375-inch (9.5 mm) particleboard;
4. 0.25-inch (6.4 mm) hardboard;
5. 0.375-inch (9.5 mm) gypsum board; or
6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.41 mm).
7. Approved ~~spray~~ applied thermal barrier, intumescent, cementitious, cellulose, or Portland cement plaster materials.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

Commenter's Reason: The committee asked for more justification for this proposal which is that currently, the IRC does not allow for economically or physically reasonable materials to be applied (for example a spray-foamed undulating underside of a roof deck – which is now "allowed" by code see IRC section 806.4 - Conditioned Attic Assemblies.). The areas where a spray foam company has sprayed the underside of a roof deck between rafters is very difficult to access and attach any of the currently listed thermal barrier materials. The construction and labor difficulties of placing the 6 "solid" materials listed above in Sections 314.5.3 in place around or over roof trusses or the top cord of trusses. The difficulty is so extreme and expensive that few to no companies are applying the code required thermal barrier, even though it is required by code. Hence, this is a code section in need of a more flexible but effective material approach. A thickness value would vary greatly in consideration of the material used. For instance, a non-combustible cementitious material would be approvable in a fraction of the thickness of cellulose with imbedded fire retardants (similar to what is used to fireproof steel beams from melting temperatures). These thicknesses should be based upon a thermal barrier manufacturer's particular level of fire retardants added or the amount of non-combustible material required to apply as a thermal barrier.

The new materials listed would require the approval of the authority having jurisdiction and only apply to fully un-occupied spaces which are not finished and have very limited access for service of utilities. Given the nature of spray foam which can vastly improve the energy conservation of a building (due to the added benefit of air sealing) and the newer allowance for these efficient systems (see R806.4 Conditioned attic assemblies since the 2006 IRC) to save energy once sprayed into the various building cavities found in the unfinished attic or crawl space. Then considering the proposed materials listed which may perform well as a thermal barrier can also be applied in the same fashion (spray) as the foam which this code section addresses in part. In other words, the labor savings and potential benefits from the combination of materials to perform both energy savings and then to provide a thermal barrier protection will greatly enhance the possibility that these spray foam applications will be safe.

The code change proposal will not increase the cost of construction and would in fact reduce the costs compared to the current material allowances in the 2007 IRC supplement, due to the allowance for spray applications of proven material equivalents for a thermal barrier.

Final Action: AS AM AMPC____ D

RB79-07/08
R314.5.11

Proposed Change as Submitted:

Proponent: Craig Conner, Building Quality, representing Icynene Incorporated

Revise as follows:

R314.5.11 Sill plates and headers. Foam plastic shall be permitted to be spray applied to a sill plate and header without the thermal barrier specified in Section R314.4 subject to all of the following:

1. The maximum thickness of the foam plastic shall be 31/4 inches (83 mm).
2. The density of the foam plastic shall be in the range of ~~1.5~~ 0.5 to 2.0 pounds per cubic foot (24 to 32 kg/m3).
3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke developed index of 450 or less when tested in accordance with ASTM E 84.

Reason: This section specifies that high density foams do not require a thermal barrier when sprayed on a sill plate or header, provided they meet the specified tests. The other common type of spray foam, low density foam, should also be allowed in the same application if it can pass the same specified flame spread and smoke development tests. Icynene's spray foam has already passed the required test. Presumably other companies that make a similar lower density foam would also qualify in this application.

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

Committee Action: **Disapproved**

Committee Reason: The committee agreed that there was insufficient technical data provided to justify this proposal to change the density of the foam plastic that is applied to sill plates and headers from 1.5 pounds per cubic foot to 0.5 pounds per cubic foot. There needs to be tests results and their criteria presented to justify this change.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Craig Conner, Building Quality, representing Icynene, Inc., requests Approval as Submitted.

Commenter's Reason: RB79 was Disapproved. The committee wanted testing to be used to justify the change from 1.5 lb/ft^3 to 0.5 lb/ft^3.

The results of spray foam testing by Omega Point Laboratories, Inc. were reviewed by Koffell Associates. The control sample for the testing was a gypsum wall board room with an exposed wood floor joist system. The testing was performed using a modified NFPA 265, which is the test procedure that was used as a basis for exempting a thermal barrier over a foam insulation in the code change that established this section of the code. After review of the data, Koffel Associates stated that "it is Koffel Associates' professional engineering opinion. that sill plate and header assemblies insulated with Icynene (nominal 3 ½ inches) performed as well as an un-insulated assembly, and neither a thermal barrier nor an ignition barrier would be required. It is also Koffel Associates' professional engineering opinion, that the sill plate and header assembly insulated with Icynene (nominal 3 ½ inches) provides a level of safety, consistent with the code requirements." Since an un-insulated gypsum wall board assembly with an exposed wood floor joist system would be acceptable under this section of the code, and the 0.5 lb/ft^3 spray foam performed as well as an un-insulated assembly; it follows that, the 0.5 lb/ft^3 foam should also acceptable under this section of the code.

The testing results by Omega Point Laboratories and the Koffel Associates professional engineering opinion may be viewed at: http://www.icynene.com/CodeResources.aspx

Final Action: AS AM AMPC____ D

RB80-07/08
R316.2

Proposed Change as Submitted:

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing Cellulose Insulation Manufacturers Association (CIMA)

Revise as follows:

R316.2 (Supp) Loose-fill insulation. Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Sections R316.1 ~~and R316.4~~ when tested in accordance with CAN/ULC S102.2.

Exception: Cellulose loose-fill insulation shall not be required to ~~comply with the flame spread index requirement of~~ be tested in accordance with CAN/ULC S102.2, provided such insulation complies with the requirements of Section R316.1 and Section R316.3.

Reason: This code change proposal deletes the requirement that cellulose loose-fill insulation be tested in accordance with CAN/ULC S102.2 for a smoke-developed rating. It should be noted that testing cellulose loose-fill insulation per CAN/ULC S102.2 for flame spread is already preempted by federal regulations promulgated by the Consumer Product Safety Commission (CPSC). However, those regulations do not specifically preempt it from being tested for smoke development. That is why the code currently requires cellulose loose-fill insulation to be tested per ASTM E84 for smoke developed. See Exception 2 to Section R316.1.

Approval of this code change would also make the International Residential Code (IRC) consistent with the requirements in Section 719.4 of the International Building Code (IBC) contained in the 2007 Supplement to the International Codes. A similar code change to the IBC (FS 148-0607) was approved during the ICC Final Action Hearings held last May in Rochester, NY to clarify how cellulose loose-fill insulation is to be tested for its flame spread and smoke-developed limitations specified in that section.

CAN/ULC S102.2 was originally developed in Canada for testing attic insulation but it never caught on, primarily because of ASTM E970, the critical radiant flux test for attic floor insulation. ASTM E970 is required by both the IRC and IBC and it is specified throughout the world simply because it is a better test for attic insulation. Another major drawback to the CAN/ULC S102.2 test is that it requires major modifications to the ASTM E84 test apparatus. In fact, there are only a couple of Canadian laboratories that can do this test because they made the modifications but there are currently no US laboratories that have made the needed modifications. Furthermore, a Health Canada Laboratories representative who conducts this test publicly stated it is "unreliable and inconsistent". And, the standard hasn't had a consensus revision in more than 20 years.

Several member companies of CIMA have conducted significant numbers of both the ASTM E84 and the CAN/ULC S102.2 tests on cellulose insulation at considerable expense and noted that they get virtually the same "smoke-developed" numbers from both tests. Please refer to the following test data that several CIMA members have provided showing the smoke characteristics of cellulose loose-fill insulation based on tests conducted in accordance with both ASTM E84 and CAN/ULC S102.2. Two of the US manufacturers sell product in Canada so they have tested to the CAN/ULC S102.2 test method and one manufacturer has actually tested to both that test method and ASTM E84. The following are the results of the smoke-developed limits determined by the two tests where both tests have been conducted:

Manufacturer	ASTM E84	CAN/ULC S102.2
X	10—30	12.4—29.5
Y	—	3.7
4 others	0—10	—
Overall	0—30	3.7—29.5

From a comparison of this limited amount of test data it is readily apparent that there is no significant difference between the smoke-developed index determined in accordance with ASTM E84 and the smoke-developed limit determined by CAN/ULC S102.2. It is also especially important to note that the smoke-developed numbers are significantly less than the maximum 450 allowed by Section 719 by an order of

magnitude. On that basis, it does not appear that there is a need to require smoke testing per CAN/ULC S102.2 where the insulation has already been tested in accordance with ASTM E84 to determine a smoke-developed index.

Furthermore, the cost to comply with the current requirement will likely run in the tens of thousands of dollars for the cellulose insulation industry. Thus, we propose there is no technical basis or benefit for testing cellulose loose-fill insulation to CAN/ULC for the sole purpose of obtaining a smoke developed number.

Also, due to a lack of interest in Canada because of its poor repeatability and reproducibility and lack of correlation with real world fires, CAN/ULC S102.2 has been earmarked by Health Canada for removal from the Canadian government's Product Safety Act.

We believe the proposed code change will better clarify the intent of the code proposal to exempt cellulose loose-fill insulation from being tested to two separate fire tests for determination of the smoke developed index (rating).

It has been stated that the ASTM E84 test is not an appropriate test for loose-fill insulation. In general, we agree, certainly from the perspective of determining a flame spread index. However, the way the present code is structured for testing of cellulose loose-fill insulation, the ASTM E84 test is only used to determine the smoke developed index. That index is allowed to be as high as 450, whereas the flame spread index could not be greater than 25. Since there is more than an order of magnitude difference in the required limits, the accuracy of the ASTM E84 test method is not nearly as critical for determining the smoke developed index of a material as it is for determining the flame spread index. Furthermore, cellulose loose-fill insulation tested to ASTM E84 generally results in smoke developed indexes of less than 50 as shown above. So even if there was a significant error in the test results, there would be no jeopardy of approaching the 450 limit specified in the code.

It has also been indicated that testing agencies in the United States do test to the CAN/ULC S102.2. However, it should be clarified that there are testing agencies in the United States that are qualified to test to this standard but they must modify their typical ASTM E84 test apparatus to accomplish that. Currently, there are no such testing labs in the United States that have permanently modified their equipment for this testing. Therefore, any manufacturer wishing to test to the Canadian standard must go to Canada. We do not believe that such a hardship which involves significant additional costs and time is justified for determining a smoke developed rating which by ASTM E84 testing has been shown to be very low.

For all of the above reasons, we respectfully request the Committee to approve this code change proposal which deletes the requirements for testing cellulose loose-fill insulation in accordance with CAN/ULC S102.2 to determine a smoke-developed number.

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

Committee Action: Approved as Modified

Modify the proposal as follows:

R316.2 (Supp) Loose-fill insulation. Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Sections R316.1 and R316.4 when tested in accordance with CAN/ULC S102.2.

> **Exception:** Cellulose loose-fill insulation shall not be required to be tested in accordance with CAN/ULC S102.2, provided such insulation complies with the requirements of Section R316.1 and Section R316.3.

Committee Reason: The committee agreed that this proposed language is consistent with what is currently in the fire safety portion of the International Building Code, Section 917.4. The modification serves to place the reference to R316.4 (radiant flux test) back into the charging text. It was inadvertently removed by the proponent.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Bob Eugene, Underwriters Laboratories, Inc., requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R316.2 (Supp) Loose-fill insulation. Loose-fill insulation materials, other than cellulose, that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Sections R316.1 ~~and R316.4~~ when tested in accordance with CAN/ULC S102.2. Such materials shall also comply with Section R316.4.

> ~~**Exception:** Cellulose loose-fill insulation shall not be required to be tested in accordance with CAN/ULC S102.2, provided such insulation complies with the requirements of Section R316.1 and Section R316.3.~~

Commenter's Reason: These proposed revisions are simply intended further clarify the language relating to the requirements for loose-fill insulation. It makes no change in the technical requirements. First, the current language would imply the testing referenced in R316.4 is determined in accordance with CAN/ULC S102.2. This is not the case. The testing is conducted in accordance with ASTM E 970 as indicated in Section R316.5. As such, reference to R316.4 is being moved to a new sentence to clearly separate it from CAN/ULC S102.2. Second, the language relating to the requirements for cellulose loose-fill insulation is being simplified. Testing of cellulose to the requirements of Sections R316.1 and R316.3 is already required. The further reference to these provisions in the exception is therefore not needed. Also, the exception for cellulose insulation is being moved to the charging statement in lieu of an exception in order to further clarify the language.

Public Comment 2:

Rick Thornberry, PE, The Code Consortium, Inc., representing Cellulose Insulation Manufacturers

Association (CIMA), requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R316.2 (Supp) Loose-fill insulation. Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Sections R316.1 ~~and R316.4~~ when tested in accordance with CAN/ULC S102.2.

Exception: Cellulose loose-fill insulation shall not be required to be tested in accordance with CAN/ULC S102.2, provided such insulation complies with the requirements of Section R316.1 and Section R316.3.

Commenter's Reason: The purpose of this Public Comment is to correct an inadvertent error that occurred during the hearings when the Committee reinstated the deleted reference to Section R316.4 on the basis that we had inadvertently removed it from the text. Although at the time we were posed that point by the Committee, it wasn't clear to us why the code change proposal showed the deletion of the reference to Section R316.4. However, upon further research subsequent to the hearings we determined that, indeed, we had done it intentionally. That is because the reference to Section R316.4 within Section R316.2 (Supp) is inappropriate. This section specifies testing in accordance with CAN/ULC S102.2 which is similar to the ASTM E84 test method except that the test sample is mounted on the floor of the tunnel instead of the ceiling. It still generates flame spread and smoke developed numbers but does not test for a critical radiant flux which is what Section R316.4 is provided to do. In fact, the critical radiant flux limit specified in R316.4 is related to testing in accordance with ASTM E970 which is specified in Section R316.5. Therefore, it makes no sense to reference R316.4 within the charging paragraph of R316.2 since the two tests are not related and generate different numbers.

Therefore, we are submitting this Public Comment to accomplish what we originally intended to accomplish as part of this code change proposal to clarify the charging paragraph in Section R316.2. This does not result in a technical change but simply clarifies the application of Section R316.2 for determining the flame spread and smoke-developed limits (as prescribed for tests conducted in accordance with ASTM E84 in Section R316.1) for loose-fill insulation materials tested in accordance with CAN/ULC S102.2.

Final Action: AS AM AMPC____ D

RB83-07/08

R317.2.1, Figure R317.2(1) (New)

Proposed Change as Submitted:

Proponent: Lee J. Kranz, City of Bellevue, WA, representing The Washington Association of Building Officials (WABO), Technical Code Development Committee

1. Revise as follows:

R317.2.1 Continuity. The fire-resistance-rated wall or assembly separating townhouses shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures. Where an upper story extends beyond a story below forming an overhanging floor area, it shall have a minimum fire-resistance rating of one hour on the underside and the fire-resistance-wall or assembly separating townhouses shall extend to within five feet of the outside edge of the upper story. (See Figure R317.2(1)).

2. Add new figure as follows:

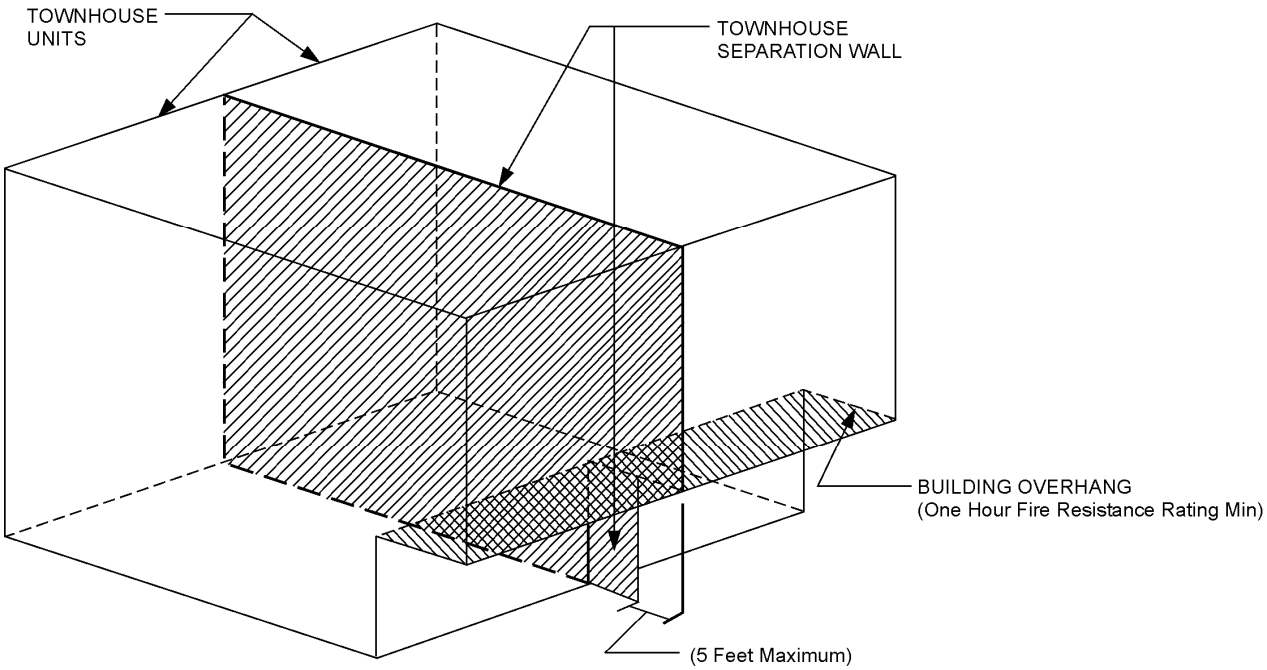


FIGURE R317.2(1)
CANTILEVERED BUILDING

Reason: Overhanging floor areas are typical in many townhouse designs and are not currently affectively addressed in the code. This proposal addresses a townhouse design with an upper story overhang. IRC 317.2.1 requires that the fire-resistance rating extend the full length of the wall and be continuous from the foundation to the roof, deck or slab. Under the current provisions, a townhouse with an overhang or cantilever design must have a fire-resistance-rated separation wall that extends to the outer face of the exterior wall above and must provide a complete fire resistance rated separation from one dwelling unit to the other.

This proposal provides an alternate means of separating the townhouse units where overhanging areas occur. By allowing the "wing wall" to terminate at a point less than the full length of the townhouse building and protecting the underside of the overhang, adequate separation is provided. The 5' distance from the end of the separation wall to the exterior wall of the floor above is consistent with the minimum fire separation distance required in Table R302.1 for projections.

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

Committee Action: **Disapproved**

Committee Reason: The committee felt that there were conflicting issues on the length of the wall. The length indicated in the charging text does not match proposed Figure R317.2(1). Overall, the committee agreed that the proposal lacked sufficient technical justification.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Scott Dornfeld, City of Delano, MN, representing Association of Minnesota Building Officials, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R317.2.1 Continuity. The fire-resistance-rated wall or assembly separating townhouses shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures. Where an upper story ~~extends beyond a story below forming an overhanging floor area,~~ floor assembly cants more than 24 inches (610 mm) past the wall below, it shall have a minimum fire-resistance rating of one hour on the underside of the floor assembly ~~and the fire-resistance-wall or assembly separating townhouses shall extend to within five feet of the outside edge of the upper story. (See Figure R317.2(1)).~~ For a minimum 4 feet (1219 mm) on each side of the separation or walls.

~~**FIGURE R317.2(1)**~~
~~**CANTILEVERED BUILDING**~~

Commenter's Reason: This wording change will make it easier to get the floor assembly cants protected and help stop the spread of fire to the unit next door. We are already using non-combustible material in parapet exception for a minimum of 4 ft each side of a separation wall. We are now taking that idea to the bottom of the floor systems that cant more than 24 inches (610mm).

Public Comment 2:

Tim Nogler, Washington State Building Code Council, representing Washington Association of Building Officials, requests Approval as Modified by this Public Comment.

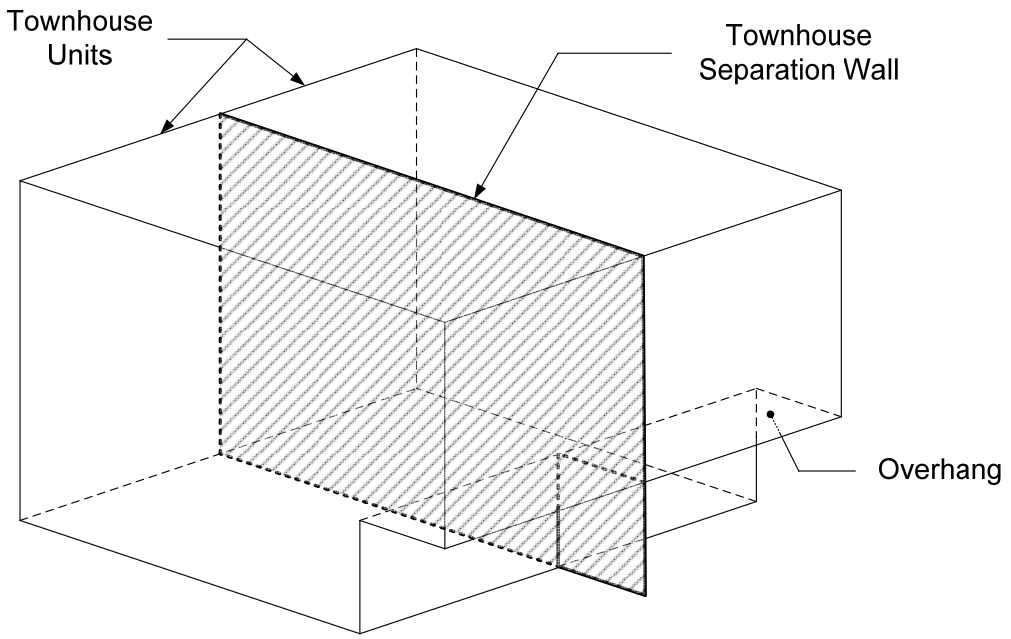
Modify proposal as follows:

R317.2.1 Continuity. The fire-resistance-rated wall or assembly separating townhouses shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures. Where an upper story extends beyond a story below forming an overhanging floor area, ~~it shall have a minimum fire-resistance rating of one hour on the underside and~~ the fire-resistance-wall or assembly separating townhouses shall extend to ~~within five feet of~~ the outside edge of the upper story. ~~(See Figure R317.2(1)).~~

~~**FIGURE R317.2(1)**~~
~~**CANTILEVERED BUILDING**~~

Commenter's Reason: The committee commented that the proposal didn't specify the length of the wall correctly. The modification keeps the concept of continuity thru the full length of the wall. The change is needed to address a townhouse design with an upper story overhang.

The modification is consistent with discussions during the committee hearings in Orlando. The interpretation of the requirement that the wall be "continuous from the foundation to the underside of the roof sheathing, deck or slab" was that it should extend to the edge of the overhang (see figure Extended Separation Wall).



EXTENDED SEPARATION WALL

Final Action: AS AM AMPC____ D

RB85-07/08
R319.3.1, Table R319.3.1 (New)

Proposed Change as Submitted:

Proponent: Steven Orlowski, National Association of Home Builders

1. Revise as follows:

R319.3.1 (Supp) Fasteners for preservative treated wood. Fasteners for preservative-treated wood shall be ~~of hotdipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper~~ in accordance with Table R319.1.3. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153

Exceptions:

1. One-half-inch (12.7 mm) diameter or greater steel bolts.
2. Fasteners other than nails, timber rivets, wood screws and lag screws shall be permitted to be of mechanically deposited zinc coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.
3. Fasteners permitted for untreated wood, used in applications that will remain dry in service, shall be permitted for wood treated with non-corrosive borate preservatives.

2. Add new table as follows:

***TABLE R319.3.1**
ACCEPTABLE FASTENERS PER CHEMICALS USED IN PRESSURE-PRESERVATIVELY TREATED WOOD

****CHEMICAL**	**FASTENERS**
Borate (disodium octaborate tetrahydrate "DOT")	Carbon steel, galvanized steel, stainless steel, copper, and silicon bronze
ACQ (copper combined with a quaternary ammonium compound "QUAT")	Hot-dipped galvanized, stainless steel, and triple coated zinc polymer
Wolman E (copper combined with the organic fungicide, tebuconazole)	Hot-dipped galvanized, stainless steel, and triple coated zinc polymer
****If the chemical used is not listed above, the fastener used in pressure-preservative treated wood is subject to approval from the building official.**	

Reason: Extensive testing of borate wood preservation products to AWPA's *Standard Method of Determining Corrosion of Metal in Contact with Treated Wood* by wood product manufacturers has consistently shown that borate treated lumber poses no significant corrosion threat to standard fasteners used with untreated lumber. Borate preservative and treated lumber manufacturers clearly state this in their respective literature describing their products and the recommended use and fastening of them. R319.3 is intended to ensure fasteners used for lumber treated with corrosive preservatives are adequately corrosion resistant. Corrosion resistant fasteners are significantly more expensive than standard fasteners. As currently written, R319.3 applies to borate treated lumber products and is being enforced as such which is not necessary based on the noted testing and manufacturers' clear affirmation of the results and therefore needlessly increases construction costs. The proposed exception addresses the matter appropriately.

Section R319.1 of the IRC ensures that preservative treated woods are specified for their species, product, preservatives and end use. In the application and end use of borates, manufactures will specify that the wood products treated with borates shall not be exposed to environments that will cause leaching by water. This is reflected in the text limiting the exception to applications that will remain dry while in service, such as sill plates for exterior and interior walls in direct contact with concrete or masonry that are protected from the elements.

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

Committee Action: **Disapproved**

Committee Reason: The committee agreed the proposed language had merit, however the proposal still lacked the necessary technical validity to solve the concerns over which fasteners could be used with the various common chemical wood treatments.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Steve Orlowski, National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R319.3.1 (Supp) Fasteners for preservative treated wood. Fasteners for preservative-treated wood shall be ~~in accordance with Table R319.3.1. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153~~ of hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper.

Exceptions:

1. One-half-inch (12.7 mm) diameter or greater steel bolts.
2. Fasteners other than nails, timber rivets, wood screws and lag screws shall be permitted to be of mechanically deposited zinc coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.
3. Fasteners permitted for untreated wood, used in applications that will remain dry in service, shall be permitted for wood treated with non-corrosive borate preservatives.

~~***TABLE R319.3.1**~~
~~**ACCEPTABLE FASTENERS PER CHEMICALS USED IN**~~
~~**PRESSURE-PRESERVATIVELY TREATED WOOD**~~

Commenter's Reason: To address the committees concerns over the lack of technical validity, the proponent is requesting the assembly to reverse the committee's action of disapproval based on the review the ICC ES Legacy Report NER-648 and the Evaluation Guideline EG293. Both of these documents outline the permitted use of carbon steel fasteners with lumber that is treated with non-corrosive borate preservatives, when the treated products are properly sized for the material and used per the manufacturer's recommendation.

Furthermore, section R319.1 of the IRC requires that all fasteners in preservative treated lumber and wood be specified for the preservative used and has specific guidelines for the end use of the product. In the application and end use of borate, the ES report specifies that the borate is a water soluble solution and should be protected from leaching which would be caused by contact with water. This is reflected in the specifying language which would only permit the exception of using fasteners used in untreated lumber when the end use of this product is in locations that are protected from the elements.

Final Action: AS AM AMPC____ D

RB86-07/08
R319.3.1, R319.3.3

Proposed Change as Submitted:

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

Revise as follows:

R319.3.1 (Supp) Fasteners for preservative treated wood. Fasteners for preservative-treated wood shall be of hotdipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper.

Exceptions:

1. One-half-inch (12.7 mm) diameter or greater steel bolts.
2. Fasteners other than nails~~,~~ and timber rivets~~, wood screws and lag screws~~ shall be permitted to be of mechanically deposited zinc coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.

R319.3.3 (Supp) Fasteners for fire-retardant-treated wood used in exterior applications or wet or damp locations. Fasteners for fire-retardant-treated wood used in exterior applications or wet or damp locations shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. Fasteners other than nails and timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.

Reason: Revise section to allow fasteners used in preservative treated wood for exterior applications for FRTW as well. Restore language inadvertently deleted by item S76-06/07 Part II.

The treatment for FRTW does not contain a copper ingredient like preservative treated wood. The copper has been identified as contributing to the corrosion of fasteners. Fasteners appropriate for preservative treated in exterior environments are also appropriate for FRTW.

This will also make the provisions in the building code and the residential code consistent with each other.

The change for S76 was developed using the 2003 IRC. This proponent did not realize the provision was modified for the 2006 IRC. The request is to restore the exception as printed in the 2006 IRC.

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

Committee Action: **Approved as Submitted**

Committee Reason: The committee felt that this proposal provides consistency with the language on fasteners used for fire-retardant-treated wood used in exterior applications or wet or damp locations with that currently found in the International Building Code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David Rochester, Plating Systems & Technologies, Inc., representing Mechanical Galvanizers, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R319.3.1 (Supp) Fasteners for preservative treated wood. Fasteners for preservative-treated wood shall be of hotdipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper.

Exceptions:

1. One-half-inch (12.7 mm) diameter or greater steel bolts.
2. Fasteners other than ~~nails and~~ timber rivets shall be permitted to be of mechanically deposited zinc coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.

R319.3.3 (Supp) Fasteners for fire-retardant-treated wood used in exterior applications or wet or damp locations. Fasteners for fire-retardant-treated wood used in exterior applications or wet or damp locations shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. Fasteners other than ~~nails and~~ timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.

Commenter's Reason: As part of S220-07/08, I have asked that results of testing done by a independent laboratory be printed, below is a summary of those results:

Hot-Dip Galvanized Sample #1 (HDG #1)	24 hours to white corrosion 264 hours to red corrosion (failure under ASTM B117) Average Thickness 0.942 mils (taken from average of means)
Hot-Dip Galvanized Sample #2 (HDG #2)	24 hours to white corrosion 192 hours to red corrosion (failure under ASTM B117) Average Thickness 0.9908 mils (taken from average of means)
Mechanically Galvanized Sample #1 (MG #1)	24 hours to white corrosion 672 hours to red corrosion (failure under ASTM B117) Average Thickness 1.3294 mils (taken from average of means)
Mechanically Galvanized Sample #2 (MG #2)	24 hours to white corrosion 696 hours to red corrosion (failure under ASTM B117) Average Thickness 1.5594 mils (taken from average of means)

Each of these coatings should have gone 300-330 hours to red corrosion failure under ASTM B117. The mechanically galvanized nails had better uniformity and less part-to-part variability than the hot-dip galvanized nails. If we discount this factor and just look at the number of hours per mil of coating of sacrificial protection, we would find that hot-dip would have yielded 280 hours (best case), whereas the mechanically galvanized nails yielded 672 hours (worst case). Bottom-line is that mechanically galvanized nails went longer in salt spray than hot-dip galvanized and clearly demonstrated that the mechanical coating provides a sufficient level of sacrificial protection.

The IRC (R319.3) only excludes nails and timber rivets, at a minimum that is all that should be excluded by the IBC. After all, one (1) ounce per square foot of zinc coating is a weighted coating and when it is applied by either the mechanical galvanizing process or the hot-dip galvanizing process, yields an equivalent zinc coating and sacrificial protection.

I hope that these results, from an independent lab, will demonstrate to the committee that mechanical should be allowed for nails.

Final Action: AS AM AMPC____ D

RB90-07/08
R324.1

Proposed Change as Submitted:

Proponent: William Easterling, Grand Haven, MI, representing himself

Revise as follows:

R324.1 (Supp) General. Buildings and structures ~~constructed~~ located in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1) shall be designed and constructed in accordance with the provisions contained in this section. ~~**Exception:**~~ Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

Reason: The purpose of the proposed code change is to clarify the two different requirements of this code section by using consistent language and proper format. An existing building or structure located in a flood hazard area and not just constructed in a flood hazard area is subject to the requirements of Section R324 as is a building or structure located in a floodway is subject to the requirements of ASCE 24. The additional requirements for floodways over flood hazard areas should be identified as such and not as an exception to the requirements for flood hazard areas. Likewise the minimum requirements of Section R324 should not be waived by exception, but maintained as a minimum requirement for building and structures located in a flood hazard area that may also be a floodway. Any conflicts between R324 and ASCE 24 are addressed by Section R102.1.

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

Committee Action: **Disapproved**

Committee Reason: The committee preferred the current word "constructed" over the proposed word "located" as this could apply to existing structures as well. This action was consistent with that taken on RB16-07/08 with respect to this same issue of location.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bill Easterling, Grand Haven, MI, representing himself, requests Approval as Submitted.

Phil Forner, Allendale, MI, representing himself, requests Approval as Submitted.

Commenters' Reason: RB90-07/08 should not be disapproved because of the weak and specious committee reason of: "The committee preferred the current word "constructed" over the proposed word "located" as this could apply to existing structures as well. This action was consistent with that taken on RB16-07/08 with respect to this same issue of location."

Such an interpretation allows Section R102.7.1 to have duo meaning and applicability when it comes to "repairs" on an existing structure located in a flood hazard area as demonstrated by IRC Interpretation 85-05 (attached) and by the committee reasons on RB2-07/08, RB3-07/08, RB16-07/08, and RB91-07/08.

When performing any repair to an existing structure located in a flood hazard area, the requirements of the code in effect at the time the repair is being undertaken must be applied so that at least the repair will be provided with the minimum requirements to safeguard the public as called for in Section R101.3. Section R105.3.1.1 does not exempt repairs below the design flood elevation from complying with Section R102.7.1, the requirement for new or the use of flood resistant material. Section R105.3.1.1 provides additional requirements applicable to the entire structures if the amount of the repair or improvement exceeds 50% of the structures value; being the "otherwise stated" as identified in Section R102.7.1.

Furthermore contrary to IRC Interpretation No. 85-05 where it "deemed" Section R102.7.1 inapplicable to only certain repairs, IRC Interpretation No. 28-07 (attached) correctly states how R102.7.1 is to be applied to all repairs; stating:
"Existing dwellings that are legally occupied at the time the *International Residential Code* is adopted, and remain unchanged, are not subject retrospectively to the provisions of the code. However, in accordance with the provisions in Section R102.7.1, any new construction, additions, alterations or repairs made to the existing dwelling after the adoption of the *International Residential Code* are required to conform to the requirements of the code for new construction.

Although new construction, additions, alterations or repairs made to the existing dwelling must comply with provisions for new construction, those portions of the existing dwelling not affected are not required to comply with all of the provisions for new construction. However, new construction shall not create an unsafe condition in the existing dwelling."

Approving RB90-07/08 as submitted is consistent with IRC Interpretation 28-07 and is needed to assist in preventing the perversion of the code as demonstrated by IRC Interpretation 85-05 for R105.3.1.1 along with the committee's stated reasons for RB2-07/08, RB3-07/08, RB16-07/08, RB90-07/08 and RB91-07/08.

IRC Interpretation No. 85-05
SECTION R105.3.1.1
2003 Edition
Issued: 06-01-06

R105.3.1.1 Substantially improved or substantially damaged existing buildings in areas prone to flooding. For applications for reconstruction, rehabilitation, addition, or other improvement of existing buildings or structures located in an area prone to flooding as established by Table R301.2(1), the building official shall examine or cause to be examined the construction documents and shall prepare a finding with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamage condition. If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the finding shall be provided to the board of appeals for a determination of substantial improvement or substantial damage. Applications determined by the board of appeals to constitute substantial improvement or substantial damage shall meet the requirements of Section R323.

REFERENCED SECTIONS:
R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to that required for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

TABLE R301.2(1) CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA FLOOD HAZARDSh
h. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the currently effective FIRM and FBFM, or other flood hazard map adopted by the community, as may be amended.

Q: An existing dwelling constructed prior to the effective date established in Table R301.2(1) is located in an area prone to flooding. Under the applicable provisions of the *2003 International Residential Code*, application is made for a permit to perform work on the existing dwelling. In accordance with Section R105.3.1.1 the building official determines the value of the proposed work to be less than 50 percent of the market value of the existing dwelling. Is the proposed work subject to the provisions of Section R323?

A: No. When proposed work is determined by the building official to be less than 50 percent of the market value of the existing dwelling, the application for permit is not required to be submitted for appeal, and the proposed work is not required to comply with the provisions of Section R323. In addition to the proposed work not being subject to the provisions of Section R323, the portions of the existing dwelling not affected by the proposed work is not required to be modified to comply with the provisions of Section R323. Although the provisions of Section R323 are deemed inapplicable to the existing dwelling and to the work proposed to the existing dwelling, that work which is permitted must comply with all other applicable provisions of the code as provided in Section R102.7.1.

Only when the building official determines the proposed work to be equal to or greater than 50 percent of the market value of the existing dwelling must the application for permit be presented for appeal.

IRC Interpretation No. 28-07
SECTION R102.7.1
2006 Edition
Issued: 09/10/2007
RE_06_28_07

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

REFERENCED SECTION:
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 in height with a separate means of egress and their accessory structures.

Q: In question are existing detached one- and two-family dwellings and townhouses containing basements without emergency escape and rescue openings. The dwellings in question were legally constructed and occupied prior to jurisdictional adoption and enforcement of the *International Residential Code*.

Do the technical provisions of the *International Residential Code* apply to additions and alterations to a legally occupied dwelling that is subject to the provisions of the *International Residential Code* at the time the additions and alterations are made to the existing dwelling?

A: Yes. The additions and alterations to existing dwellings must be made to comply with the technical provisions of the appropriate codes being enforced at the time the work is done.

The provisions of the *International Residential Code*, as defined in Section R101.2, apply to all aspects of construction for detached one-and two-family dwellings, multiple single-family dwellings defined as townhouses and all structures accessory to the dwellings and townhouses. The provisions address all aspects of constructing, altering, repairing, maintaining, using, occupying, enlarging, locating, removing or demolishing any one-family dwelling, two-family dwelling, townhouse or accessory structure. The code regulates any and all activities that modify the dwellings as well as any structures that are incidental to the main dwelling and are located on the same lot.

Existing dwellings that are legally occupied at the time the *International Residential Code* is adopted, and remain unchanged, are not subject retrospectively to the provisions of the code. However, in accordance with the provisions in Section R102.7.1, any new construction, additions, alterations or repairs made to the existing dwelling after the adoption of the *International Residential Code* are required to conform to the requirements of the code for new construction.

Although new construction, additions, alterations or repairs made to the existing dwelling must comply with provisions for new construction, those portions of the existing dwelling not affected are not required to comply with all of the provisions for new construction. However, new construction shall not create an unsafe condition in the existing dwelling. Changing a non-habitable basement to an occupied space without emergency escape and rescue openings creates an unsafe condition that is in conflict with the provisions of the code intended to insure a safe and usable living environment for the occupants of the dwelling.

Final Action: AS AM AMPC____ D

RB91-07/08
R324.1.2

Proposed Change as Submitted:

Proponent: William Easterling, Grand Haven, MI, representing himself

Revise as follows:

R324.1.2 Flood-resistant construction. All buildings and structures ~~erected~~ located in areas prone to flooding shall be designed, constructed, altered and repaired by methods and practices that minimize flood damage below the design flood elevation.

Reason: The purpose of the proposed code change is to clarify what Section R102.7.1 already plainly requires to be done under Section R301.2.4 and R324 when making repairs or alterations below the design flood elevation to an existing structure. Like with other hazards that become known after a structure is built, subsequent repairs and alterations below the design flood elevation to an existing structure must meet and be afforded same the minimum safety requirements as established by the IRC for new structures.

Plain meaning enforcement of Section R324 when required by Section R102.7.1 will incrementally provide, at least to the repair or alteration undertaken, the already established minimum protection from the known hazard of floods; which when enforced properly does protect emergency responders from falling through a floor that was repaired with 5/8" flood-resistant floor sheathing 16" O.C. in a flood situation as opposed to if no flood-resistant materials were used on the repair. Additionally plain meaning enforcement of Section R102.7.1 when structures are repaired or altered will help reduce repetitive losses and assist in keeping future repair costs from reaching the substantial damage threshold.

The proposed code clarification is also inline with 44CFR60.3.3 – Floodplain Management Criteria for Flood-Prone Areas; which requires a local jurisdiction participating in FEMA's National Flood Insurance Program to "Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, (ii) be constructed with materials resistant to flood damage, (iii) be constructed by methods and practices that minimize flood damages, and (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding."

Likewise according to federal law, being 44CFR60.1.d, FEMA encourages jurisdictions to adopt more comprehensive floodplain management regulations such as what IRC has already done with plain meaning of Section R102.7.1, Section R301.2.4, and Section R324. Federal law states in part at 44CFR60.1.d that: "Any community may exceed the minimum criteria under this part by adopting more comprehensive flood plain management regulations … Therefore, any flood plain management regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence".

The proposed code change is also needed because of the confusion caused by IRC Committee Interpretation 85-05, where without citing any authority, "deemed inapplicable" the requirements of Section R102.7.1, as affirmed by R102.1, when making repairs below the design flood elevation to an existing structure from the known and identified flood hazard. The IRC contains no basis for differentiating between repairs made below the design flood elevation and from repairs that require the minimum safety levels bet met. The finding through Section R105.3.1.1 that elevation is not required should not be the implied basis of not enforcing Section R102.7.1 and R102.1. Additionally no creditability should be afforded IRC Committee Interpretation 85-05 given the fact that the submitted information on which the IRC Committee based its decision is intentionally withheld from being disclosed, even upon request; which is contrary to an open consensus process and good public policy.

Cost Impact: The code change proposal will not increase the cost of construction given the fact that the code already requires it.

Committee Action: **Disapproved**

Committee Reason: The committee indicated that the proponent failed to provide sufficient technical justification to support the change. This action was consistent with that taken on RB16-07/08.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bill Easterling, Grand Haven, MI, representing himself, requests Approval as Submitted.

Phil Forner, Allendale, MI, representing himself, requests Approval as Submitted.

Commenters' Reason: RB90-07/08 should not be disapproved because of the weak and specious committee reason of: "The committee preferred the current word "constructed" over the proposed word "located" as this could apply to existing structures as well. This action was consistent with that taken on RB16-07/08 with respect to this same issue of location."

Such an interpretation allows Section R102.7.1 to have duo meaning and applicability when it comes to "repairs" on an existing structure located in a flood hazard area as demonstrated by IRC Interpretation 85-05 (attached) and by the committee reasons on RB2-07/08, RB3-07/08, RB16-07/08, and RB91-07/08.

When performing any repair to an existing structure located in a flood hazard area, the requirements of the code in effect at the time the repair is being undertaken must be applied so that at least the repair will be provided with the minimum requirements to safeguard the public as

called for in Section R101.3. Section R105.3.1.1 does not exempt repairs below the design flood elevation from complying with Section R102.7.1, the requirement for new or the use of flood resistant material. Section R105.3.1.1 provides additional requirements applicable to the entire structures if the amount of the repair or improvement exceeds 50% of the structures value; being the "otherwise stated" as identified in Section R102.7.1.

Furthermore contrary to IRC Interpretation No. 85-05 where it "deemed" Section R102.7.1 inapplicable to only certain repairs, IRC Interpretation No. 28-07 (attached) correctly states how R102.7.1 is to be applied to all repairs; stating:
"Existing dwellings that are legally occupied at the time the *International Residential Code* is adopted, and remain unchanged, are not subject retrospectively to the provisions of the code. However, in accordance with the provisions in Section R102.7.1, any new construction, additions, alterations or repairs made to the existing dwelling after the adoption of the *International Residential Code* are required to conform to the requirements of the code for new construction.

Although new construction, additions, alterations or repairs made to the existing dwelling must comply with provisions for new construction, those portions of the existing dwelling not affected are not required to comply with all of the provisions for new construction. However, new construction shall not create an unsafe condition in the existing dwelling."

Approving RB90-07/08 as submitted is consistent with IRC Interpretation 28-07 and is needed to assist in preventing the perversion of the code as demonstrated by IRC Interpretation 85-05 for R105.3.1.1 along with the committee's stated reasons for RB2-07/08, RB3-07/08, RB16-07/08, RB90-07/08 and RB91-07/08..

IRC Interpretation No. 85-05
SECTION R105.3.1.1
2003 Edition
Issued: 06-01-06

R105.3.1.1 Substantially improved or substantially damaged existing buildings in areas prone to flooding. For applications for reconstruction, rehabilitation, addition, or other improvement of existing buildings or structures located in an area prone to flooding as established by Table R301.2(1), the building official shall examine or cause to be examined the construction documents and shall prepare a finding with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its predamage condition. If the building official finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the finding shall be provided to the board of appeals for a determination of substantial improvement or substantial damage. Applications determined by the board of appeals to constitute substantial improvement or substantial damage shall meet the requirements of Section R323.

REFERENCED SECTIONS:
R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to that required for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

TABLE R301.2(1) CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA FLOOD HAZARDSh
h. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the currently effective FIRM and FBFM, or other flood hazard map adopted by the community, as may be amended.

Q: An existing dwelling constructed prior to the effective date established in Table R301.2(1) is located in an area prone to flooding. Under the applicable provisions of the *2003 International Residential Code*, application is made for a permit to perform work on the existing dwelling. In accordance with Section R105.3.1.1 the building official determines the value of the proposed work to be less than 50 percent of the market value of the existing dwelling. Is the proposed work subject to the provisions of Section R323?

A: No. When proposed work is determined by the building official to be less than 50 percent of the market value of the existing dwelling, the application for permit is not required to be submitted for appeal, and the proposed work is not required to comply with the provisions of Section R323. In addition to the proposed work not being subject to the provisions of Section R323, the portions of the existing dwelling not affected by the proposed work is not required to be modified to comply with the provisions of Section R323. Although the provisions of Section R323 are deemed inapplicable to the existing dwelling and to the work proposed to the existing dwelling, that work which is permitted must comply with all other applicable provisions of the code as provided in Section R102.7.1.

Only when the building official determines the proposed work to be equal to or greater than 50 percent of the market value of the existing dwelling must the application for permit be presented for appeal.

IRC Interpretation No. 28-07
SECTION R102.7.1
2006 Edition
Issued: 09/10/2007
RE_06_28_07

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

REFERENCED SECTION:
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 in height with a separate means of egress and their accessory structures.

Q: In question are existing detached one- and two-family dwellings and townhouses containing basements without emergency escape and rescue openings. The dwellings in question were legally constructed and occupied prior to jurisdictional adoption and enforcement of the *International Residential Code*.

Do the technical provisions of the *International Residential Code* apply to additions and alterations to a legally occupied dwelling that is subject to the provisions of the *International Residential Code* at the time the additions and alterations are made to the existing dwelling?

A: Yes. The additions and alterations to existing dwellings must be made to comply with the technical provisions of the appropriate codes being enforced at the time the work is done.

The provisions of the *International Residential Code*, as defined in Section R101.2, apply to all aspects of construction for detached one-and two-family dwellings, multiple single-family dwellings defined as townhouses and all structures accessory to the dwellings and townhouses. The provisions address all aspects of constructing, altering, repairing, maintaining, using, occupying, enlarging, locating, removing or demolishing any one-family dwelling, two-family dwelling, townhouse or accessory structure. The code regulates any and all activities that modify the dwellings as well as any structures that are incidental to the main dwelling and are located on the same lot.

Existing dwellings that are legally occupied at the time the *International Residential Code* is adopted, and remain unchanged, are not subject retrospectively to the provisions of the code. However, in accordance with the provisions in Section R102.7.1, any new construction, additions, alterations or repairs made to the existing dwelling after the adoption of the *International Residential Code* are required to conform to the requirements of the code for new construction.

Although new construction, additions, alterations or repairs made to the existing dwelling must comply with provisions for new construction, those portions of the existing dwelling not affected are not required to comply with all of the provisions for new construction. However, new construction shall not create an unsafe condition in the existing dwelling. Changing a non-habitable basement to an occupied space without emergency escape and rescue openings creates an unsafe condition that is in conflict with the provisions of the code intended to insure a safe and usable living environment for the occupants of the dwelling.

Final Action: AS AM AMPC____ D

RB93-07/08

R324.1.5, R324.1.7, R324.2.1, R324.3.2, M1701.6, M2201.6, P3101.5

Proposed Change as Submitted:

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.1.5 (Supp) Protection of mechanical and electrical systems. Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall be located at or above the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones) or R324.3.2 (coastal high-hazard areas including V Zones). If replaced as part of a substantial improvement, electrical systems, equipment and components, and heating, ventilating, air conditioning, and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment are permitted to be located below the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones) or R324.3.2 (coastal high-hazard areas including V Zones) provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in accordance with ASCE 24. Electrical wiring systems are permitted to be located below the ~~design flood~~ required elevation provided they conform to the provisions of the electrical part of this code for wet locations.

R324.1.7 Flood-resistant materials. Building materials used below the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones) or R324.3.2 (coastal high-hazard areas including V Zones) shall comply with the following:

1. All wood, including floor sheathing, shall be pressure-preservative-treated in accordance with AWPA U1 for the species, product, preservative and end use or be the decay-resistant heartwood of redwood, black locust or cedars. Preservatives shall be listed in Section 4 of AWPA U1.
2. Materials and installation methods used for flooring and interior and exterior walls and wall coverings shall conform to the provisions of FEMA/FIA-TB

R324.2.1 Elevation requirements.

1. Buildings and structures shall have the lowest floors elevated to or above the base flood elevation plus one foot (305 mm), or the design flood elevation, whichever is higher.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet (mm) on the FIRM plus one foot (305 mm), or at least ~~2~~ 3 feet (~~610~~ 915 mm) if a depth number is not specified.
3. Basement floors that are below grade on all sides shall be elevated to or above the base flood elevation plus one foot (305 mm), or the design flood elevation, whichever is higher.

   Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R324.2.2.

R324.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high hazard areas shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing, is ~~located at or above the design flood elevation.~~:
   1.1 Located at or above the design flood elevation, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees from the direction of approach, or
   1.2. Located at the base flood elevation plus one foot (305 mm), or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees from the direction of approach.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. The placement of fill beneath buildings and structures is prohibited.

   Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R324.3.4 and R324.3.5.

M1701.6 [Combustion air] Opening location. In areas prone to flooding as established by Table R301.2(1), openings shall be located at or above the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones) or 324.3.2 (coastal high-hazard areas including V Zones) ~~established in Section R324.1.5~~.

M2201.6 Flood-resistant installation. In areas prone to flooding as established by Table R301.2(1), tanks shall be installed at or above the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones or R324.3.2 (coastal high-hazard areas including V Zones) ~~established in Section R323~~ or shall be anchored to prevent flotation, collapse and lateral movement under conditions of the design flood.

P3101.5 Flood resistance. In areas prone to floodings as established by Table R301.2(1), vents shall be located at or above the ~~design flood~~ elevation ~~established in Section R324.1~~ required in Section R324.2.1 (flood hazard areas including A Zones) or R324.3.2 (coastal high-hazard areas including V Zones).

Reason: The purpose of this code change is to reduce flood risks on homes by adding a factor of safety of one-foot of additional height (called freeboard) to the requirements related to elevation of the lowest floors and other aspects of buildings that are located, in whole or in part, in flood hazard areas.

The design flood elevation is defined as the higher of the elevation of the base flood (i.e., the base flood elevation shown on many NFIP flood hazard maps) or the elevation of the flood hazard area shown on a community's flood hazard map if a community has elected to adopt a different map. A community may elect to use a design flood or design flood elevation that is higher than the base flood elevation for a number of reasons. Some communities prepare flood hazard maps based on such factors projecting build-out of upper watershed areas or a flood of record. This code change mirrors the elevation requirements in the *International Building Code,* which cites the 2005 edition of ASCE's standard *Flood Resistant Design and Construction* (ASCE 24-05). Therefore, this code change aligns the IRC with the IBC with respect to elevation requirements for Category II buildings.

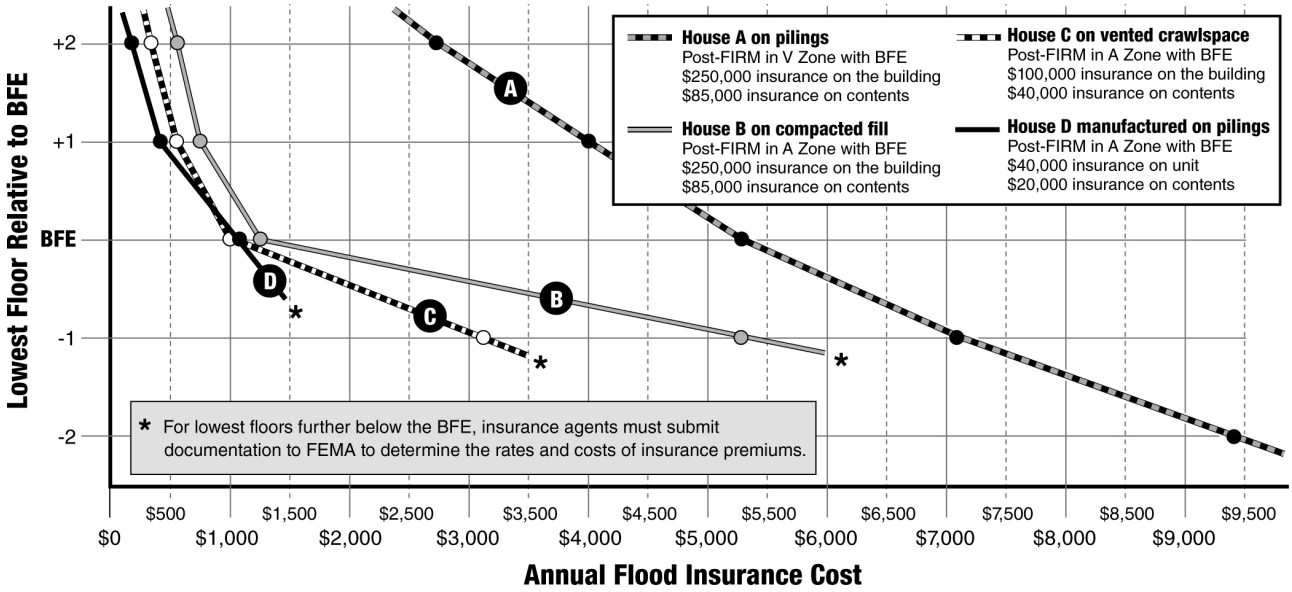
Evaluation of the National Flood Insurance Program's Building Standards (October 2006), a report prepared by the American Institutes of Research for the Federal Emergency Management Agency provides clear evidence of the benefits associated with adding freeboard to homes built in flood hazard areas. The report documented the added costs (as a percent of the cost of building to the base flood elevation) and the benefits of adding freeboard to new construction. Approximately 1,500 combinations of house size, foundation type, flood hazard zone, flood elevation, freeboard added, and discount rate were evaluated. The benefits considered are two-fold: flood damages avoided and flood insurance premium savings.

The report concluded that – based on flood damages avoided only -- it is worth spending an additional percentage of the at-BFE building cost to incorporate freeboard, where the percentage generally ranges from less than 1% to 5% for one-foot of freeboard, depending on the flood hazard zone. The cost of adding one-foot of freeboard, on the other hand, ranged from 0.25% to 3% of the at-BFE building cost (see cost statement below) depending on the type of foundation and the flood hazard zone. The flood damage reduction benefits of one-foot of freeboard outweighed the costs of that freeboard in all but a few cases (e.g., where large quantities of fill are already needed to raise an A zone building to the BFE).

The savings in insurance premium reduction, which are realized by homeowners for the life of the building, are on top of savings associated with avoiding future damage. Flood insurance premium savings alone can recover the added cost of freeboard in just a few years. Importantly, the report acknowledges that the computed benefits "are conservative, and will understate the true benefits" because some avoided costs are not accounted for, including clean-up and demolition costs, debris disposal costs, uninsured losses, displacement and relocation costs, loss of jobs and tax base, etc.

The technical information that substantiates this proposal is ASCE 24-05, *Flood Resistant Design and Construction.* The 2005 edition of this standard incorporates freeboard as a function of building occupancy and flood hazard zone. ASCE 24 sets requirements for Category II buildings, including the one- and two-family dwellings and townhouses that are within the scope of the IRC, such that the lowest floor is to be elevated to or above the base flood elevation plus one foot, or the design flood elevation, whichever is higher. In coastal high hazard areas (V Zone), the freeboard specified in ASCE 24 is a function of whether the lowest horizontal structural member is parallel – or perpendicular – to the anticipated direction of wave approach. As noted in the commentary for ASCE 24 Section 4.4, "[t]here is substantial evidence from post-event investigations that indicate damage occurs when water strikes a structure broadside, which is the case when horizontal structural members are struck. Orienting these members to minimize the direct impact by the water will reduce flood loads being transmitted to the structure."

Additional substantiation for the additional elevation requirement is found in the insurance rating structure of the National Flood Insurance Program. The NFIP bases the rates for insurance for new buildings as a function of risk. Freeboard reduces risk because the lowest floors of buildings are elevated above the predicted flood levels associated with the 1-percent-annual-chance flood (100-year or base flood). This risk reduction is reflected in reduced insurance rates, with reductions of 20% or more for the first foot of freeboard above the base flood elevation. These cost savings will be realized every year by building owners. The graphic that shows examples of how insurance varies as a function of elevation is provided (based on insurance rates in effect in 2007). Note: the graphic illustrates insurance costs for four scenario dwellings with different foundation types and different values of the structure and contents; it should not be used for any purpose other than to illustrate the general variation in costs as a function of elevation.



Further substantiation for this code change is found in Mitigation Assessment Team reports prepared by teams of experts assembled by FEMA after significant disasters for more than 10 years. The reports are published by FEMA and are available in hardcopy by calling the FEMA Distribution Center (800-480-2520) or online at http://www.fema.gov/fima/mat/mat_rprts.shtm. A summary report of the 2004 hurricane season in Florida (FEMA 490) characterizes the nature and severity of damage and recommendations that are intended to reduce future damage. The most recent report, FEMA 548, was prepared after Hurricane Katrina; it includes a recommendation to add at least one-foot of freeboard to reduce future damage. Specific recommendations are to adopt freeboard requirements that are consistent with those specified in ASCE 24-05.

Bibliography:
Mitigation Assessment Team reports published by FEMA, including: FEMA 490 *Summary Report on Building Performance: 2004 Hurricane Season* 2005); and FEMA 549 *Mitigation Assessment Team Report: Hurricane Katrina in the Gulf Coast* (2006)
American Institutes for Research (October 2006), *Evaluation of the National Flood Insurance Program's Building Standards.* Available online: www.fema.gov/business/nfip/nfipeval.shtm.

Cost Impact: This code change will increase the initial cost of construction. The anticipated damages avoided because of the higher level of protection, other savings realized by owners, and the lower cost of federal flood insurance justifies the added initial construction costs. Flood insurance premium savings alone can recover the added cost of freeboard in just a few years. As cited in the *Evaluation of the National Flood Insurance Program's Building Standards* (2006), the added cost is a function of the type of foundation. However, estimates of the cost increase over the cost to build a foundation at the base flood elevation range from less than 1% to 3% of to add one foot of freeboard, where the lower range is applicable to pile or masonry pier foundations and the upper end of the range applies to masonry walls with interior piers (crawlspace). The cost increase to add freeboard when placing fill to raise a slab-on-grade foundation is slightly higher because the fill quantity and therefore costs do not increase linearly with added height.

Committee Action: Disapproved

Committee Reason: The committee felt that if it is the position of the Federal Emergency Management Agency that a one foot freeboard is appropriate they should reflect that in their current maps. This additional language would exceed what is called for in the National Flood Insurance Program.

Assembly Action: Approved as Submitted

Individual Consideration Agenda

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

Public Comment 1:

Rebecca C. Quinn, CFM, RCQuinn Consulting, Inc., representing Department of Homeland Security/Federal Emergency Management Agency, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R324.2.1 Elevation requirements.

1. Buildings and structures shall have the lowest floors elevated to or above the ~~base flood elevation plus one foot (305 mm), or the~~ design flood elevation~~, whichever is higher~~.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet (mm) on the FIRM ~~plus one foot (305 mm)~~, or at least 2 ~~3~~ feet (610 ~~915~~ mm) if a depth number is not specified.
3. Basement floors that are below grade on all sides shall be elevated to or above the ~~base flood elevation plus one foot (305 mm), or the~~ design flood elevation~~, whichever is higher~~.

Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R324.2.2.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: ***Note: The intent is to NOT modify this section at all.*** The original proposal called for 1 foot of freeboard in all flood hazard areas, including all A Zones and V Zones. This modification has the effect of removing the proposed freeboard requirement in all A Zones by restoring the original language in R324.2.1. Therefore, this modification would require 1-foot of freeboard only in coastal high hazard areas (V Zones) where the waves are predicted to be 3-feet and higher during the base flood.

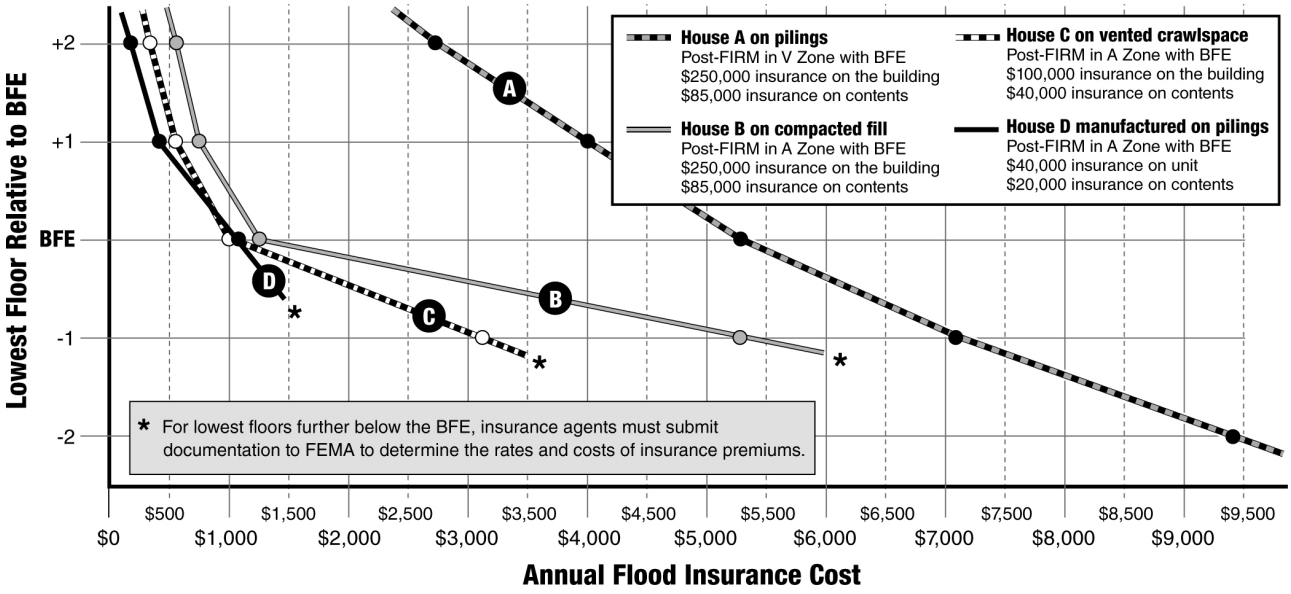
FEMA's mapping data show that less than 3 percent of all mapped flood hazard areas is V Zone. And less than 1 percent of all NFIP flood insurance policies are on 1-4 family homes in V Zones. According to the Association of State Floodplain Managers, coastal states that either require freeboard or where most coastal communities have adopted freeboard include: Alabama, Connecticut, Florida, Georgia, Hawaii, Maryland, Maine, North Carolina, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Virginia, and Washington.

Clear evidence of the benefits associated with adding freeboard to homes built in V Zones is documented in *Evaluation of the National Flood Insurance Program's Building Standards* (October 2006), a report prepared by the American Institutes of Research for the Federal Emergency Management Agency. The report documented the added costs (as a percent of the cost of building to the base flood elevation) and the benefits of adding freeboard to new construction. Approximately 1,500 combinations of house size, foundation type, flood zone, flood elevation, freeboard added, and discount rate were evaluated. The benefits considered are two-fold: flood damages avoided and flood insurance premium savings.

The report concluded that – based on flood damages avoided only – it is worth spending 3% of the at-BFE building cost to incorporate 1-foot of freeboard in V Zones. The cost of adding 1-foot of freeboard is approximately 0.5% of the at-BFE building cost for pile and pier foundations. By themselves, the flood damage reduction benefits of one-foot of freeboard outweigh the costs of adding one foot of freeboard at the time of construction.

The savings in NFIP flood insurance premium reduction, which are realized by homeowners for the life of the building, are on top of savings associated with avoiding future damage. In V Zones, flood insurance premium savings alone can recover the added cost of freeboard in two to three years. Importantly, the report acknowledges that the computed benefits "are conservative, and will understate the true benefits" because some avoided costs are not accounted for, including clean-up and demolition costs, debris disposal costs, uninsured losses, displacement and relocation costs, loss of jobs and tax base, etc.

The graphic below shows examples of how NFIP flood insurance costs vary as a function of elevation (based on insurance rates in effect in 2007). The V Zone scenario (curve A) shows that at the BFE, the annual premium is approximately $5,300; at BFE+1 the annual premium is approximately $4,000, for an annual savings of $1,300. The other curves show savings in A Zones. Note: this graphic should be used only to illustrate the general variation in costs as a function of flood zone and elevation.



During the Committee discussion in Palm Springs, a question was asked about why the proposed changes need to be made to so many sections. Changes to those sections are necessary because those sections cover aspects of dwellings subject to the elevation requirements (materials, HVAC, vents, etc.) and the elevation requirements depend on whether the dwelling is located (A Zone or V Zone) and those elevations are specified in R324.2.1 (A Zones) and R324.3.2 (V Zones).

Public Comment 2:

Rebecca C. Quinn, CFM, RCQuinn Consulting, Inc., representing Department of Homeland Security/Federal Emergency Management Agency, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R324.2 Flood hazard areas (including A Zones). All areas that have been determined to be prone to flooding but not subject to high velocity wave action shall be designated as flood hazard areas. Flood hazard areas that have been delineated as subject to wave heights between 1.5 feet and 3 feet shall be designated as Coastal A Zones. All buildings and structures constructed in whole or in part in flood hazard areas shall be designed and constructed in accordance with Sections R324.2.1 through R324.2.3.

R324.2.1 Elevation requirements.

1. Buildings and structures shall have the lowest floors elevated to or above the ~~base flood elevation plus one foot (305 mm), or the~~ design flood elevation~~, whichever is higher~~.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet (mm) on the FIRM ~~plus one foot (305 mm)~~, or at least 2 ~~3~~ feet (610 ~~915~~ mm) if a depth number is not specified.
3. Basement floors that are below grade on all sides shall be elevated to or above the ~~base flood elevation plus one foot (305 mm), or the~~ design flood elevation~~, whichever is higher~~.

   Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R324.2.2.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The original proposal called for 1 foot of freeboard in all flood hazard areas, including all V Zones and A Zones (which include areas called "Coastal A Zones" that are not shown on FIRMs).

This modification has the effect of removing the proposed freeboard requirement in all riverine A Zones and in all A Zones along coastal shorelines unless a community's floodplain map delineates a portion of the A Zone as a "Coastal A Zone." The restores the original text; the single underline text adds the Coastal A Zone, if delineated. Therefore, this modification requires 1-foot of freeboard in coastal high hazard areas (V Zones) where the waves are predicted to be 3-feet and higher during the base flood and in delineated Coastal A Zones, which are areas where wave heights during the base flood are predicted to be between 1.5 feet high and 3 feet high (the V Zone boundary).

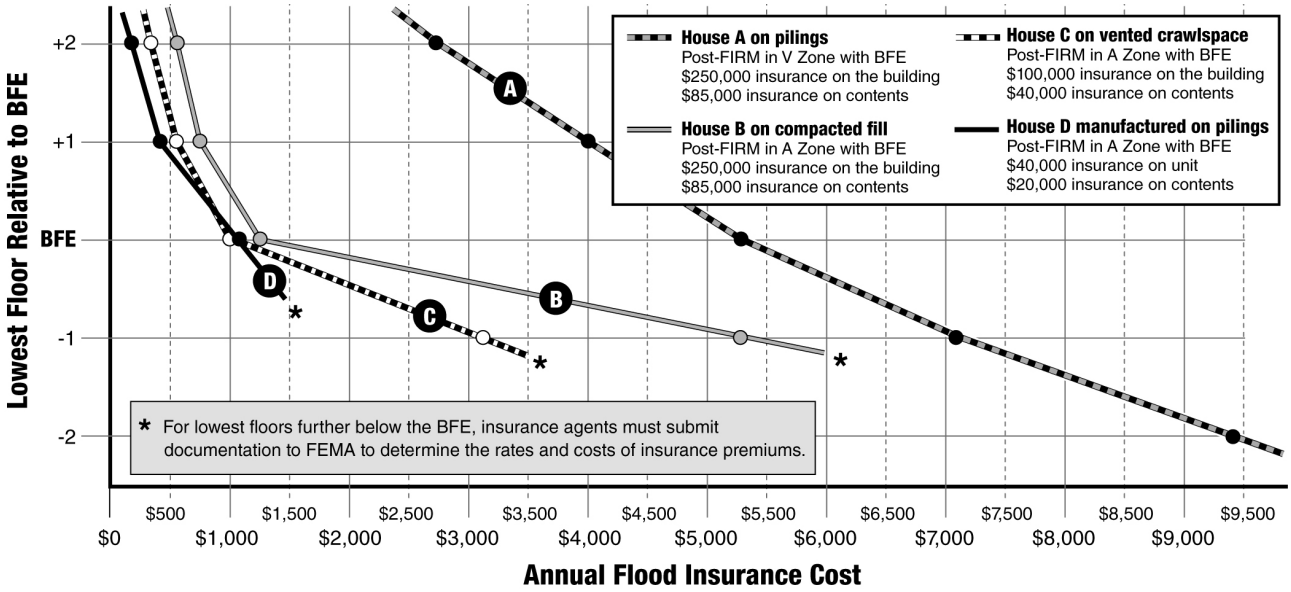
FEMA's mapping data show that less than 3 percent of all mapped flood hazard areas is V Zone. And less than 1 percent of all NFIP flood insurance policies are on 1-4 family homes in V Zones. At present, FEMA does not delineateshow a Coastal A Zone on Flood Insurance Rate Maps. According to the Association of State Floodplain Managers, coastal states that either require freeboard or where most coastal communities have adopted freeboard include: Alabama, Connecticut, Florida, Georgia, Hawaii, Maryland, Maine, North Carolina, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Virginia, and Washington.

Clear evidence of the benefits associated with adding freeboard to homes built in V Zones and Coastal A Zones is documented in *Evaluation of the National Flood Insurance Program's Building Standards* (October 2006), a report prepared by the American Institutes of Research for the Federal Emergency Management Agency. The report documented the added costs (as a percent of the cost of building to the base flood elevation) and the benefits of adding freeboard to new construction. Approximately 1,500 combinations of house size, foundation type, flood zone, flood elevation, freeboard added, and discount rate were evaluated. The benefits considered are two-fold: flood damages avoided and flood insurance premium savings.

The report concluded that – based on flood damages avoided only – it is worth spending 3% of the at-BFE building cost to incorporate 1-foot of freeboard in V Zones and Coastal A Zones. The cost of adding 1-foot of freeboard is approximately 0.5% of the at-BFE building cost for pile and pier foundations. By themselves, the flood damage reduction benefits of one-foot of freeboard outweigh the costs of adding one foot of freeboard at the time of construction.

The savings in NFIP flood insurance premium reduction, which are realized by homeowners for the life of the building, are on top of savings associated with avoiding future damage. In V Zones, flood insurance premium savings alone can recover the added cost of freeboard in two to three years. In Coastal A Zones, the payback through premium will be longer. Importantly, the report acknowledges that the computed benefits "are conservative, and will understate the true benefits" because some avoided costs are not accounted for, including clean-up and demolition costs, debris disposal costs, uninsured losses, displacement and relocation costs, loss of jobs and tax base, etc.

The graphic below shows examples of how NFIP flood insurance costs vary as a function of elevation (based on insurance rates in effect in 2007). The V Zone scenario (curve A) shows that at the BFE, the annual premium is approximately $5,300; at BFE+1 the annual premium is approximately $4,000, for an annual savings of $1,300. The other curves show savings in A Zones, where the BFE+1 savings for the three scenarios range from about $500 to about $700 a year. Note: this graphic should be used only to illustrate the general variation in costs as a function of flood zone and elevation.



During the Committee discussion in Palm Springs, a question was asked about why the proposed changes need to be made to so many sections. Changes to those sections are necessary because those sections cover aspects of dwellings subject to the elevation requirements (materials, HVAC, vents, etc.) and the elevation requirements depend on whether the dwelling is located (A Zone or V Zone) and those elevations are specified in R324.2.1 (A Zones) and R324.3.2 (V Zones).

Final Action: AS AM AMPC____ D

RB98-07/08

R324.2.2

Proposed Change as Submitted:

Proponent: Michael Graham, Smart Vent, Inc.

Revise as follows:

R324.2.2 (Supp) Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria:
   - 2.1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
   - 2.2. The total net area of all openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area, or the openings shall be designed and the construction documents shall include a statement <u>by a registered design professional</u> that the design ~~and installation~~ <u>of the openings</u> will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters <u>as specified in Section 2.6.2.2 of ASCE 24</u>.
   - 2.3. The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.
   - 2.4. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.
   - 2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area.
   - 2.6. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

Reason: The purpose of this code change is to improve consistency with the *International Building Code* and the regulations of the National Flood Insurance Program, to clarify the code that statement regarding design pertains to design of flood openings, and to cite the design criteria for engineered openings in ASCE 24, *Flood Resistant Design and Construction*.

The *International Building Code* (1612.5(1.2)) and the regulations of the National Flood Insurance Program (44 CFS 60.3(c)(5)) both require that openings other than those that meet the prescriptive requirement (1 square inch per square foot of enclosed area) be certified by a registered design professional. In addition, both the IBC and the NFIP regulations specifically require that the design of openings other than prescriptive openings (but not the installation of those openings) must be certified by a registered professional engineer or architect. Criteria for determining adequacy of performance are found in ASCE 24-05 *Flood Resistant Design and Construction* and in the NFIP's Technical Bulletin 1-93, *Openings in Foundation Walls for Buildings Located in Special Flood Hazard Areas*..

As added background, it is valuable for code officials, designers and builders to know that the International Code Council Evaluation Service recently issued Acceptance Criteria 364, *Acceptance Criteria for Automatic Foundation Flood Vents*. As with other products that are designed to satisfy code requirements, it is reasonable that a device intended to meet the performance-based alternative of the IRC (and IBC, which references ASCE 24 *Flood Resistant Design and Construction*) be demonstrated and certified as meeting the performance requirement, which is appropriately done by conforming with AC364.

Cost Impact: The code change proposal will not increase the cost of construction. Certification of the design of non-prescriptive (engineered) openings is already required by communities that participate in the NFIP.

Committee Action: **Disapproved**

Committee Reason: The committee indicated that they saw insufficient justification to support this change in language to require a registered design professional include a statement that the design of openings in an enclosed area below flood elevation will provide for equalization of hydrostatic flood forces. The committee preferred the existing prescriptive solution already offered in ASCE 24.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Michael Graham, CFM, Smart Vent, Inc., requests Approval as Submitted.

Commenter's Reason: This code change as submitted does not alter a community's responsibility under the National Flood Insurance Program (NFIP). It simply relieves the code official of the responsibility of determining whether a design for flood openings is satisfactory.

Both the IRC and ASCE 24 already offer two options to provide for relief of unbalanced hydrostatic pressures against walls in enclosures below the Base Flood Elevation: (1) prescriptive solution of 1 sq in per sq ft of enclosed area; and (2) design/performance solution. Rather than leave it to the code official to decide if a submitted design solution is acceptable, this code change as submitted specifies that the design must be in accordance with ASCE 24 Section 2.6.2.2, and that a registered design professional is to sign the design statement. Concerns about state variations should not be raised for this code change proposal because there are other places in the IRC where approval or design by an RDP is required.

Final Action: AS AM AMPC____ D

RB99-07/08
R324.2.2

Proposed Change as Submitted:

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.2.2 (Supp) Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria:
   2.1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
   2.2. The total net area of all openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area, or the openings shall be designed and the construction documents shall include a statement <u>by a registered design professional</u> that the design ~~and installation~~ will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters.

2.3. The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.
2.4. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.
2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area.
2.6. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

Reason: The purpose of this code change is to clarify that flood openings (sometimes called flood vents) that are designed to satisfy the stated performance rather than meet the prescriptive requirements (1 sq in per square foot of enclosed area) are to be designed by a registered design professional. This change is consistent with IBC Section 1612.5(1.2) and the regulations of the National Flood Insurance Program, which requires that the design be certified. Installation of flood openings is governed by the remaining requirements of R324.2.2.

Cost Impact: The code change proposal will not increase the cost of construction. Communities that participate in the NFIP already require that engineered openings be certified by a registered design professional.

Committee Action: **Disapproved**

Committee Reason: To be consistent with the decision made on RB98-07/08 the committee indicated that this language may cause problems with the jurisdictions by requiring a registered design professional. Further, this proposal does not reference ASCE 24.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rebecca C. Quinn, CFM, RCQuinn Consulting, Inc., representing Department of Homeland Security/Federal Emergency Management Agency, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R324.2.2 (Supp) Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria:
   2.1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
   2.2. The total net area of all openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area, or the openings shall be designed and the construction documents shall include a statement <u>prepared</u> by a registered design professional
   that the design <u>is consistent with ASCE 24, Section 2.6.2.2 and</u> will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters.
   2.3. The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.
   2.4. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.
   2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area.
   2.6. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

Commenter's Reason: The current IRC text provides two options for flood openings: prescriptive (1 sq in per sq ft of enclosed area) and design (provide for equalization of hydrostatic flood forces by allowing for automatic entry and exit of floodwaters). Because an improper design could lead to structural damage, it is important that a registered design professional state that the design of openings intended to meet the performance requirement. This modification to the original code change clarifies that the design should be consistent with the specifications for such openings in, ASCE 24. The addition of the word "prepared" is for consistency with other places in the IRC that call for submittals to be prepared by a registered design professional. This change is also necessary for consistency with the requirements of the National Flood Insurance Program.

This code change does not change how communities have handled flood openings under their floodplain management regulations. Openings that meet the design performance are called "engineered openings" in ASCE 24 and in FEMA's revised Technical Bulletin 1, *Openings in Foundation Walls and Walls of Enclosures Below Elevated Buildings in Special Flood Hazard Areas*, available online at www.fema.gov/plan/prevent/floodplain/techbul.shtm. The revised Technical Bulletin incorporates the design requirements of ASCE 24, Section 2.6.2.2.

Final Action: AS AM AMPC____ D

RB103-07/08
R402.2

Proposed Change as Submitted:

Proponent: J. Edward Sauter, Concrete Foundations Association of North America; Daniel Falconer, American Concrete Institute; Erin Ashley, National Ready-Mix Concrete Association

Revise as follows:

R402.2 Concrete. Concrete shall have a minimum specified compressive strength of f'_c , as shown in Table R402.2. Concrete subject to moderate or severe weathering as indicated in Table R301.2(1) shall be air entrained as specified in Table R402.2. The maximum weight of fly ash, other pozzolans, silica fume, slag or blended cements that is included in concrete mixtures for garage floor slabs and for exterior porches, carport slabs and steps that will be exposed to deicing chemicals shall not exceed the percentages of the total weight of cementitious materials specified in Section 4.2.3 of ACI 318. Materials used to produce concrete and testing thereof shall comply with the applicable standards listed in Chapter 3 of ACI 318 or ACI 332.

Reason: This code change supports the proper use of ACI's Residential Concrete Code to reference the structures that are within the scope of the IRC. The information found in ACI 332 is identical to or more appropriate than ACI 318 information based on the application to one- and two-family residential structures.

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

Committee Action: **Disapproved**

Committee Reason: Based upon the proponent's request for disapproval. The update of ACI 332 is not ready at this time.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ed Sauter, Concrete Foundations Association, Dan Falconer, American Concrete Institute, Erin Ashley, National Ready-Mixed Concrete Association, requests Approval as Submitted.

Commenter's Reason: The Committee recommendation for disapproval of RB103-07/08 was based on ACI 332-08 not being published at the time of the hearings in Palm Springs, CA. Publication of the proposed reference document (ACI Standard 332-08, Code Requirements for Residential Structural Concrete and Commentary) had been delayed because last minute changes were made to the document in response to the public review comment phase for the standard. All public comments were resolved and the document is published and available to the public. Based on that we recommend that the Code Committee action for Disapproved be voted down and a motion for Approved As Submitted for RB103-07/08 be approved by the membership.

Final Action: AS AM AMPC____ D

RB104 -07/08
R202

Proposed Change as Submitted:

Proponent: Gregory A. Stutz, National Precast Concrete Association

Add new definition as follows:

PRECAST CONCRETE FOUNDATION WALLS. Pre-engineered, precast concrete wall panels that are designed to withstand specified stresses and used to build below grade foundations.

Reason: The purpose of the code change is to clarify the Code regarding the definition of precast concrete foundation walls. The Code has recently approved sections relative to precast concrete foundation wall systems in several sections. Upon review of Chapter 2, no definition of said system exists that identifies the generic category of structural precast concrete panels (above or below grade).

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

Committee Action: **Disapproved**

Committee Reason: The definition is unclear. It is not clear if the foundation wall can extend a certain distance above grade. The "pre" can be deleted from "pre-engineered".

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Evan Gurley, National Precast Concrete Association, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

PRECAST CONCRETE FOUNDATION WALLS. ~~Pre-~~Engineered, precast concrete wall panels ~~that are designed to withstand specified stresses and used to build below-grade foundations~~ used to construct building foundations.

Commenter's Reason: The purpose of the code change is to clarify the Code regarding the definition of precast concrete foundation walls. This change addresses the committee's concerns by eliminating the term "pre" from pre-engineering. The language in the definition has been simplified.

Purpose: To clarify the Code regarding the definition of precast concrete foundation walls.

The Code has recently approved sections relative to precast concrete foundation wall systems in several sections. Upon review of Chapter 2, no definition of said system exists that identifies the generic category of structural precast concrete panels (above or below grade).

Final Action: AS AM AMPC_____ D

RB105-07/08

R404.6 (New), R404.6.1 (New), R404.6.2 (New), R404.6.3 (New)

Proposed Change as Submitted:

Proponent: Gregory A. Stutz, National Precast Concrete Association

Add new text as follows:

R404.6 Precast concrete foundation walls. Precast concrete foundation walls shall be manufactured and installed in accordance with Section R 404.6.

R404.6.1 Design. The design and manufacture of precast foundation systems shall be in accordance with Section R404.6.2 and ACI 318. The system design shall be sealed by a registered professional engineer. Individual projects built from the system design, drawings, manuals and fabrication procedures shall not be required to bear the seal of the architect or engineer unless otherwise required by state law of the jurisdiction having authority. Fabrication plants shall be inspected annually by an approved third-party inspection agency.

R404.6.2 Minimum design criteria for precast concrete foundation walls

1. Total uniform load applied to the top of foundation walls, 5300 lbs/ft (7886 kg/m)
2. Lateral earth pressure 60 lbs/ft^2/ft of depth (9.42 kPa/mm)
3. Accommodate concentrated loads in excess of the uniform load

R404.6.3 Precast concrete foundation wall design drawings. Precast concrete panel systems used as foundations shall be pre-engineered systems and shall have all applicable design criteria and rated capacities noted on the panel design drawings. The panel design drawings shall be available to the building official. Precast concrete panel design drawings shall include at a minimum, the information specified below:

1. Soil bearing capacity (psf)
2. Footing design and material
3. Maximum allowable total uniform load (lbs/linear foot)
4. Concentrated loads and their points of application