INTERNATIONAL CODE COUNCIL 2009/2010 CODE DEVELOPMENT CYCLE

PROPOSED CHANGES TO THE 2009 EDITIONS OF THE

INTERNATIONAL BUILDING CODE® INTERNATIONAL ENERGY CONSERVATION CODE® INTERNATIONAL EXISTING BUILDING CODE® INTERNATIONAL FIRE CODE® INTERNATIONAL FUEL GAS CODE® INTERNATIONAL MECHANICAL CODE® INTERNATIONAL PLUMBING CODE® INTERNATIONAL PRIVATE SEWAGE DISPOSAL CODE® INTERNATIONAL PROPERTY MAINTENANCE CODE® INTERNATIONAL RESIDENTIAL CODE® INTERNATIONAL RESIDENTIAL CODE®

October 24 2009 - November 11, 2009

Hilton Baltimore Baltimore, MD



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INTRODUCTION

The proposed changes published herein have been submitted in accordance with established procedures and are distributed for review. The publication of these changes constitutes neither endorsement nor question of them but is in accordance with established procedures so that any interested individuals may make their views known to the relevant code committee and others similarly interested. In furtherance of this purpose, the committee will hold an open public hearing at the date and place shown below for the purpose of receiving comments and arguments for or against such proposed changes. Those who are interested in testifying on any of the published changes are expected to be represented at these hearings.

This compilation of code change proposals is available in electronic form only. As part of ICC's green initiative, ICC will no longer print and distribute this document. The compilation of code change proposals will be posted on the ICC website, and CD copies will be distributed to all interested parties on our list.

2009 ICC CODE DEVELOPMENT HEARINGS

These proposed changes will be discussed in public hearings to be held on October 24, 2009 through October 31, 2009 and November 4-11, 2009 at the Hilton Baltimore, Baltimore, Maryland. The code committees will conduct their public hearings in accordance with the schedule shown on page xxxii.

REGISTRATION AND VOTING

All members of ICC may vote on any assembly motion on proposed code changes to all International Codes. For identification purposes, eligible voting members must register, at no cost, in order to vote. The registration desk will be open in the lobby of the convention center according to the following schedule:

Friday, October 23rd Saturday, October 24th through Wednesday November 11th

3:00 pm to 6:00 pm 7:30 am to 5:00 pm

Council Policy #28-Code Development (page xii) requires that ICC's membership records regarding ICC members reflect the eligible voters 10 days prior to the start of the Code Development Hearings. This process includes new as well as changes to voting status. Section 5.7.4 of CP #28 (page xix) reads as follows:

5.7.4 Eligible Voters: All members of ICC in attendance at the public hearing shall be eligible to vote on floor motions. Only one vote authorized for each eligible attendee. Code Development Committee member shall be eligible to vote on floor motions. Application, whether new or updated, for ICC membership must be received by the Code Council ten days prior to the commencement of the first day of the public hearing.

As such, new membership application as well as renewal applications must be received by ICC's Member Services Department by October 14, 2009. These records will be used to verify eligible voter status for the Code Development Hearings. Members are strongly encouraged to review their membership records for accuracy well in advance of the hearings so that any necessary changes are made prior to the October 14, 2009 deadline. For information on application for new membership and membership renewal, please go to www.iccsafe.org/membership/join.html or call ICC Member Services at 1-888-ICC SAFE (422-7233)

It should be noted that a corporate member has a single vote. Only one representative of a corporate member will be issued a voting badge. ICC Staff will be contacting corporate members regarding who the designated voting representative will be.

ADVANCED REGISTRATION

You are encouraged to advance register by filling out the registration form available at <u>www.iccsafe.org/codesforum</u>.

CODE DEVELOPMENT PROCESS CHANGES

As noted in the posted Advisory Statement of February 4, 2009, the revised Code Development Process includes maintaining the current 3-year publication cycle with a single cycle of code development between code editions. The schedule for the 2009/2010 Code Development Cycle is the transitional schedule for the revised code development process. As noted, there will be two Final Action Hearings in 2010—one for the modified Group A, and one for the modified Group B. The codes that will comprise the Group A and Group B hearings will be announced prior to the Code Development Hearings in Baltimore. See the Code Development Process Notes included with the Schedule on page viii.

PROCEDURES

The procedures for the conduct of the public hearing are published in *Council Policy* #28-Code *Development (CP#28)* ("Procedures") on page xii. The attention of interested parties is specifically directed to Section 5.0 of the Procedures. These procedures indicate the conduct of, and opportunity to participate in the ICC Code Development Process. Please review these procedures carefully to familiarize yourself with the process.

There have been a number of revisions to the procedures. Included among these revisions are the following:

- Section 2.3: **Supplements:** ICC will no longer produce a Supplement to each edition of the I-Codes. A new edition of the I-Codes will be based upon activity of a single code change cycle.
- Section 3.3.3: **Multiple code change proposals:** A proponent is not permitted to submit multiple code changes to one section of a code unless the subject matter of each proposal is different.
- Section 4.5.1: Administrative update of standards: Updating of standards without a change to code text (administrative update) shall be a code change proposal dealt with by the Administrative Code Development Committee. The updating of standards procedures have also changed. See discussion on updating of standards on page vi.
- Section 4.7: **Code change posting:** All code change proposals are required to be posted on the ICC website 30 days before the code development hearings. Published copies will not be provided.
- Section 5.2.2: **Conflict of interest:** Clarification is added that a committee member who steps down from the dais because of a conflict of interest is allowed to provide testimony from the floor on that code change proposal.
- Section 5.4.6.2: **Proponent rebuttal testimony:** Where the code change proposal is submitted by multiple proponents, only one proponent of the joint submittal to be allotted additional time for rebuttal.
- Section 5.5.2: **Modifications:** The chair rules a modification in or out of order. The chair's decision is final. No challenge in a point of order is allowed for this ruling.

Section 5.7.3: Assembly Actions: Several changes have been made to assembly actions. See explanation page v

Section 7.3.8.2: Initial motion at final action hearings: A successful assembly action becomes the initial motion at the final action hearings. See explanation page v.

ASSEMBLY ACTION

The procedures regarding assembly action at the Code Development Hearings have been revised to place more weight on the results of that action (see Section 5.7 of CP #28 on page viii). Some important items to note regarding assembly action are:

- A successful assembly action now requires a 2/3 majority rather than a simple majority.
- After the committee decision on a code change proposal is announced by the moderator, any one in the assembly may make a motion for assembly action.
- After a motion for assembly action is made and seconded, the moderator calls for a floor vote in accordance with Section 5.7.2. *No additional testimony will be permitted.*
- A successful assembly action becomes the initial motion considered at the Final Action Hearings. This also means that the required vote at the Final Action Hearings to uphold the assembly action is a simple majority.

MULTIPLE PART CODE CHANGE PROPOSALS

It is common for ICC to receive code change proposals for more than one code or more than 1 part of a code that is the responsibility of more than one committee. For instance, a code change proposal could be proposing related changes to the text of IBC Chapter 4 (IBC-General), IBC Chapter 7 (IBC-Fire Safety), and the IFC Chapter 27 (IFC). When this occurs, a single committee will now hear all of the parts, unless one of the parts is a change to the IRC, in which case the respective IRC committee will hear that part separately.

ADMINISTRATIVE CODE DEVELOPMENT COMMITTEE

A new committee for the 2009/2010 Code Change Cycle and going forward is the Administrative Code Development Committee. This committee will hear code change proposals to the administrative provisions of the I-Codes (Chapter 1 of each code.) The purpose of this committee is to achieve, inasmuch as possible, uniformity in the administrative provisions of all I-Codes when such uniformity is warranted.

ANALYSIS STATEMENTS

Various proposed changes published herein contain an "analysis" that appears after the proponent's reason. These comments do not advocate action by the code committees or the voting membership for or against a proposal. The purpose of such comments is to identify pertinent information that is relevant to the consideration of the proposed change by all interested parties, including those testifying, the code committees and the voting membership. Staff analyses customarily identify such things as: conflicts and duplication within a proposed change and with other proposed changes and/or current code text; deficiencies in proposed text and/or substantiation; text problems such as wording defects and vagueness; background information on the development of current text; and staff's review of proposed reference standards for compliance with the Procedures. Lack of an analysis indicates neither support for, nor opposition to a proposal.

REFERENCE STANDARDS

Proposed changes that include the addition of a reference to a new standard (i.e. a standard that is not currently referenced in the I-Codes.) will include in the proposal the number, title and edition of the proposed standard. This identifies to all interested parties the precise document that is being proposed and which would be included in the referenced standards chapter of the code if the proposed change is approved. Proponents of code changes which propose a new standard have been directed to forward copies of the standard to the Code Committee and an analysis statement will be posted on the ICC website indication the status of compliance of the standard with the ICC referenced standards criteria in Section 3.6 of CP #28 (see page xiv). (See the ICC Website page xi) The analysis statements for referenced standards will be posted on or before September 24, 2009. This information will also be published and made available at the hearings.

REFERENCED STANDARDS UPDATES

At the end of the agenda of the Administrative Code Development Committee is a code change proposal that is an administrative update of the referenced standards contained in the I-Codes. This code change proposal, ADM39-09/10 contains a list of standards for which the respective promulgators have indicated that the standard has been updated. The codes that these standards appear in are indicated beside each listed referenced standard. This update will then apply to every code in which the standard appears.

It should be noted that in accordance with Section 4.5.1 of CP #28 (see page xvi), standards promulgators have until December 1, 2011 to finalize and publish any updates to standards in the administrative update. If the standard is not finalized by December 1, 2011, the code will be revised to reference the previously listed year edition of that standard.

MODIFICATIONS

Those who are submitting modification for consideration by the respective Code Development Committee are required to submit a Copyright Release in order to have their modifications considered (Section 3.3.4.5 of CP #28). It is preferred that such release be executed <u>in advance</u> – the form is at <u>http://www.iccsafe.org/cs/codes/publicforms.htm</u>. Copyright release forms will also be available at the hearings. Please note that an individual need only sign one copyright release for submittals of all code change proposals, modification, and public comments in this code change cycle for which the individual might be responsible. **Please be sure to review Section 5.5.2 of CP #28 for the modification process.** The Chair of the respective code development committee rules a modification in or out of order. That ruling is final, with no challenge allowed. The proponent submitting a modification is required to supply 20 printed copies. The minimum font size must be 12 point.

CODE CORRELATION COMMITTEE

In every code change cycle, there are code change proposals that are strictly editorial. The Code Correlation Committee approves all proposals deemed editorial. A list of code correlation committee actions will be posted on the ICC website by September 24, 2009.

2009/2010 ICC CODE DEVELOPMENT SCHEDULE

STEP IN CODE DEVELOPMENT CYCLE	D	ATE	
DEADLINE FOR RECEIPT OF APPLICATIONS FOR CODE COMMITTEES	Januar	y 2, 2009	
DEADLINE FOR RECEIPT OF CODE CHANGE PROPOSALS	June	1, 2009	
WEB POSTING OF "PROPOSED CHANGES TO THE I-CODES"	August	24, 2009	
DISTRIBUTION DATE OF "PROPOSED CHANGES TO THE I-CODES" (Limited distribution – see notes)	Octobe	er 3, 2009	
CODE DEVELOPMENT HEARING (CDH)	October 24 2009 – N Hilton	ovember 11, 2009 Baltimore	
ALL CODES – see notes	Baltin	nore, MD	
WEB POSTING OF "REPORT OF THE PUBLIC HEARING"	" December 16, 2009		
DISTRIBUTION DATE OF "REPORT OF THE PUBLIC HEARING" (Limited distribution – see notes)	January	/ 11, 2010	
IN ACCORDANCE WITH THE NEW CODE DEVELOPMENT PRO INTO TWO GROUPS WITH SEPARATE PUBLIC COMMENT	DCESS (see notes), THE COE DEADLINES AND FINAL ACT	DES WILL BE SPLIT TION HEARINGS	
	GROUP A (see notes)	GROUP B (see notes)	
DEADLINE FOR RECEIPT OF PUBLIC COMMENTS	February 8, 2010	July 1, 2010	
WEB POSTING OF PUBLIC COMMENTS "FINAL ACTION AGENDA"	March 15, 2010	August 26, 2010	
DISTRIBUTION DATE OF PUBLIC COMMENTS "FINAL ACTION AGENDA" (Limited distribution see notes)	April 16, 2010 September 27, 201		
FINAL ACTION HEARINGS (FAH)	May 14 – 23, 2010 Oct 28 – Nov 1, 102 Dallas, TX Charlotte, NC		
ANNUAL CONFERENCES	October 24 – November 11, 2009 2009 ICC Annual Conference and Code Development Hearing Balitmore, MD October 25 – November 1, 2010		
	2010 ICC Annual Conference Charlotte, NC	2010 ICC Annual Conference and Final Action Hearing Charlotte, NC	
RESULTING PUBLICATION	2012 – (available /	I-Codes April, 2011)	

Code Development Process Notes:

As noted in the posted Advisory Statement of February 4, 2009, the revised Code Development Process includes maintaining the current 3-year publication cycle with a single cycle of code development between code editions. Implemented as follows:

- Transitional Process 2009/2010 only
 - o Single Code Development Hearing (CDH) for all codes in 2009
 - Two Final Action Hearings (FAH) in 2010 modified Groups A and B (see below)
 - o Public 2012 edition in April, 2011
- New Process 2012/2013 and going forward
 - o Code Committee application deadline (all codes); June 1, 2011
 - o Codes split into two groups: Group A and Group B
 - Group A: IBC; IFGC; IMC; IPC; IPSDC
 - Code change deadline: January 3, 2012
 - Code Development Hearing: April/May 2012
 - Final Action Hearing: October/November 2012 (in conjunction with Annual Conference)
 - o Group B: Admin (Ch. 1 of I-Codes); IEBC; IECC; IFC; IPerfC; IPMC; IRC; IWUIC; IZC
 - Code change deadline: January 3, 2013
 - Code Development Hearing: April/May 2013
 - Final Action Hearing: October/November 2013 (in conjunction with Annual Conference)
 - o Publish 2015 edition in April, 2014
 - o Repeat for subsequent editions

2009/2010 Cycle Notes:

- Revised code change deadline of June 1st posted on March 19th
- Distribution date: Complimentary code development cycle document distribution will be limited to CD's mailed to those who are on ICC's code change document mailing list.
- Code Development Hearings: The Baltimore Code Development Hearings will include 12 I-Codes (no changes to the ICC Performance Code. The hearings will be held in the conventional two track format with the hearings split before and after the Annual Conference during the periods of October 24 31 and November 4 11. The specific codes and hearing order to be determined based on code change volume.
- Final Action Hearing Groupings: Final Action Hearing logistics dictate that the hearings will not be split along established Group A and B codes (see above) due to hotel commitments which limit the amount of hearing time at the October/2010 FAH versus the May/2010 FAH. Tentatively, the May/2010 FAH will include Group A codes plus certain Group B codes to be determined based on code change volume.

2009/2010 STAFF SECRETARIES

IBC-General	IBC-Fire Safety	IBC-Means of Egress	IBC-Structural
Chapters 1-6. 12, 13, 27-34	Chapters 7, 8, 9, 14, 26	Chapters 10, 11	Chapters 15-25
Kermit Robinson	Ed Wirtschoreck	Kim Paarlberg	Alan Carr
ICC Whittier District Office	ICC Chicago District Office	ICC Indianapolis Field Office	ICC NW Resource Center
1-888-ICC-SAFE, ext. 3317	1-888-ICC-SAFE, ext 4317	1-888-ICC-SAFE, ext 4306	1-888-ICC-SAFE, ext 7601
FAX: 562/699-4522	FAX: 708/799-0320	FAX: 708/799-0320	FAX: 425/637-8939
krobinson@iccsafe.org	ewirtschoreck@iccsafe.org	kpearlberg@iccsafe.org	acarr@iccsafe.org

IEBC	IECC	IFC	IFGC
BethTubbs ICC Northbridge Field Office 1-888-ICC-SAFE, ext 7708 FAX: 419/ 730-6531 btubbs@iccsafe.org	Dave Bowman ICC Chicago District Office 1-888-ICC-SAFE, ext 4323 FAX: 708/799-0320 dmeyers@iccsafe.org	Bill Rehr/ Beth Tubbs ICC Chicago District Office 1-888-ICC-SAFE, ext 4342 FAX: 708/799-0320 brehr@iccsafe.org btubbs@iccsafe.org	Gregg Gress ICC Chicago District Office 1-888-ICC-SAFE, ext 4343 FAX: 708/799-0320 ggress@iccsafe.org

ІМС	ICC PC	ІРМС	IPC/IPSDC
Gregg Gress	BethTubbs	Ed Wirtschoreck	Fred Grable
ICC Chicago District Office	ICC Northbridge Field Office	ICC Chicago District Office	ICC Chicago District Office
1-888-ICC-SAFE, ext 4343	1-888-ICC-SAFE, ext 7708	1-888-ICC-SAFE, ext 4317	1-888-ICC-SAFE, ext 4359
FAX: 708/799-0320	FAX: 419/ 730-6531	FAX: 708/799-0320	FAX: 708/799-0320
ggress@iccsafe.org	btubbs@iccsafe.org	ewirtschoreck@iccsafe.org	fgrable@iccsafe.org

IRC-Building/Energy	IRC Mechanical	IRC Plumbing	IWUIC
Larry Franks/ Dave Bowman ICC Northbridge Field Office 1-888-ICC-SAFE, ext 5279 FAX: 205/592-7001 Ifranks@iccsafe.org dbowman@iccsafe.org	Gregg Gress ICC Chicago District Office 1-888-ICC-SAFE, ext 4343 FAX: 708/799-0320 ggress@iccsafe.org	Fred Grable ICC Chicago District Office 1-888-ICC-SAFE, ext 4359 FAX: 708/799-0320 fgrable@iccsafe.org	Bill Rehr ICC Chicago District Office 1-888-ICC-SAFE, ext 4342 FAX: 708/799-0320 brehr@iccsafe.org

IZC	ADMINISTRATIVE Chapter 1 All Codes Except IRC
Ed Wirtschoreck	Dave Bowman
ICC Chicago District Office	ICC Chicago District Office
1-888-ICC-SAFE, ext 4317	1-888-ICC-SAFE, ext 4323
FAX: 708/799-0320	FAX: 708/799-0320
ewirtschoreck@iccsafe.org	dbowman@iccsafe.org

SCOPING REVISIONS – WITHIN THE IBC

The 2009/2010 Staff Secretaries assignments on page ix indicate which chapters of the International Building Code are generally within the responsibility of each IBC Code Committee. However, within each of these IBC Chapters are subjects that are most appropriately maintained by another IBC Code Committee. For example, the provisions of Section 3008.1 deal with occupant evacuation elevators. Therefore, even though Chapter 30 is within the responsibility of the IBC General Committee, this section would most appropriately be maintained by the IBC Means of Egress Committee. The following table indicates responsibilities by IBC Code Committees other than the main committee for those chapters, for code changes submitted for the 2009/2010 Cycle.

SECTION	CHAPTER MAINTAINED BY	SECTION MAINTAINED BY	CODE CHANGES
403.2.3	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
403.5.1	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
403.5.2	IBC-General	IBC-Means of Egress	G46
403.5.4	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
403.5.4	IBC-General	IBC-Means of Egress	G47
403.6.1	IBC-General	IBC-Means of Egress	G48, G49
408.3.8	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
410.5.3.1	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
419.3.0	IBC-General	IBC-Means of Egress	G79
1505.1.0	IBC-Structural	IBC-Fire Safety	S10, S11
1505.8.0	IBC-Structural	IBC-Fire Safety	S12, S13
1507.16.0	IBC-Structural	IBC-Fire Safety	S10, S11
1508.1.0	IBC-Structural	IBC-Fire Safety	S24
1508.2.0	IBC-Structural	IBC-Fire Safety	S25
1509.0.0	IBC-Structural	IBC-General	S26, S27
1509.6.(new)	IBC-Structural	IBC-General	S28
1704.15.0	IBC-Structural	IBC-Fire Safety	S126, S127,S128
3007.1.0	IBC-General	IBC-Means of Egress	G48,G157
3007.2.(new)	IBC-General	IBC-Means of Egress	G158, G159
3007.2.0	IBC-General	IBC-Means of Egress	G160
3007.3.(new)	IBC-General	IBC-Means of Egress	G158, G161
3007.4.(new)	IBC-General	IBC-Means of Egress	G162
3007.4.2	IBC-General	IBC-Means of Egress	G163
3007.4.3	IBC-General	IBC-Means of Egress	G176
3007.5.1.(NEW)	IBC-General	IBC-Means of Egress	G164
3007.7.1	IBC-General	IBC-Means of Egress	G165, G166
3007.8.0	IBC-General	IBC-Means of Egress	G167
3008.1.0	IBC-General	IBC-Means of Egress	G168, G170
3008.1.1	IBC-General	IBC-Means of Egress	G169
3008.10.0	IBC-General	IBC-Means of Egress	G174
3008.10.1	IBC-General	IBC-Means of Egress	G175
3008.11.3	IBC-General	IBC-Means of Egress	G176
3008.11.5	IBC-General	IBC-Means of Egress	G177
3008.3.(NEW)	IBC-General	IBC-Means of Egress	G165, G166
3008.4.(NEW)	IBC-General	IBC-Means of Egress	G171
3008.4.0	IBC-General	IBC-Means of Egress	G46
3008.7.0	IBC-General	IBC-Means of Egress	G172
3008.9.0	IBC-General	IBC-Means of Egress	G173
3401.4.0	IBC-General	IBC-Structural	G190
3401.4.1	IBC-General	IBC-Structural	G191
3401.4.3	IBC-General	IBC-Structural	G190
3401.5.(NEW)	IBC-General	IBC-Structural	G192

SECTION	CHAPTER MAINTAINED BY	SECTION MAINTAINED BY	CODE CHANGES
3402.1.0	IBC-General	IBC-Structural	G193
3403.4.1	IBC-General	IBC-Structural	G190
3404.4.1	IBC-General	IBC-Structural	G190
3405.1.1	IBC-General	IBC-Structural	G192
3405.2.0	IBC-General	IBC-Structural	G193, G194
3405.2.1	IBC-General	IBC-Structural	G193, G190
3405.2.2	IBC-General	IBC-Structural	G193
3405.2.3	IBC-General	IBC-Structural	G193, G195
3405.3.0	IBC-General	IBC-Structural	G193
3405.4.0	IBC-General	IBC-Structural	G193, G194
3405.5.0	IBC-General	IBC-Structural	G196
3408.4.0	IBC-General	IBC-Structural	G190, G197
3408.4.0	IBC-General	IBC-Structural	G190
403.2.3	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
403.5.1	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
403.5.2	IBC-General	IBC-Means of Egress	G46
403.5.4	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
403.5.4	IBC-General	IBC-Means of Egress	G47
403.6.1	IBC-General	IBC-Means of Egress	G48, G49
408.3.8	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
410.5.3.1	IBC-General	IBC-Structural	E5 Part I (Heard by IBC-MOE)
419.3.0	IBC-General	IBC-Means of Egress	G79

ICC WEBSITE – <u>WWW.ICCSAFE.ORG</u>

While great care has been exercised in the publication of this document, errata to proposed changes may occur. Errata, if any, identified prior to the Code Development Hearings will be posted on the ICC website at http://www.iccsafe.org. Users are encouraged to periodically review the ICC Website for updates to errata to the 2009/2010 Code Development Cycle Proposed Changes. Additionally, analysis statements for code changes which propose a new referenced standard will be updated to reflect the staff review of the standard for compliance with Section 3.6 of the Procedures.



CP# 28-05 CODE DEVELOPMENT

Approved:	9/24/05
Revised:	2/27/09

CP # 28-05 is an update to ICC's Code Development Process for the International Codes dated May 15, 2004.

1.0 Introduction

- **1.1 Purpose:** The purpose of this Council Policy is to prescribe the Rules of Procedure utilized in the continued development and maintenance of the International Codes (Codes).
- **1.2 Objectives:** The ICC Code Development Process has the following objectives:
 - **1.2.1** The timely evaluation and recognition of technological developments pertaining to construction regulations.
 - **1.2.2** The open discussion of proposals by all parties desiring to participate.
 - **1.2.3** The final determination of Code text by officials representing code enforcement and regulatory agencies and by honorary members.
- **1.3 Code Publication:** The ICC Board of Directors (ICC Board) shall determine the title and the general purpose and scope of each Code published by the ICC.
 - **1.3.1 Code Correlation:** The provisions of all Codes shall be consistent with one another so that conflicts between the Codes do not occur. Where a given subject matter or code text could appear in more than one Code, the ICC Board shall determine which Code shall be the primary document, and therefore which code development committee shall be responsible for review and maintenance of the code text. Duplication of content or text between Codes shall be limited to the minimum extent necessary for practical usability of the Codes, as determined in accordance with Section 4.4.
- **1.4 Process Maintenance:** The review and maintenance of the Code Development Process and these Rules of Procedure shall be by the ICC Board. The manner in which ICC codes are developed embodies core principles of the organization. One of those principles is that the final content of ICC codes is determined by a majority vote of the governmental and honorary members. It is the policy of the Board that there shall be no change to this principle without the affirmation of two-thirds of the governmental and honorary members responding.
- **1.5 Secretariat:** The Chief Executive Officer shall assign a Secretariat for each of the Codes. All correspondence relating to code change proposals and public comments shall be addressed to the Secretariat.
- **1.6** Video Taping: Individuals requesting permission to video tape any meeting, or portion thereof, shall be required to provide the ICC with a release of responsibility disclaimer and shall acknowledge that they have insurance coverage for liability and misuse of video tape materials. Equipment and the process used to video tape shall, in the judgment of the ICC Secretariat, be conducted in a manner that is not disruptive to the meeting. The ICC shall not be responsible for equipment, personnel or any other provision necessary to accomplish the videotaping. An unedited copy of the video tape shall be forwarded to ICC within 30 days of the meeting.

2.0 Code Development Cycle

2.1 Intent: The code development cycle shall consist of the complete consideration of code change proposals in accordance with the procedures herein specified, commencing with the deadline for submission of code change proposals (see Section 3.5) and ending with publication of final action on the code change proposals (see Section 7.6).

- **2.2 New Editions:** The ICC Board shall determine the schedule for publishing new editions of the Codes. Each new edition shall incorporate the results of the code development activity since the last edition.
- **2.3 Supplements:** The results of code development activity between editions may be published.
- 2.4 Emergency Procedures: In the event that the ICC Board determines that an emergency amendment to any Code is warranted, the same may be adopted by the ICC Board. Such action shall require an affirmative vote of at least two-thirds of the ICC Board.

The ICC membership shall be notified within ten days after the ICC Boards' official action of any emergency amendment. At the next Annual Business Meeting, any emergency amendment shall be presented to the members for ratification by a majority of the ICC Governmental Member Representatives and Honorary Members present and voting.

All code revisions pursuant to these emergency procedures and the reasons for such corrective action shall be published as soon as practicable after ICC Board action. Such revisions shall be identified as an emergency amendment.

Emergency amendments to any Code shall not be considered as a retro-active requirement to the Code. Incorporation of the emergency amendment into the adopted Code shall be subjected to the process established by the adopting authority.

3.0 Submittal of Code Change Proposals

- **3.1 Intent:** Any interested person, persons or group may submit a code change proposal which will be duly considered when in conformance to these Rules of Procedure.
- **3.2** Withdrawal of Proposal: A code change proposal may be withdrawn by the proponent (WP) at any time prior to Final Action Consideration of that proposal. A withdrawn code change proposal shall not be subject to a public hearing, motions, or Final Action Consideration.
- **3.3** Form and Content of Code Change Submittals: Each code change proposal shall be submitted separately and shall be complete in itself. Each submittal shall contain the following information:
 - **3.3.1 Proponent:** Each code change proposal shall include the name, title, mailing address, telephone number, and email address of the proponent.
 - **3.3.1.1** If a group, organization or committee submits a code change proposal, an individual with prime responsibility shall be indicated.
 - **3.3.1.2** If a proponent submits a code change on behalf of a client, group, organization or committee, the name and mailing address of the client, group, organization or committee shall be indicated.
 - **3.3.2** Code Reference: Each code change proposal shall relate to the applicable code sections(s) in the latest edition of the Code.
 - **3.3.2.1** If more than one section in the Code is affected by a code change proposal, appropriate proposals shall be included for all such affected sections.
 - **3.3.2.2** If more than one Code is affected by a code change proposal, appropriate proposals shall be included for all such affected Codes and appropriate cross referencing shall be included in the supporting information.
 - **3.3.3 Multiple code change proposals to a code section.** A proponent shall not submit multiple code change proposals to the same code section. When a proponent submits multiple code change proposals to the same section, the proposals shall be considered as incomplete proposals and processed in accordance with Section 4.3. This restriction shall not apply to code change proposals that attempt to address differing subject matter within a code section.
 - **3.3.4 Text Presentation:** The text proposal shall be presented in the specific wording desired with deletions shown struck out with a single line and additions shown underlined with a single line.

- **3.3.4.1** A charging statement shall indicate the referenced code section(s) and whether the proposal is intended to be an addition, a deletion or a revision to existing Code text.
- **3.3.4.2** Whenever practical, the existing wording of the text shall be preserved with only such deletions and additions as necessary to accomplish the desired change.
- **3.3.4.3** Each proposal shall be in proper code format and terminology.
- **3.3.4.4** Each proposal shall be complete and specific in the text to eliminate unnecessary confusion or misinterpretation.
- **3.3.4.5** The proposed text shall be in mandatory terms.
- **3.3.5 Supporting Information:** Each code change proposal shall include sufficient supporting information to indicate how the proposal is intended to affect the intent and application of the Code.
 - **3.3.5.1 Purpose:** The proponent shall clearly state the purpose of the proposed code change (e.g. clarify the Code; revise outdated material; substitute new or revised material for current provisions of the Code; add new requirements to the Code; delete current requirements, etc.)
 - **3.3.5.2 Reasons:** The proponent shall justify changing the current Code provisions, stating why the proposal is superior to the current provisions of the Code. Proposals which add or delete requirements shall be supported by a logical explanation which clearly shows why the current Code provisions are inadequate or overly restrictive, specifies the shortcomings of the current Code provisions and explains how such proposals will improve the Code.
 - **3.3.5.3 Substantiation:** The proponent shall substantiate the proposed code change based on technical information and substantiation. Substantiation provided which is reviewed in accordance with Section 4.2 and determined as not germane to the technical issues addressed in the proposed code change shall be identified as such. The proponent shall be notified that the proposal is considered an incomplete proposal in accordance with Section 4.3 and the proposal shall be held until the deficiencies are corrected. The proponent shall have the right to appeal this action in accordance with the policy of the ICC Board. The burden of providing substantiating material lies with the proponent of the code change proposal.
 - **3.3.5.4 Bibliography:** The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change and the proponent shall make the substantiating materials available for review at the appropriate ICC office and during the public hearing.
 - **3.3.5.5 Copyright Release:** The proponent of code change proposals, floor modifications and public comments shall sign a copyright release reading: "I hereby grant and assign to ICC all rights in copyright I may have in any authorship contributions I make to ICC in connection with any proposal and public comment, in its original form submitted or revised form, including written and verbal modifications submitted in accordance Section 5.5.2. I understand that I will have no rights in any ICC publications that use such contributions in the form submitted by me or another similar form and certify that such contributions are not protected by the copyright of any other person or entity."
 - **3.3.5.6 Cost Impact:** The proponent shall indicate one of the following regarding the cost impact of the code change proposal: 1) the code change proposal will increase the cost of construction; or 2) the code change proposal will not increase the cost of construction. This information will be included in the published code change proposal.
- **3.4 Number:** One copy of each code change proposal, two copies of each proposed new referenced standard and one copy of all substantiating information shall be submitted. Additional copies may be requested when determined necessary by the Secretariat to allow such information to be distributed to the code development committee. Where such additional copies are requested, it shall be the responsibility of the proponent to send such copies to the respective code development committee. A copy of the code change proposal in electronic form is preferred.
- **3.5 Submittal Deadline:** Each code change proposal shall be received at the office of the Secretariat by the posted deadline. Such posting shall occur no later than 120 days prior to the code change deadline. The submitter of a proposed code change is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.
- **3.6 Referenced Standards:** In order for a standard to be considered for reference or to continue to be referenced by the Codes, a standard shall meet the following criteria:

3.6.1 Code References:

- **3.6.1.1** The standard, including title and date, and the manner in which it is to be utilized shall be specifically referenced in the Code text.
- **3.6.1.2** The need for the standard to be referenced shall be established.

3.6.2 Standard Content:

- **3.6.2.1** A standard or portions of a standard intended to be enforced shall be written in mandatory language.
- **3.6.2.2** The standard shall be appropriate for the subject covered.
- **3.6.2.3** All terms shall be defined when they deviate from an ordinarily accepted meaning or a dictionary definition.
- **3.6.2.4** The scope or application of a standard shall be clearly described.
- 3.6.2.5 The standard shall not have the effect of requiring proprietary materials.
- **3.6.2.6** The standard shall not prescribe a proprietary agency for quality control or testing.
- **3.6.2.7** The test standard shall describe, in detail, preparation of the test sample, sample selection or both.
- **3.6.2.8** The test standard shall prescribe the reporting format for the test results. The format shall identify the key performance criteria for the element(s) tested.
- **3.6.2.9** The measure of performance for which the test is conducted shall be clearly defined in either the test standard or in Code text.
- **3.6.2.10** The standard shall not state that its provisions shall govern whenever the referenced standard is in conflict with the requirements of the referencing Code.
- **3.6.2.11** The preface to the standard shall announce that the standard is promulgated according to a consensus procedure.

3.6.3 Standard Promulgation:

- **3.6.3.1** Code change proposals with corresponding changes to the code text which include a reference to a proposed new standard or a proposed update of an existing referenced shall comply with this section. The standard shall be completed and readily available prior to Final Action Consideration based on the cycle of code development which includes the proposed code change proposal. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. Updating of standards without corresponding code text changes shall be accomplished administratively in accordance with Section 4.5.
- **3.6.3.2** The standard shall be developed and maintained through a consensus process such as ASTM or ANSI.

4.0 Processing of Proposals

- **4.1 Intent:** The processing of code change proposals is intended to ensure that each proposal complies with these Rules of Procedure and that the resulting published proposal accurately reflects that proponent's intent.
- **4.2 Review:** Upon receipt in the Secretariat's office, the code change proposals will be checked for compliance with these Rules of Procedure as to division, separation, number of copies, form, language, terminology, supporting statements and substantiating data. Where a code change proposal consists of multiple parts which fall under the maintenance responsibilities of different code committees, the Secretariat shall determine the code committee responsible for determining the committee action in accordance with Section 5.6.
- **4.3 Incomplete Proposals:** When a code change proposal is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the Secretariat shall notify the proponent of the specific deficiencies and the proposal shall be held until the deficiencies are corrected, with a final date set for receipt of a corrected submittal. If the Secretariat receives the corrected proposal after the final date, the proposal shall be held over until the next code development cycle. Where there are otherwise no deficiencies addressed by this section, a proposal that incorporates a new referenced standard shall be processed with an analysis of referenced standard's compliance with the criteria set forth in Section 3.6.
- **4.4 Editorial:** The Chief Executive Officer shall have the authority at all times to make editorial and format changes to the Code text, or any approved changes, consistent with the intent, provisions and style of the Code. An editorial or format change is a text change that does not affect the scope or application of the code requirements.

4.5 Updating Standards:

- **4.5.1 Standards referenced in the 2012 Edition of the I-Codes:** The updating of standards referenced by the Codes shall be accomplished administratively by the Administrative code development committee in accordance with these full procedures except that the deadline for availability of the updated standard and receipt by the Secretariat shall be December 1, 2011. The published version of the 2012 Code which references the standard will refer to the updated edition of the standard. If the standard is not available by the deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued Multiple standards to be updated may be included in a single proposal.
- **4.5.2** Standards referenced in the 2015 Edition and following Editions of the I-Codes: The updating of standards referenced by the Codes shall be accomplished administratively by the Administrative code development committee in accordance with these full procedures except that multiple standards to be updated may be included in a single proposal. The standard shall be completed and readily available prior to Final Action Consideration of the Administrative code change proposal which includes the proposed update.
- **4.6 Preparation:** All code change proposals in compliance with these procedures shall be prepared in a standard manner by the Secretariat and be assigned separate, distinct and consecutive numbers. The Secretariat shall coordinate related proposals submitted in accordance with Section 3.3.2 to facilitate the hearing process.
- **4.7 Publication:** All code change proposals shall be posted on the ICC website at least 30 days prior to the public hearing on those proposals and shall constitute the agenda for the public hearing. Code change proposals which have not been published shall not be considered.

5.0 Public Hearing

- **5.1 Intent:** The intent of the public hearing is to permit interested parties to present their views including the cost and benefits on the code change proposals on the published agenda. The code development committee will consider such comments as may be presented in the development of their action on the disposition of such proposals. At the conclusion of the code development committee deliberations, the committee action on each code change proposal shall be placed before the hearing assembly for consideration in accordance with Section 5.7.
- 5.2 **Committee:** The Code Development Committees shall be appointed by the applicable ICC Council.
 - **5.2.1** Chairman/Moderator: The Chairman and Vice-Chairman shall be appointed by the Steering Committee on Councils from the appointed members of the committee. The ICC President shall appoint one or more Moderators who shall act as presiding officer for the public hearing.
 - **5.2.2 Conflict of Interest:** A committee member shall withdraw from and take no part in those matters with which the committee member has an undisclosed financial, business or property interest. The committee member shall not participate in any committee discussion on the matter or any committee vote. Violation thereof shall result in the immediate removal of the committee member from the committee. A committee member who is a proponent of a proposal shall not participate in any committee discussion on the matter or any committee member shall be permitted to participate in the floor discussion in accordance with Section 5.5 by stepping down from the dais.
 - **5.2.3 Representation of Interest:** Committee members shall not represent themselves as official or unofficial representatives of the ICC except at regularly convened meetings of the committee.
 - **5.2.4 Committee Composition:** The committee may consist of representation from multiple interests. A minimum of thirty-three and one-third percent (33.3%) of the committee members shall be regulators.
- **5.3 Date and Location:** The date and location of each public hearing shall be announced not less than 60 days prior to the date of the public hearing.
- **5.4 General Procedures:** *The Robert's Rules of Order* shall be the formal procedure for the conduct of the public hearing except as a specific provision of these Rules of Procedure may otherwise dictate. A quorum shall consist of a majority of the voting members of the committee.

- **5.4.1** Chair Voting: The Chairman of the committee shall vote only when the vote cast will break a tie vote of the committee.
- **5.4.2 Open Meetings:** Public hearings of the Code Development Committees are open meetings. ` Any interested person may attend and participate in the Floor Discussion and Assembly Consideration portions of the hearing. Only eligible voters (see Section 5.7.4) are permitted to vote on Assembly Considerations. Only Code Development Committee members may participate in the Committee Action portion of the hearings (see Section 5.6).
- **5.4.3 Presentation of Material at the Public Hearing:** Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 5.5.2. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 3.3.4.4 and other material submitted in response to a code change proposal shall be located in a designated area in the hearing room and shall not be distributed to the code development committee at the public hearing.
- **5.4.4** Agenda Order: The Secretariat shall publish an agenda for each public hearing, placing individual code change proposals in a logical order to facilitate the hearing. Any public hearing attendee may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another proposal is being discussed. Preference shall be given to grouping like subjects together, and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position. A motion to revise the agenda order is subject to a 2/3 vote of those present and voting.
- **5.4.5 Reconsideration:** There shall be no reconsideration of a proposed code change after it has been voted on by the committee in accordance with Section 5.6; or, in the case of assembly consideration, there shall be no reconsideration of a proposed code change after it has been voted on by the assembly in accordance with Section 5.7.
- **5.4.6 Time Limits:** Time limits shall be established as part of the agenda for testimony on all proposed changes at the beginning of each hearing session. Each person requesting to testify on a change shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall have limited authority to modify time limitations on debate. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.
 - **5.4.6.1 Time Keeping:** Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.
 - **5.4.6.2 Proponent Testimony:** The Proponent is permitted to waive an initial statement. The Proponent shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where the code change proposal is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to be allotted additional time for rebuttal.
- **5.4.7 Points of Order:** Any person participating in the public hearing may challenge a procedural ruling of the Moderator or the Chairman. A majority vote of the eligible voters as determined in Section 5.7.4 shall determine the decision.
- **5.5 Floor Discussion:** The Moderator shall place each code change proposal before the hearing for discussion by identifying the proposal and by regulating discussion as follows:

5.5.1 Discussion Order:

- 1. *Proponents.* The Moderator shall begin by asking the proponent and then others in support of the proposal for their comments.
- 2. Opponents. After discussion by those in support of a proposal, those opposed hereto, if any, shall have the opportunity to present their views.
- 3. *Rebuttal in support.* Proponents shall then have the opportunity to rebut points raised by the opponents.
- 4. Rerebuttal in opposition. Opponents shall then have the opportunity to respond to the proponent's rebuttal.
- **5.5.2 Modifications:** Modifications to proposals may be suggested from the floor by any person participating in the public hearing. The person proposing the modification is deemed to be the proponent of the modification.

- **5.5.2.1 Submission and Written Copies.** All modifications must be written, unless determined by the Chairman to be either editorial or minor in nature. The modification proponent shall provide 20 copies to the Secretariat for distribution to the committee.
- **5.5.2.2 Criteria.** The Chairman shall rule proposed modifications in or out of order before they are discussed on the floor. A proposed modification shall be ruled out of order if it:
 - 1. is not legible, unless not required to be written in accordance with Section 5.5.2.1; or
 - 2. changes the scope of the original proposal; or
 - 3. is not readily understood to allow a proper assessment of its impact on the original proposal or the code.

The ruling of the Chairman on whether or not the modification is in or out of order shall be final and is not subject to a point of order in accordance with Section 5.4.7.

- **5.5.2.3 Testimony.** When a modification is offered from the floor and ruled in order by the Chairman, a specific floor discussion on that modification is to commence in accordance with the procedures listed in Section 5.5.1.
- **5.6 Committee Action:** Following the floor discussion of each code change proposal, one of the following motions shall be made and seconded by members of the committee.
 - 1. Approve the code change proposal as submitted (AS) or
 - 2. Approve the code change proposal as modified with specific modifications (AM), or
 - 3. Disapprove the code change proposal (D)

Discussion on this motion shall be limited to Code Development Committee members. If a committee member proposes a modification which had not been proposed during floor discussion, the Chairman shall rule on the modification in accordance with Section 5.5.2.2 If a committee member raises a matter of issue, including a proposed modification, which has not been proposed or discussed during the floor discussion, the Moderator shall suspend the committee discussion and shall reopen the floor discussion for comments on the specific matter or issue. Upon receipt of all comments from the floor, the Moderator shall resume committee discussion.

The Code Development Committee shall vote on each motion with the majority dictating the committee's action. Committee action on each code change proposal shall be completed when one of the motions noted above has been approved. Each committee vote shall be supported by a reason.

The Code Development Committee shall maintain a record of its proceedings including the action on each code change proposal.

5.7 Assembly Consideration: At the conclusion of the committee's action on a code change proposal and before the next code change proposal is called to the floor, the Moderator shall ask for a motion from the public hearing attendees who may object to the committee's action. If a motion in accordance with Section 5.7.1 is not brought forward on the committee's action, the results of the public hearing shall be established by the committee's action. If a motion in accordance with Section 5.7.1 is brought forward and

is sustained in accordance with Section 5.7.3, both the committee's action and the assemblies' action shall be reported as the results of the public hearing. Where a motion is sustained in accordance with Section 5.7.3, such action shall be the initial motion considered at Final Action Consideration in accordance with Section 7.3.8.2.

- **5.7.1** Floor Motion: Any attendee may raise an objection to the committee's action in which case the attendee will be able to make a motion to:
 - 1. Approve the code change proposal as submitted from the floor_(ASF), or
 - Approve the code change proposal as modified from the floor (AMF) with a specific modification that has been previously offered from the floor and ruled in order by the Chairman during floor discussion (see Section 5.5.2) or has been offered by a member of the Committee and ruled in order by the Chairman during committee discussion (see Section 5.6), or
 - 3. Disapprove the code change proposal from the floor (DF).

- **5.7.2 Discussion:** On receipt of a second to the floor motion, the Moderator shall place the motion before the assembly for a vote. No additional testimony shall be permitted.
- **5.7.3** Assembly Action: The assembly action shall be in accordance with the following majorities based on the number of votes cast by eligible voters (See 5.7.4).

Committee	Desired Assembly Action			
Action	ASF	AMF	DF	
AS		2/3 Majority	2/3 Majority	
AM	2/3 Majority	2/3 Majority	2/3 Majority	
D	2/3 Majority	2/3 Majority		

- **5.7.4 Eligible Voters:** All members of ICC in attendance at the public hearing shall be eligible to vote on floor motions. Only one vote authorized for each eligible attendee. Code Development Committee members shall be eligible to vote on floor motions. Application, whether new or updated, for ICC membership must be received by the Code Council ten days prior to the commencement of the first day of the public hearing.
- **5.8 Report of the Public Hearing:** The results of the public hearing, including committee action and successful assembly action, shall be posted on the ICC website not less than 60 days prior to Final Action Consideration except as approved by the ICC Board.

6.0 Public Comments

- 6.1 Intent: The public comment process gives attendees at the Final Action Hearing an opportunity to consider specific objections to the results of the public hearing and more thoughtfully prepare for the discussion for Final Action Consideration. The public comment process expedites the Final Action Consideration at the Final Action Hearing by limiting the items discussed to the following:
 - 6.1.1 Consideration of items for which a public comment has been submitted; and
 - **6.1.2** Consideration of items which received a successful assembly action at the public hearing.
- **6.2 Deadline:** The deadline for receipt of a public comment to the results of the public hearing shall be announced at the public hearing but shall not be less than 30 days from the availability of the report of the results of the public hearing (see Section 5.8).
- **6.3 Withdrawal of Public Comment:** A public comment may be withdrawn by the public commenter at any time prior to Final Action Consideration of that comment. A withdrawn public comment shall not be subject to Final Action Consideration. If the only public comment to a code change proposal is withdrawn by the public commenter prior to the vote on the consent agenda in accordance with Section 7.3.4, the proposal shall be considered as part of the consent agenda. If the only public comment to a code change proposal is withdrawn by the public commenter after the vote on the consent agenda in accordance with Section 7.3.4, the proposal shall be considered as part of the public commenter after the vote on the consent agenda in accordance with Section 7.3.4, the proposal shall continue as part of the individual consent agenda in accordance with Section 7.3.5, however the public comment shall not be subject to Final Action Consideration.
- **6.4** Form and Content of Public Comments: Any interested person, persons, or group may submit a public comment to the results of the public hearing which will be considered when in conformance to these requirements. Each public comment to a code change proposal shall be submitted separately and shall be complete in itself. Each public comment shall contain the following information:
 - **6.4.1 Public comment:** Each public comment shall include the name, title, mailing address, telephone number and email address of the public commenter. If group, organization, or committee submits a public comment, an individual with prime responsibility shall be indicated. If a public comment is submitted on behalf a client, group, organization or committee, the name and mailing address of the client, group, organization or committee shall be indicated. The scope of the public comment shall be consistent with the scope of the original code change proposal, committee action or successful assembly action. Public comments which are determined as not within the scope of the code change proposal, committee action or successful assembly action or successful assembly action shall be identified as such. The public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. A copyright release in accordance with Section 3.3.4.5 shall be provided with the public comment.

- **6.4.2 Code Reference:** Each public comment shall include the code change proposal number and the results of the public hearing, including successful assembly actions, on the code change proposal to which the public comment is directed.
- 6.4.3 Multiple public comments to a code change proposal. A proponent shall not submit multiple public comments to the same code change proposal. When a proponent submits multiple public comments to the same code change proposal, the public comments shall be considered as incomplete public comments and processed in accordance with Section 6.5.1. This restriction shall not apply to public comments that attempt to address differing subject matter within a code section.
- **6.4.4 Desired Final Action:** The public comment shall indicate the desired final action as one of the following:
 - 1. Approve the code change proposal as submitted (AS), or
 - 2. Approve the code change proposal as modified (AM) by one or more specific modifications published in the Results of the Public Hearing or published in a public comment, or
 - 3. Disapprove the code change proposal (D)
- **6.4.5 Supporting Information:** The public comment shall include in a statement containing a reason and justification for the desired final action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 6.4 and determined as not germane to the technical issues addressed in the code change proposal or committee action shall be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. The public commenter shall have the right to appeal this action in accordance with the policy of the ICC Board. A bibliography of any substantiating material submitted with a public comment shall be published with the public comment and the substantiating material shall be made available at the Final Action Hearing.
- **6.4.6 Number:** One copy of each public comment and one copy of all substantiating information shall be submitted. Additional copies may be requested when determined necessary by the Secretariat. A copy of the public comment in electronic form is preferred.
- **6.5 Review:** The Secretariat shall be responsible for reviewing all submitted public comments from an editorial and technical viewpoint similar to the review of code change proposals (See Section 4.2).
 - **6.5.1 Incomplete Public Comment:** When a public comment is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the public comment shall not be processed. The Secretariat shall notify the public commenter of the specific deficiencies and the public comment shall be held until the deficiencies are corrected, or the public comment shall be returned to the public commenter with instructions to correct the deficiencies with a final date set for receipt of the corrected public comment.
 - **6.5.2 Duplications**: On receipt of duplicate or parallel public comments, the Secretariat may consolidate such public comments for Final Action Consideration. Each public commenter shall be notified of this action when it occurs.
 - **6.5.3 Deadline:** Public comments received by the Secretariat after the deadline set for receipt shall not be published and shall not be considered as part of the Final Action Consideration.
- **6.6 Publication:** The public hearing results on code change proposals that have not been public commented and the code change proposals with public commented public hearing results and successful assembly actions shall constitute the Final Action Agenda. The Final Action Agenda shall be posted on the ICC website at least 30 days prior to Final Action consideration.

7.0 Final Action Consideration

- **7.1 Intent:** The purpose of Final Action Consideration is to make a final determination of all code change proposals which have been considered in a code development cycle by a vote cast by eligible voters (see Section 7.4).
- **7.2** Agenda: The final action consent agenda shall be comprised of proposals which have neither an assembly action nor public comment. The agenda for public testimony and individual consideration shall be comprised of proposals which have a successful assembly action or public comment (see Sections 5.7 and 6.0).
- **7.3 Procedure:** *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Final Action Consideration except as these Rules of Procedure may otherwise dictate.

- **7.3.1 Open Meetings:** Public hearings for Final Action Consideration are open meetings. Any interested person may attend and participate in the Floor Discussion.
- **7.3.2** Agenda Order: The Secretariat shall publish an agenda for Final Action Consideration, placing individual code change proposals and public comments in a logical order to facilitate the hearing. The proponents or opponents of any proposal or public comment may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another proposal is being discussed. Preference shall be given to grouping like subjects together and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position. A motion to revise the agenda order is subject to a 2/3 vote of those present and voting.
- **7.3.3 Presentation of Material at the Public Hearing:** Information to be provided at the hearing shall be limited to verbal presentations. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 6.4.4 and other material submitted in response to a code change proposal or public comment shall be located in a designated area in the hearing room.
- **7.3.4** Final Action Consent Agenda: The final action consent agenda (see Section 7.2) shall be placed before the assembly with a single motion for final action in accordance with the results of the public hearing. When the motion has been seconded, the vote shall be taken with no testimony being allowed. A simple majority (50% plus one) based on the number of votes cast by eligible voters shall decide the motion.
- **7.3.5** Individual Consideration Agenda: Upon completion of the final action consent vote, all proposed changes not on the final action consent agenda shall be placed before the assembly for individual consideration of each item (see Section 7.2).
- **7.3.6 Reconsideration:** There shall be no reconsideration of a proposed code change after it has been voted on in accordance with Section 7.3.8.
- **7.3.7 Time Limits:** Time limits shall be established as part of the agenda for testimony on all proposed changes at the beginning of each hearing session. Each person requesting to testify on a change shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall have limited authority to modify time limitations on debate. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.
 - **7.3.7.1 Time Keeping:** Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.
- **7.3.8 Discussion and Voting:** Discussion and voting on proposals being individually considered shall be in accordance with the following procedures:
 - **7.3.8.1 Allowable Final Action Motions:** The only allowable motions for final action are Approval as Submitted, Approval as Modified by one or more modifications published in the Final Action Agenda, and Disapproval.
 - **7.3.8.2 Initial Motion:** The Code Development Committee action shall be the initial motion considered, unless there was a successful assembly action in accordance with Section 5.7.3. If there was a successful assembly action, it shall be the initial motion considered. If the assembly action motion fails, the code development committee action shall become the next motion considered.
 - **7.3.8.3 Motions for Modifications:** Whenever a motion under consideration is for Approval as Submitted or Approval as Modified, a subsequent motion and second for a modification published in the Final Action Agenda may be made (see Section 6.4.3). Each subsequent motion for modification, if any, shall be individually discussed and voted before returning to the main motion. A two-thirds majority based on the number of votes cast by eligible voters shall be required for a successful motion on all modifications.
 - **7.3.8.4 Voting:** After dispensing with all motions for modifications, if any, and upon completion of discussion on the main motion, the Moderator shall then ask for the vote on the main motion. If the motion fails to receive the majority required in Section 7.5, the Moderator shall ask for a new motion.
 - **7.3.8.5 Subsequent Motion:** If the initial motion is unsuccessful, a motion for one of the other allowable final actions shall be made (see Section 7.3.8.1) and dispensed with until a successful final action is achieved. If a successful final action is not achieved, Section 7.5.1 shall apply.

- **7.3.9 Proponent testimony:** The Proponent of a public comment is permitted to waive an initial statement. The Proponent of the public comment shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where a public comment is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to waive an initial statement.
- **7.3.10 Points of Order:** Any person participating in the public hearing may challenge a procedural ruling of the Moderator. A majority vote of the eligible voters as determined in Section 5.7.4 shall determine the decision.
- 7.4 Eligible voters: ICC Governmental Member Representatives and Honorary Members in attendance at the Final Action Hearing shall have one vote per eligible attendee on all International Codes. Applications, whether new or updated, for governmental member voting representative status must be received by the Code Council ten days prior to the commencement of the first day of the Final Action Hearing in order for any designated representative to be eligible to vote.
- **7.5 Majorities for Final Action:** The required voting majority based on the number of votes cast of eligible voters shall be in accordance with the following table:

Public Hearing	Desired Final	Desired Final Action			
Action (see note)	AS	AM	D		
AS	Simple Majority	2/3 Majority	Simple Majority		
AM	2/3 Majority	Simple Majority to sustain the Public Hearing Action or; 2/3 Majority on additional modifications and 2/3 on overall AM	Simple Majority		
D	2/3 Majority	2/3 Majority	Simple Majority		

Note: The Public Hearing Action includes the committee action and successful assembly action.

- **7.5.1** Failure to Achieve Majority Vote: In the event that a code change proposal does not receive any of the required majorities for final action in Section 7.5, final action on the code change proposal in question shall be disapproval.
- **7.6 Publication:** The Final action on all proposed code changes shall be published as soon as practicable after the determination of final action. The exact wording of any resulting text modifications shall be made available to any interested party.

8.0 Appeals

8.1 Right to Appeal: Any person may appeal an action or inaction in accordance with CP-1.

2009/2010 ICC CODE DEVELOPMENT CYCLE CROSS INDEX OF PROPOSED CODE CHANGES

Some of the proposed code changes include sections that are outside of the scope of the chapters or the code listed in the table of 2009/2010 Staff Secretaries on page ix. This is done in order to facilitate coordination among the International Codes which is one of the fundamental principles of the International Codes.

Listed in this cross index are proposed code changes that include sections of codes or codes other than those listed on page ix. For example, IBC Section 402.16.5 is proposed for revision in Part II of code change F58-09/10, which is to be heard by the IFC Committee. This section of the IBC is typically the responsibility of the IBC General Committee as listed in the table of 2009/2010 Staff Secretaries. It is therefore identified in this cross index. Another example is Section 905.4 of the International Fire Code. The International Fire Code is normally maintained by the IFC Committee, but Section 905.4 will be considered for revision in proposed code change G31-09/10 and will be placed on the IBC General Committee agenda. In some instances, there are other subsections that are revised by an identified code change that is not included in the cross index. For example, numerous sections in Chapter 10 of the International Fire Code would be revised by the proposed changes to Chapter 10 of the IBC. This was done to keep the cross index brief enough for easy reference.

This information is provided to assist users in locating all of the proposed code changes that would affect a certain section or chapter. For example, to find all of the proposed code changes that would affect Chapter 7 of the IBC, review the proposed code changes in the Volume 1 monograph for the IBC Fire Safety Committee (listed with a FS prefix) then review this cross reference for Chapter 7 of the IBC for proposed code change groups. While care has been taken to be accurate, there may be some omissions in this list.

Letter prefix: Each proposed change number has a letter prefix that will identify where the proposal is published. The letter designations for proposed changes and the corresponding publications are as follows:

PREFIX	PROPOSED CHANGE GROUP (see monograph table of contents for location)
ADM	Administrative
E	International Building Code - Means of Egress
EB	International Existing Building Code
EC	International Energy Conservation Code
F	International Fire Code
FG	International Fuel Gas Code
FS	International Building Code - Fire Safety
G	International Building Code - General
Μ	International Mechanical Code
PC	ICC Performance Code
Р	International Plumbing Code
PSD	International Private Sewage Disposal Code
PM	International Property Maintenance Code
RB	International Residential Code - Building
RE	International Residential Code - Energy
RM	International Residential Code - Mechanical
RP	International Residential Code - Plumbing
S	International Building Code - Structural
WUIC	International Wildland-Urban Interface Code
Z	International Zoning Code

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107.2.2	ADM10	707.7.1	E5 – Part I
107.2.3	ADM11	708.1	E5 – Part I
107.2.6	ADM12	708.2	E5 – Part I
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109.3.10.1	ADM14 Part I	708.6	E5 – Part I
110.3	ADM8 Part II	708.14.1	G44 Part I
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403.2.3.1	E5 – Part I	Table 803.9	E5 – Part I
403.2.3.2	E5 – Part I	804.4	E5 – Part I
403.3.1.1 (IFC	E5 – Part II	804.4.1	E5 – Part I
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403.5.1	E5 – Part I	901.2.1	F62
403.5.4	E5 – Part I	901.6.3	F193, Part II
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P3113.4.1	P131 Part II
P3201.5	P135 Part II
P3201.2	P136 Part II
Chapter 44	P60 Part II, P68 Part II, P69
	Part II, P70 Part II, P71 Part
	II, P73 Part II, P83 Part II,
	P106 Part II, P108 Part II,
	P135 Part II, P136 Part II,
	P157 Part II
Chapter 44	F108, Part II; F132, Part II
Chapter 44	ADM39
Appendix H	G2 Part II
Appendix K	G147 Part II
Appendix I	G204 Part II

INT. WILDLAND-URBAN INTERFACE CODE					
Chapter 1	ADM1 Part X				
101.3	ADM3				
102.4	ADM4				
115 (New)	ADM16 Part I				
Chapter 15	ADM39				
INTERNATIONAL ZONING CODE					
Chapter 1	ADM1 Part XI				
101.2	ADM3				
112 (New)	ADM16 Part I				
Chapter 14	ADM39				

2009/2010 ICC CODE DEVELOPMENT HEARING SCHEDULE October 24 – November 11, 2009 Hilton Baltimore

Unless noted by "Start no earlier than X am/pm," each Code Committee will begin immediately upon completion of the hearings for the prior Committee. Thus the actual start times for the various Code Committees are tentative. The hearing volume is higher than previous cycles. The schedule anticipates that the hearings will finish by the times noted as "Finish" for each track and each week.

CODE DEVELOPMENT HEARINGS: OCTOBER 24 - 31

	Saturday October 24	Sunday October 25	Monday October 26	Tuesday October 27	Wednesday October 28	Thursday October 29	Friday October 30	Saturday October 31
	Start 8 am	Start 10 am	Start 8 am	Start 8 am	Start 8 am	Start 8 am	Start 8 am	Start 8 am
TRACK 1	IWUIC IFC	IFC	IFC IRC-Energy (Start no earlier than 1 pm)	IRC – Energy	IRC-Building (Start no earlier than 8 am)	IRC- Building	IRC – Building Admin (Start no earlier than 3 pm)	Admin
	End 8 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	Finish 3 pm
TRACK 2	Start 8 am IBC- Structural	Start 10 am IBC- Structural	Start 8 am IBC- Structural	Start 8 am IBC- Structural	Start 8 am IECC (Start no earlier than 8 am)	Start 8 am IECC	Start 8 am IECC	Start 8 am IECC
	End 8 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	Finish 8 pm

ANNUAL CONFERENCE: NOVEMBER 1 - 4

CODE DEVELOPMENT HEARINGS: NOVEMBER 4 - 11

	Wednesday November 4	Thursday November 5	Friday November 6	Saturday November 7	Sunday November 8	Monday November 9	Tuesday November 10	Wednesday November 11
	Start 8 am	Start 8 am	Start 8 am	Start 8 am	Start 10 am	Start 8 am	Start 8 am	Start 8 am
1	IPM/ZC IEBC	IBC-Fire Safety	IBC – Fire Safety	IBC - General	IBC – General	IBC - Egress	IBC - Egress	IBC - Egress
TRACK	IBC-Fire Safety		IBC – General (Start no earlier than 3 pm)		IBC – Egress (Start no earlier than 3 pm)			
	End 5 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	End 8 pm	Finish 12 pm
TRACK 2	Start 8 am IPC/IPSDC	Start 8 am IPC/IPSDC	Start 8 am IMC (Start no earlier than 8 am)	Start 8 am IMC IRC- Plumbing/ Mechanical (Start no earlier than 1	Start 10 am IRC – Plumbing/ Mechanical	Start 8 am IRC – Plumbing/ Mechanical IFGC (Start no earlier than 8 am)	NO HEARINGS TRACK 2 COM	PLETED
	End 5 pm	End 9 pm	End 9 pm	End 9 pm	End 9 pm	Finish 9 pm		

Notes:

1. Hearing times may be modified at the discretion of the Chairman. Breaks will be announced.

2. Proposed code changes submitted to the International Wildland-Urban Interface Code (IWUIC) to be heard by the IFC Committee.

3. Proposed code changes submitted to the International Zoning (Z) and Property Maintenance (PM) Codes to be heard by the IPM/Z Committee.

4. "Admin" is a new code committee who will hear changes that affect coordination of Chapter 1 of all the I-Codes, except the IRC, and referenced standards updates.

2009/2010 PROPOSED CHANGES TO THE INTERNATIONAL CODES

CODE PAGE
Administrative Provisions (All Codes) ADM1
International Building Code Fire SafetyIBC-FS1 GeneralIBC-G1 Means of EgressIBC-E1 StructuralIBC-S1
International Energy Conservation Code EC1
International Existing Building Code EB1
International Fuel Gas Code FG1
International Fire CodeF1
International Mechanical Code M1
International Plumbing CodeP1
International Private Sewage Disposal CodePSD1
International Property Maintenance CodePM1
International Residential Code Building/EnergyIRC-RB1 PlumbingIRC-RP1 MechanicalIRC-RM1
International Wildland-Urban Interface Code (To be heard by the IFC Committee)WUIC1
International Zoning Code (To be heard by the IPM/IZC Committee)Z1

Registration Delegate 2009 Annual Conference and Code Development Hearings Hearings: October 24–31 and November 4–11 Hilton Baltimore Conference: November 1–4 Baltimore Convention Center

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

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TENTATIVE ORDER OF DISCUSSION

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

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

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

IRC ENERGY	EC53-09/10, Part II	EC102-09/10, Part II	RB88-09/10
RE1-09/10	EC54-09/10, Part II	EC103-09/10, Part II	RB10-09/10
RE2-09/10	EC55-09/10, Part II	EC104-09/10, Part II	RB2-09/10
RE3-09/10	EC56-09/10, Part II	EC106-09/10, Part II	RB3-09/10
RE4-09/10	EC57-09/10, Part II	EC107-09/10, Part II	RB76-09/10
EC1-09/10. Part II	EC58-09/10, Part II	EC109-09/10, Part II	RB130-09/10
EC2-09/10, Part II	EC59-09/10, Part II	RE7-09/10	G2-09/10, Part II
EC4-09/10, Part II	EC60-09/10, Part II	EC112-09/10, Part II	RB11-09/10
EC13-09/10. Part II	EC63-09/10, Part II	EC114-09/10, Part II	RB12-09/10
EC19-09/10, Part II	EC64-09/10, Part II	EC115-09/10, Part II	RB13-09/10
EC25-09/10, Part II	EC66-09/10, Part II	EC116-09/10, Part II	RB14-09/10
EC16-09/10, Part II	EC68-09/10, Part II	EC117-09/10, Part II	RB15-09/10
EC11-09/10, Part II	EC69-09/10, Part II	EC118-09/10, Part II	S97-09/10, Part II
EC17-09/10, Part II	EC71-09/10, Part II	EC119-09/10, Part II	RB16-09/10
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EC21-09/10, Part II	EC73-09/10, Part II	EC121-09/10, Part II	S57-09/10, Part II
EC22-09/10, Part II	EC74-09/10, Part II	EC122-09/10, Part II	S61-09/10, Part II
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EC27-09/10, Part II	EC78-09/10, Part II	EC125-09/10, Part II	RB18-09/10
EC28-09/10, Part II	EC79-09/10, Part II	EC126-09/10, Part II	RB19-09/10
EC29-09/10, Part II	EC80-09/10, Part II	EC127-09/10, Part II	RB20-09/10
EC30-09/10, Part II	EC81-09/10, Part II	EC129-09/10, Part II	RB21-09/10
EC31-09/10. Part II	EC82-09/10, Part II	EC130-09/10, Part II	FS155-09/10, Part II
EC32-09/10. Part II	EC83-09/10, Part II	EC131-09/10, Part II	RB5-09/10
EC34-09/10, Part II	EC84-09/10, Part II		RB22-09/10
EC35-09/10. Part II	EC86-09/10, Part II	IRC BUILDING	RB23-09/10
EC36-09/10, Part II	EC87-09/10, Part II	G28-09/10, Part II	S1-09/10, Part II
EC38-09/10, Part II	EC89-09/10, Part II	RB1-09/10	RB24-09/10
EC39-09/10, Part II	EC90-09/10, Part II	RB4-09/10	RB25-09/10
EC40-09/10, Part II	EC91-09/10, Part II	RB7-09/10	RB26-09/10
EC41-09/10, Part II	EC92-09/10, Part II	S87-09/10, Part II	G56-09/10, Part II
EC42-09/10, Part II	RE6-09/10	RB8-09/10	RB27-09/10
EC43-09/10, Part II	EC96-09/10, Part II	RB9-09/10, Part I	RB28-09/10
EC45-09/10, Part II	RE5-09/10	RB31-09/10	RB29-09/10
EC46-09/10, Part II	EC98-09/10, Part II	RB84-09/10	RB30-09/10
EC47-09/10, Part II	EC99-09/10. Part II	RB85-09/10	RB32-09/10
EC48-09/10, Part II	EC100-09/10. Part II	RB86-09/10	RB33-09/10
EC50-09/10, Part II	EC101-09/10. Part II	RB87-09/10	FS124-09/10, Part II

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S17-09/10, Part II

S20-09/10, Part II S21-09/10, Part II S22-09/10. Part III S23-09/10, Part II RB171-09/10 S30-09/10, Part II RB172-09/10 S182-09/10, Part II RB173-09/10 RB174-09/10 RB175-09/10 RB176-09/10, Part I RB177-09/10, Part I RB178-09/10 RB179-09/10 RB180-09/10 RB181-09/10 G147-09/10, Part II G204-09/10, Part II RB182-09/10 RB183-09/10 ADM1-09/10, Part XII ADM3-09/10, Part II ADM4-09/10. Part II ADM6-09/10. Part II ADM7-09/10, Part II ADM8-09/10, Part III ADM9-09/10, Part II ADM14-09/10, Part II ADM15-09/10, Part II ADM16-09/10, Part II

S18-09/10, Part II

RB63-09/10

RB1-09/10 R202

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

Revise definition as follows:

BASEMENT. That portion of a building <u>A story</u> that is partly or completely below grade not a story above grade plane (see "Story above grade <u>plane</u>").

Reason: This definition of "Basement" has been modified to be consistent with the 2009 IBC definition of "Basement." The reference to "Story above grade" has been replaced with "Story above grade plane" to be consistent with the updated definition in the 2009 IRC.

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

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

RB2-09/10

R202

Proponent: Diana M. Hanson, representing North American Deck and Railing Association, Inc.

Add new definition as follows:

PATIO. An exterior walking surface typically made of concrete, stone, slab, brick, or other masonry product laid over a base, supported directly by the grade beneath and located at grade level.

Reason: To distinguish a patio from a deck. Where both decks and patios are both considered walking surfaces, patios are typically supported by grade, while decks are supported by an elevated frame structure with a load path through various structural components.

We feel that an IRC definition of "patio" will greatly assist in making the distinction between decks and patios. The term "patio" is referenced several times in the IRC*, yet nowhere is it defined. Further, we are seeing jurisdictional instruction that refer to patios, when in actuality, they mean decks. An IRC definition of the term will be helpful to code officials and builders, as well as, clarify the difference between "deck" and "patio" for the general public.

*Instances of the term "patio" in IRC: (R506 Concrete Floors on Ground) Section R506.2.3 Vapor retarder. (Chapter 24 Fuel Gas) G2415.14 (404.14) Location of Outlets (Chapter 24 Fuel Gas) G2415.15.1 (404.15.1) Limitations (Appendix H Patio Covers) AH105 Light and Ventilation/Emergency Egress (3 instances)

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: HANSON-RB-3-R202

RB3-09/10 R202

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

Add new definition as follows:

PATIO COVER. A one story structure not exceeding 12 feet (3657 mm) in height used for recreational, outdoor living purposes and not as carports, garages, storage rooms or habitable rooms. Enclosure walls shall be permitted to be of any configuration, provided the open or glazed area of the longer wall and one additional wall is equal to at least 65 percent of the area below a minimum of 6 feet 8 inches (2032 mm) of each wall, measured from the floor.

Reason: This information has long been included in Appendix H of the code. Although the term is defined in the Appendix, this information is not a mandatorily adopted part of the code. Because the term is used in the body of the code and no ordinarily accepted meaning exists, a specific definition is necessary.

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

Public Hearing: Committee:	AS	AM	D	ICCEII ENAME: WAI KER-RB-1-R202
Assembly:	ASF	AMF	DF	
				ICCFILENAIVIE. WALKER-RD-1-R202

RB4-09/10 R202

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

Revise definition as follows:

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

1. Is- More than 6 feet (1829 mm) above grade plane ; or

- 2. Is more than 6 feet (1829 mm) above the finished ground level for more than 50 percent of the total building perimeter.
- 23. Is More than 12 feet (3658 mm) above the finished ground level at any point.

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: TRAXLER-RB-2-R202

RB5-09/10 R202

Proponent: James Ranfone, American Gas Association

Revise definition as follows:

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCEILENAME: RANFONE-RB-1-R202

RB6-09/10 R202

Proponent: Dennis Pitts, American Forest & Paper Association

Revise definition as follows:

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: PITTS-RB-9-R202

RB7–09/10 R301.1.1, Chapter 44 (New)

Proponent: Julie Ruth, PE, JRuth Code Consulting, representing the American Architectural Manufacturers Association

1. Revise as follows:

R301.1.1 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 (AISI S230).
- 3. ICC-400 Standard on the Design and Construction of Log Structures.
- 4. <u>American Architectural Manufacturers Association/National Sunroom Association (AAMA) 2100 Specification</u> for Sunrooms for the construction of sunroom additions in areas of Seismic Design Category A and B only.

2. Add new standard to Chapter 44 as follows:

AAMA

2100-10 Specification for Sunrooms

Reason: The 2009 International Residential Code defines a sunroom as "A one-story structure attached to a dwelling with a glazing area in excess of 40 percent of the gross area of the structure's exterior walls and roof." These structures are typically constructed in one of two manners: 1) using typical wood framing techniques, or 2) using a stick system that consists of prefabricated framing of aluminum, fiberglass, wood or other materials, with glass or opaque wall or roof panels, and steel or aluminum connections.

The first technique can be done in accordance with the current provisions of the IRC for wood framed construction. There are not now, however, any provisions in the IRC for the second method of constructing a sunroom other than by engineering analysis or demonstrating equivalence to the current provisions of the *International Residential Code* by some other means. This proposal seeks to add testing of sunrooms to the provisions of AAMA/NSA 2100 - 10 *Specification for Sunrooms* to the available options for approval of sunroom construction in the IRC.

In 2002 the American Architectural Manufacturers Association, the National Sunroom Association and the National Patio Association published the first U.S. standard for the construction of sunroom – AAMA/NPEA/NSA 2100 – 02. The standard established five different categories of sunrooms based upon the intended use of the space, and established specific design criteria for them, based upon those same categories and intended end use. The document establishes specific parameters for a test structure, including minimum depth, width, slope of roof, etc., while relying upon documents such as the local building code and ASCE 7 to determine the minimum design loads that the testing is to be based upon.

As the document began to be used and proposed for inclusion in various codes (it is now referenced in the 2007 Florida Building Code) the members of the AAMA Sunroom Council became aware of improvements that were needed. These improvements included revisions that would bring the document more tightly in line with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440 for the design, testing and labeling of windows, glass doors and skylights, and revisions that would bring the foundation requirements more closely in line with the requirements of the *International Residential Code*. AAMA/WDMA/CSA 101/I.S.2/A440 – 08 is referenced in the 2009 edition of the International Residential Code, International Building Code and International Energy Conservation Code for these products.

The standard is currently undergoing revision to incorporate the improvements mentioned above. If the revision is completed by the Code Development Hearings in Baltimore, we will ask the IRC Building and Energy Committee to approve it at that time. If not, we will have the revision complete and the next edition of the standard published and readily available before the 2010 Final Action Hearings for the 2012 International Residential Code for consideration by the active members of the ICC at that time.

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

Analysis: A review of the standard proposed for inclusion in the code, AAMA 2100, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: RUTH-RB-3-R301.1.1-CH 44

RB8–09/10 R301.1.4 (New), R301.1.4.1 (New), R301.1.4.2 (New), R301.1.4.3 (New), Figure R301.1.4 (New)

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

Add new text as follows:

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

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

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

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

AS – Automated Fire Sprinkler System installed throughout

<u>PS – Partial Automatic Fire Sprinkler System, and designate floor</u> NS – No system installed

> T NS E,C

<u>T= Truss construction</u> <u>E= Engineered lumber</u> <u>C=Conventional Framing</u>

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: WAINRIGHT-RB-7-R301.1.4

RB9-09/10

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

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

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

PART I - IRC BUILDING/ENERGY

Add new text as follows:

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

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

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

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

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



FIGURE R301.1.4.2 EXAMPLE STRUCTURAL IDENTIFICATION LABEL

PART II – IFC

Add new text as follows:

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

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

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

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

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



FIGURE 316.6.2 EXAMPLE STRUCTURAL IDENTIFICATION LABEL

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

The floor they were operating on was unprotected lightweight construction that collapsed without warning. In the ensuing investigation, the National Institute for Occupational Safety and Health released report F2006-26¹. 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, NIOSH² 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 2006-24³. The first recommendation of the report read "Ensure that fire fighters and incident commanders are aware unprotected pre-engineered l-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 F2007-07⁴. In this Fire Fighter Death in the Line-of-Duty report, NIOSH recommends "building code officials and local authorities having jurisdiction should consider modifying the current codes to require that lightweight trusses are protected with a fire barrier on both the top and the bottom". The report further states "In this incident, the floor trusses for the first floor did not have any protection on the bottom cord, which immediately exposed the trusses to fire in the basement. Unfinished basements are very common throughout the country. Basements typically house additional fire exposures such as alternative heating sources, hot water heaters, clothes dryers, etc.. It is critical for trusses and lightweight engineered wood I-beams that are used in a load-bearing assembly to be protected with a thermal barrier such as gypsum wallboard. The function of the thermal barrier is a critical factor in the fire performance of the assembly".

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

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

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

The National Research Council Canada performed a series of tests in creating their report Fire Performance of Houses, Phase I: Study of Unprotected Floor Assemblies in Basement Fire Scenarios, released December 18, 2008. The goal of the report was "With the advent of new materials and innovative construction products and systems for use in construction of houses, there is a need to understand what impacts these materials and products will have on occupant life safety under fire conditions and a need to develop a technical basis for the evaluation of their fire performance¹⁷. These tests were not intentionally conducted for fire fighter safety but rather to identify the dangers to the civilian occupants and their ability to self evacuate. The report states "With the relatively severe fire scenarios used in the experiments, the times to reach structural failure for the wood I-joist, steel C-joist, metal plate and metal wood truss assemblies were 35-60% shorter than that for the solid wood joist assembly". Additionally, "For the solid wood joist assemblies, the structural failure occurred after deflection of the floor, mainly in the form of OSB subfloor failure (burn through). For all other floor assemblies, after deflection of the floor, the structural failure occurred either in the form of complete collapse into the basement or in the form of a "V" shaped collapse due to joist or truss failure". In keeping with the intent of occupant safety the report also found "One engineered floor assembly, which gave the shortest time to reach structural failure in the open basement scenario, failed structurally in the closed basement doorway scenario before the tenability limits were reached for healthy adults of average susceptibility". This calls into question, if it can not give the occupant time to self evacuate how will it perform when a fire fighter is performing Search and Rescue for that specific occupant. In summarizing the various test results the report found "The time gap between the onset of untenable conditions and the structural failure of the floor assembly was smaller for the engineered floor assemblies than for the solid wood joist assembly used in the experiments". This is very serious for the responding fire fighter performing life saving Search and Rescue for occupants who have lost consciousness due to the untenable conditions. These victims may still be savable but, the performances of the lightweight assemblies indicate that, savable victims may not be reached due to floor compromise.

In 2008 Tyco Fire Suppression & Building Products performed a series of fire tests. The intent of these tests was to demonstrate the impact residential sprinklers will have in improving fire safety in one and two-family occupancies when lightweight construction is present. The results of these tests were released in 2008 as A Technical Analysis: The Performance of Composite Wood Joists Under Realistic Fire Conditions⁸. In the introduction of the report the author states, "One example of the difference in fire performance of a lightweight structural member compared to solid sawn lumber is the behavior of composite wood joists. When a composite wood joist is exposed to fire, the thin oriented strand board used as the web in the joist is quickly consumed, which results in an inability of the joist to carry the load and ultimately a failure of the supported floor assembly". Later in the introduction the report continues "Due to the greater mass per unit of surface area of the solid wood joist, it will support the floor assembly for much longer than its lightweight alternative when exposed to equivalent fire conditions". The first test involving an unsprinklered room fire led to flashover in 7:09 from ignition and floor assembly collapse at the 11:30 mark from ignition. That is roughly four minutes from flashover we had a collapse of almost the entire 16' x 16' floor area. The second test results reached flashover in only 5:15 from ignition, collapse in this test occurred at 8:34 from ignition, a stunning three minutes after flashover. This would be the time the fire fighters are entering the structure for suppression and Search and Rescue efforts.

These reports are still not enough for some critics so I am referencing a third report. Underwriters Laboratories, The Chicago Fire Department and the International Association of Fire Chiefs received a grant from the Department of Homeland Security to conduct a number of tests on various topics but the main issue was to conduct tests, and report the findings, to evaluate the performance of lightweight structural components when exposed to fire and if the components can be protected. They recently issued the subsequent report Structural Stability of Engineered Lumber in Fire Conditions⁹. Tests assemblies were subjected to the standards of the ASTM E119 Test Standard. Two assemblies did not include a ceiling, six of the assemblies included a ceiling consisting of ½ inch thick gypsum board and one assembly included a ¾ inch plaster ceiling. A load of 40 psf was placed along two of the four edges and two 300 lb fire fighter mannequins were applied to the floor assembly. Results from the tests indicated that unprotected 12" wooden I-joist reached structural failure at the 5:58 mark in the tests. The resulting failure covered a large area of the floor. The unprotected 2" x 10" wooden I-beams reached structural collapse at the 18:45 mark in the test, a difference of over twelve minutes. These twelve minutes are critical in Search and Rescue. Further tests demonstrated that when ½ inch gypsum was placed on the 12" I-joists the collapse did not occur until the 26:45 mark in the test. Just a simple ½ covering extended the collapse time approximately twenty minutes. When the ½ inch covering was applied to the wooden I-beams the collapse time was extended to 44:45 mark in the test. One important factor to point out regarding these tests is that the fire fighters are a dead load and not a live load. Would a simulated live load of fire fighters transferring additional psi with each step or crawl have contributed to an earlier collapse? When we review the Wisconsin fire where Engineer Arnie Wolf was killed, the fire fighters stated the floor felt solid but suffered a catastrophic collapse when they began their search pattern. These tests clearly outline the performances of the various construction practices and the dangers these performances present to fire fighters. Underwriters Laboratories and the Chicago Fire Department followed these tests with an online educational program, to view go to http://www.uluniversity.us/home.aspx, in an attempt to educate the nation's fire service on the hazards of operating in these environments.

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

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

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



Floor assembly where Fire Engineer Arnie Wolf was killed



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



Even lighterweight materials - Georgia Pacific XJ-85

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

PART I - IRC BUILDING/ENERGY

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
PART II – IFC					
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	ICCFILENAME: DECRANE-RB-2-R301.1.4-F2-316.6

RB10-09/10 R301.1.4 (New)

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

Add new text as follows:

R301.1.4 Patio covers. Patio covers shall be designed and constructed to sustain, within the stress limits of this code, all dead loads plus a minimum vertical live load of 10 pounds per square foot (0.48 kN/m²) except that snow loads shall be used where such snow loads exceed this minimum. Such covers shall be designed to resist the minimum wind loads set forth in Section R301.2.1.

Reason: This language has long been included in Appendix H of the code. The requirements are specific to this section and therefore should be included here.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: WALKER-RB-3-R301.1.4

RB11-09/10

R202 (New), R301.1.5 (New), R301.1.5.1 (New), R301.1.5.2 (New), R301.1.5.3 (New), R301.1.5.4 (New), Table R301.1.5(1) (New), Table R301.1.5(2) (New)

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

Add new text as follows:

SCREEN ENCLOSURE. A building or part thereof, in whole or in part self-supporting, and having walls of insect screening and a roof of insect screening, plastic, aluminum, or similar light-weight material.

R301.1.5 Special provisions for aluminum screen enclosures in hurricane-prone regions. Aluminum screen enclosures in hurricane-prone regions shall comply with Sections R301.1.5.1 through R301.1.5.4.

R301.1.5.1 Wind load. Structural members supporting screen enclosures shall be designed to support minimum wind loads given in Table R301.1.5(1) and R301.1.5(2). Where any value is less than 10 psf (0.479 kN/m²) use 10 psf (0.0479 kN/m²).

R301.1.5.2 Deflection Limit. For members supporting screen surfaces only, the total load deflection shall not exceed *I*/60. Screen surfaces shall be permitted to include a maximum of 25 percent solid flexible finishes.

R301.1.5.3 Importance factor. The wind factor for screen enclosures shall be 0.77 in accordance with Section 6.5.5 of ASCE 7.

R301.1.5.4 Roof live load. The minimum roof live load shall be 10 psf (0.479 kN/m²).

TABLE R301.1.5(1) DESIGN WIND PRESSURES FOR ALUMINUM SCREEN ENCLOSURE FRAMING WITH AN IMPORTANCE FACTOR OF 0.77 ^{a, b, c}

		Basic Wind Speed (mph)											
		1(00	11	10	1:	20	1:	30	14	40	15	50
					Expos	ure Cat	egory [Design	Pressu	re (psf)			
CASE	WALL	С	в	С	в	С	в	С	в	С	в	С	в
Aď	Windward and leeward walls (flow thru) and windward wall (non-flow thru) L/W = 0-1	12	8	14	10	17	12	19	14	23	16	26	18
A ^d	Windward and leeward walls (flow thru) and windward wall (non-flow thru) L/W = 2	13	9	16	11	19	14	22	16	26	18	30	21
B ^e	Windward: Non-gable roof	16	12	20	14	24	17	28	20	32	23	37	26
B ^e	Windward: Gable roof	22	16	27	19	32	23	38	27	44	31	50	36
	ROOF												
All ^f	Roof-screen	4	3	5	4	6	4	7	5	8	6	9	7
All ^f	Roof-solid	12	9	15	11	18	13	21	15	24	17	28	20

For SI: 1 mile per hour = 0.44 m/s, 1 pound per square foot = 0.0479kPa, 1 foot = 304.8 mm.

a. Values have been reduced for 0.77 Importance Factor in accordance with Section R301.1.5.3.

b. Minimum design pressure shall be 10 psf in accordance with Section R301.1.5.1.

c. Loads are applicable to screen enclosures with a mean roof height of 30 feet or less. For screen enclosures of different heights the pressures given shall be adjusted by multiplying the table pressure by the adjustment factor given in Table R301.1.5(2).

- d. For Load Case A flow thru condition the pressure given shall be applied simultaneously to both the upwind and downwind screen walls acting in the same direction as the wind. The structure shall also be analyzed for wind coming from the opposite direction. For the non-flow thru condition the screen enclosure wall shall be analyzed for the load applied acting toward the interior of the enclosure.
- e. For Load Case B the table pressure multiplied by the projected frontal area of the screen enclosure is the total drag force, including drag on screen surfaces parallel to the wind, which must be transmitted to the ground. Use Load Case A for members directly supporting the screen surface perpendicular to the wind. Load Case B loads shall be applied only to structural members which carry wind loads from more than one surface.
- f. The roof structure shall be analyzed for the pressure given occurring both upward and downward.

TABLE R301.1.5(2) HEIGHT ADJUSTMENT FACTORS

MEAN	EXPOSURE				
Roof Height (ft)	В	С			
15	1	0.86			
20	1	0.92			
25	1	0.96			
30	1	1.00			
35	1.05	1.03			
40	1.09	1.06			
45	1.12	1.09			
50	1.16	1.11			
55	1.19	1.14			
60	1.22	1.16			

For SI: 1 foot = 304.8 mm.

Reason: This language has long been included in Appendix H of the code. The requirements are specific to this section and therefore should be included here.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCEILENAME: WALKER-RB-6-RB-2-R202-R301.1.5

RB12–09/10 R301.2.1, R301.2.1.1, R301.2.2.2.5, R301.2.2.4, R301.3

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

Revise as follows:

R301.2.1 Wind <u>design criteria</u> limitations. Buildings, and portions thereof, shall be <u>constructed in accordance with</u> the wind provisions of this code using the basic limited by wind speed, as defined in Table R301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be <u>as</u> determined from Figure R301.2(4). Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where loads for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors are not otherwise specified, the <u>wind</u> loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.6.

R301.2.1.1 <u>Wind limitations</u> Design criteria. In <u>The wind provisions of this code shall apply to the design of buildings</u> regions where the basic wind speeds from Figure R301.2(4) <u>is less than</u> 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.

Exceptions:

- <u>1.</u> For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R611.
- 2. For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R614.

Where the basic wind speed exceeds the limitations above, the design of buildings for wind resistance shall be in accordance with one or more of the following methods:

- 1. American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM);-or
- 2. International Code Council (ICC) Standard for Residential Construction in High-Wind Regions (ICC-600);-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 (AISI 230).
- 5. Concrete construction shall be designed in accordance with the provisions of this code.
- 6. Structural insulated panel (SIP) walls shall be designed in accordance with the provisions of this code.

The elements of design not addressed by the methods in Items 1 through 4 shall be in accordance with the provisions of this code.

R301.2.2.5 Irregular buildings. The seismic provisions of Prescriptive construction as regulated by this code shall not be used for irregular structures located in Seismic Design Categories C, D0, D1 and D2. Irregular portions of structures shall be designed in accordance with accepted engineering practice to the extent the irregular features affect the performance of the remaining structural system. When the forces associated with the irregularity are resisted by a structural system designed in accordance with accepted engineering practice, design of the remainder of the building shall be permitted using the provisions of this code. A building or portion of a building shall be considered to be irregular when one or more of the following conditions occur:

1. When exterior shear wall lines or *braced wall panels* are not in one plane vertically from the foundation to the uppermost *story* in which they are required.

Exception: For wood light-frame construction, floors with cantilevers or setbacks not exceeding four times the nominal depth of the wood floor joists are permitted to support *braced wall panels* that are out of plane with *braced wall panels* below provided that:

- 1. Floor joists are nominal 2 inches by 10 inches (51 mm by 254 mm) or larger and spaced not more than 16 inches (406 mm) on center.
- 2. The ratio of the back span to the cantilever is at least 2 to 1.
- 3. Floor joists at ends of *braced wall panels* are doubled.
- 4. For wood-frame construction, a continuous rim joist is connected to ends of all cantilever joists. When spliced, the rim joists shall be spliced using a galvanized metal tie not less than 0.058 inch (1.5 mm) (16 gage) and 11/2 inches (38 mm) wide fastened with six 16d nails on each side of the splice or a block of the same size as the rim joist of sufficient length to fit securely between the joist space at which the splice occurs fastened with eight 16d nails on each side of the splice; and
- 5. Gravity loads carried at the end of cantilevered joists are limited to uniform wall and roof loads and the reactions from headers having a span of 8 feet (2438 mm) or less.
- 2. When a section of floor or roof is not laterally supported by shear walls or braced wall lines on all edges.

Exception: Portions of floors that do not support shear walls or *braced wall panels* above, or roofs, shall be permitted to extend no more than 6 feet (1829 mm) beyond a shear wall or *braced wall line*.

3. When the end of a *braced wall panel* occurs over an opening in the wall below and ends at a horizontal distance greater than 1 foot (305 mm) from the edge of the opening. This provision is applicable to shear walls and *braced wall panels* offset in plane and to *braced wall panels* offset out of plane as permitted by the exception to Item 1 above.

Exception: For wood light-frame wall construction, one end of a *braced wall panel* shall be permitted to extend more than 1 foot (305 mm) over an opening not more than 8 feet (2438 mm) wide in the wall below provided that the opening includes a header in accordance with the following:

- 1. The building width, loading condition and framing member species limitations of Table R502.5(1) shall apply; and
- 2. Not less than one 2 x 12 or two 2 x 10 for an opening not more than 4 feet (1219 mm) wide; or
- 3. Not less than two 2 x 12 or three 2 x 10 for an opening not more than 6 feet (1829 mm) wide; or
- 4. Not less than three 2 × 12 or four 2 × 10 for an opening not more than 8 feet (2438 mm) wide; and
- 5. The entire length of the *braced wall panel* does not occur over an opening in the wall below.
- 4. When an opening in a floor or roof exceeds the lesser of 12 feet (3658 mm) or 50 percent of the least floor or roof dimension.
- 5. When portions of a floor level are vertically offset.

Exceptions:

- 1. Framing supported directly by continuous foundations at the perimeter of the building.
- 2. For wood light-frame construction, floors shall be permitted to be vertically offset when the floor framing is lapped or tied together as required by Section R502.6.1.
- 6. When shear walls and braced wall lines do not occur in two perpendicular directions.
- 7. When stories above-*grade* partially or completely braced by wood wall framing in accordance with Section R602 or steel wall framing in accordance with Section R603 include masonry or concrete construction.

Exception: Fireplaces, chimneys and masonry veneer as permitted by this code. When this irregularity applies, the entire *story* shall be designed in accordance withaccepted engineering practice.

R301.2.2.4 Seismic Design Category E. Buildings in Seismic Design Category E shall be designed to resist seismic loads in accordance with the *International Building Code*, except when the seismic design category is reclassified to a lower seismic design category in accordance with Section R301.2.2.1. <u>Components of buildings not required to be designed to resist seismic loads shall be constructed in accordance with the provisions of this code.</u>

R301.3 Story height. The wind and seismic provisions of this code shall apply to buildings with story heights not exceeding the following: Buildings constructed in accordance with these provisions shall be limited to story heights of not more than the following:

1. For wood wall framing, the laterally unsupported bearing wall stud height permitted by Table R602.3(5) plus a height of floor framing not to exceed 16 inches (406 mm).

Exception: For wood framed wall buildings with bracing in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2), the wall stud clear height used to determine the maximum permitted *story height* may be increased to 12 feet (3658 mm) without requiring an engineered design for the building wind and seismic force resisting systems provided that the length of bracing required by Table R602.10.1.2(1) is increased by multiplying by a factor of 1.10 and the length of bracing required by Table R602.10.1.2(2) is increased by multiplying by a factor of 1.20. Wall studs are still subject to the requirements of this section.

- 2. For steel wall framing, a stud height of 10 feet (3048 mm), plus a height of floor framing not to exceed 16 inches (406 mm).
- 3. For masonry walls, a maximum bearing wall clear height of 12 feet (3658 mm) plus a height of floor framing not to exceed 16 inches (406 mm).

Exception: An additional 8 feet (2438 mm) is permitted for gable end walls.

- 4. For insulating concrete form walls, the maximum bearing wall height per *story* as permitted by Section R611 tables plus a height of floor framing not to exceed 16 inches (406 mm).
- 5. For structural insulated panel (SIP) walls, the maximum bearing wall height per *story* as permitted by Section 614 tables shall not exceed 10 feet (3048 mm) plus a height of floor framing not to exceed 16 inches (406 mm).

Individual walls or walls studs shall be permitted to exceed these limits as permitted by Chapter 6 provisions, provided story heights are not exceeded. Floor framing height shall be permitted to exceed these limits provided the story height does not exceed 11 feet 7 inches (3531 mm). An engineered design shall be provided for the wall or wall framing members when they exceed the limits of Chapter 6. Where the story height limits <u>of this section</u> are exceeded, <u>the design of the building</u>, or the non-compliant portions thereof, to resist wind and seismic loads an engineered design shall be provided in accordance with the *International Building Code* for the overall wind and seismic force resisting systems.

Reason: The purpose of this code proposal is to clarify the IRC limitations for wind and seismic design. Code users have expressed confusion over the current language of the wind limitations and other code limits on structural elements. Some builders and code officials believe that if a dwelling exceeds the wind limits of R301.2.1.1, the seismic limits of R301.2.2, or the story height limits of R301.3, the entire dwelling must be designed in accordance with the IBC, including the HVAC, electrical and plumbing systems and the provisions of the IBC for egress, fire rating, and other architectural elements.

This code proposal clarifies that it is only the structural design of the dwelling to resist wind loads or seismic loads, and the selection of certain critical components such as windows or roofing that is prone to wind damage, which must be performed in accordance with the IBC or the other alternate standards (e.g. the WFCM or the AISI standards). The remaining architectural, mechanical, electrical and plumbing provisions of the IRC still apply to the dwelling.

Section R301.2.1.1 is reorganized for better readability and flow. Its title is swapped with R301.2.1, since it is the larger paragraph above that actually provides design criteria and Section R301.2.1.1 that actually provides wind limitations. Section R301.3 is also revised as noted above to clarify it is the structural portions exceeding the story height limits that require an engineering design.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: EHRLICH-RB-1-R301.2.1

RB13-09/10

R301.2.1.1

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

Revise as follows:

R301.2.1.1 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 (49m/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. International Code Council (ICC) Standard for Residential Construction in High-Wind Regions (ICC-600); 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 (AISI 230).
- 5. Concrete construction shall be designed in accordance with the provisions of this code.
- 6. Structural insulated panel (SIP) walls shall be designed in accordance with the provisions of this code.

Reason: The purpose of this proposal is to restore the IRC scope limit for construction in high-wind areas to the original 110 miles per hour for all areas of the country. Without this revision, houses in areas along the Atlantic and Gulf coasts where the basic wind speed is 100 or 105 miles per hour will need to be engineered or designed to prescriptive requirements intended for areas at risk for Category 4 and 5 hurricanes.

As justification for the original code change made during the 2004-2005 Code Development Cycle (RB31-04/05) the Institute for Building and Home Safety (IBHS) cited 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 individual modifications to resolve these issues within the IRC, the proponent simply lowered the ceiling for using prescriptive design provisions along the Atlantic & Gulf coasts. We believe this is excessive and not supported by the observed performance of housing properly constructed to previous editions of the IRC in extreme wind events (hurricanes). At no time did the proponents ever provide documented evidence of failures of structures constructed to the previous IRC provisions. Nor did they provide technical justification in the form of engineering calculations or structural research to support their contentions. However, the 2004-2005 Code Development Cycle coincided with the four 2004 Florida hurricanes (Wilma, Ivan, Charley and Frances) and with Katrina and Rita in 2005. This led to 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 subject to the new provisions.

In the subsequent code development cycles, individual changes have been made to address all four issues raised by IBHS. The 2006 IRC increased the minimum roof sheathing nail size from 6d to 8d common nails for all roofs, and the gable and eave end zone nail spacing was tightened for dwellings in the 100mph region. The wall bracing provisions in the 2009 IRC have been reorganized, improved, and clarified and many new construction details provided. Most importantly, a new wind bracing table is provided which ties the required wall bracing for wind resistance to the wind loads determined using ASCE 7-05. Finally, a requirement for a continuous load path at the roof-to-wall, floor-to-floor, and floor-to-foundation connections at braced wall panels was added.

The 2009 IRC also provides requirements for wind resistance of exterior wood sheathing and for the installation of vinyl siding and foam sheathing. These new requirements further increase the resistance of structures built under the IRC to wind damage.

We question the age of the damaged structures used for justifying the code change reducing the IRC scope. The Federal Emergency Management Agency 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...appeared to be the result of inadequate design and construction methods commonly used before IBC 2000 and IRC 2000 were adopted and enforced." Finally, 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. NAHB estimates show that complying with the ICC-600 Standard for Residential Construction in High Wind Regions or the AF&PA Wood Frame Construction Manual where required by the IRC can add as much as \$10,000 to the cost of a home. We believe these additional requirements make it extremely difficult to construct affordable housing along the Atlantic and Gulf coasts and place an onerous burden on builders and homeowners, and particularly on first-time home buyers. This added cost of construction will have the effect of keeping residents of these 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.

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

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

ICCFILENAME: EHRLICH-RB-2-R301.2.1.1

RB14–09/10 R202, R301.2.1, Figure R301.2(4), Figure R301.2(4)A (New), R301.2.1.1, Figure R301.2(4)B (New), R301.2.1.2, Figure R301.2(4)C, R301.2.1.4

Proponent: James Rossberg, Structural Engineering Institute of ASCE

1. Revise as follows:

BASIC WIND SPEED. Three-second gust speed at 33 feet (10 058 mm) above the ground in Exposure C (see Section R301.2.1) as given in Figure R301.2(4)<u>A</u>.

WIND BORNE DEBRIS REGION. Areas within hurricane-prone regions as designated in accordance with Figure R302.1(4)C within one mile of the coastal mean high water line where the basic wind speed is 110 miles per hour (49 m/s) or greater; or where the basic wind speed is equal to or greater than 120 miles per hour (54 m/s); or Hawaii.

R301.2.1 Wind limitations. Buildings and portions thereof shall be limited by wind speed, as defined in TableR301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be determined from Figure R301.2(4)<u>A</u>. The structural provisions of this code for wind loads are not permitted where wind design is required as specified in Section R301.2.1.1. Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where loads for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior windows, skylights, garage doors and exterior and exterior windows, skylights, garage doors and exterior and exterior windows, skylights, garage doors and exterior shall apply. Coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.6.

2. Delete Figure R301.2(4) and replace as follows:



Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.

2. Linear interpolation between contours is permitted.

Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
 Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

FIGURE R301.2(4)A BASIC WIND SPEEDS

3. Revise as follows:

R301.2.1.1 <u>Wind design required</u> <u>Design criteria</u>. In regions where <u>wind design is required in accordance with</u> the basic wind speeds from Figure R301.2(4)<u>B</u> 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 for wind loads 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. International Code Council (ICC) Standard for Residential Construction in High Wind Regions (ICC-600); 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 (AISI S230).
- 5. Concrete construction shall be designed in accordance with the provisions of this code.
- 6. Structural insulated panel (SIP) walls shall be designed in accordance with the provisions of this code.
- 7. International Building Code

When ASCE 7 or the International Building Code is used for the design of the building, the wind speed map and exposure category requirements as specified in ASCE 7 and the International Building Code shall be used.

4. Add new figure as follows:



Other Locations where Wind Design Required Puerto Rico Guam Virgin Islands American Samoa Hawaii - Special Wind Regions

FIGURE R301.2(4)B REGIONS WHERE WIND DESIGN IS REQUIRED

5. Revise as follows:

R301.2.1.2 Protection of openings. <u>Glazing Windows</u> in buildings located in windborne debris regions shall <u>be</u> have glazed openings protected from windborne debris. Glazed opening protection for windborne debris shall meet the requirements of the Large Missile Test of ASTM E 1996 and ASTM E 1886 referenced therein. <u>The applicable wind</u> <u>zones for establishing missile types in ASTM E 1996 are shown on Figure R301.2(4)C.</u> Garage door glazed opening protection for windborne debris shall meet the requirements of an *approved* impact resisting standard or ANSI/DASMA 115.

Exception: Wood structural panels with a minimum thickness of 7/16 inch (11 mm) and a maximum span of 8 feet (2438 mm) shall be permitted for opening protection in one- and two-story buildings. Panels shall be precut and attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the component and cladding loads determined in accordance with either Table R301.2(2) or ASCE 7, with the permanent corrosion resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table R301.2.1.2 is permitted for buildings with a mean roof height of 33 feet (10 058 mm) or less where located in Wind Zones 1 and 2 in accordance with Figure R301.2(4)C wind speeds do not exceed 130 miles per hour (58 m/s).

5. Add new figure as follows:



FIGURE R301.2(4)C WIND-BORNE DEBRIS REGIONS

6. Revise as follows:

R301.2.1.4 Exposure category. For each wind direction considered, an exposure category that adequately reflects the characteristics of ground surface irregularities shall be determined for the site at which the building or structure is to be constructed. For a site located in the transition zone between categories, the category resulting in the largest wind forces shall apply. Account shall be taken of variations in ground surface roughness that arise from natural topography and vegetation as well as from constructed features. For a site where multiple detached one- and two-family dwellings, *townhouses* or other structures are to be constructed as part of a subdivision, master-planned community, or otherwise designated as a developed area by the authority having jurisdiction, the exposure category for an individual structure shall be based upon the site conditions that will exist at the time when all adjacent structures on the site have been constructed, provided their construction is expected to begin within one year of the start of construction for the structure for which the exposure category is determined. For any given wind direction, the exposure in which a specific building or other structure is sited shall be assessed as being one of the following categories:

Exposure A. Large city centers with at least 50 percent of the buildings having a height in excess of 70 feet (21 336 mm). Use of this exposure category shall be limited to those areas for which terrain representative of Exposure A prevails in the upwind direction for a distance of at least 0.5 mile (0.8 km) or 10 times the height of the building or other structure, whichever is greater. Possible channeling effects or increased velocity

pressures due to the building or structure being located in the wake of adjacent buildings shall be taken into account.

- Exposure B. Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B shall be assumed unless the site meets the definition of another type exposure.
- 3. Exposure C. Open terrain with scattered obstructions, including surface undulations or other irregularities, having heights generally less than 30 feet (9144 mm) extending more than 1500 feet (457 m) from the building site in any quadrant. This exposure shall also apply to any building located within Exposure B type terrain where the building is directly adjacent to open areas of Exposure C type terrain in any quadrant for a distance of more than 600 feet (183 m). This category includes flat open country, and grasslands and shorelines in hurricane prone regions.
- 4. Exposure D. Flat, unobstructed areas exposed to wind flowing over open water (excluding shorelines in hurricane prone regions) for a distance of at least 1 mile (1.61 km). Shorelines in Exposure D include inland waterways, the Great Lakes, and coastal areas of California, Oregon, Washington and Alaska. This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the water. Exposure D extends inland from the shoreline a distance of 1500 feet (457 m) or 10 times the height of the building or structure, whichever is greater.

Reason: The purpose of this proposal is to update and coordinate the provisions of the 2012 IRC with those of the 2010 edition of ASCE 7 for the determination of wind loads, specifically to incorporate the effect of the new wind speed maps that have been adopted into ASCE 7.

Over the past 10 years, new data and research has been performed that indicates that the hurricane wind speeds provided in the current maps of the IBC-09 and ASCE-05 are too conservative and needed to be adjusted downward. Significantly more hurricane data have become available thereby allowing for substantial improvements in the hurricane simulation model that is used to create the wind speed maps.

These new data have resulted in an improved representation of the hurricane wind field, including the modeling of the sea-land transition and the hurricane boundary layer height; new models for hurricane weakening after landfall; and an improved statistical model for the Holland *B* parameter which controls the wind pressure relationship. The new hurricane hazard model yields hurricane wind speeds that are lower than those given in ASCE 7-05 and IBC-09 even though the overall rate of intense storms (as defined by central pressure) produced by the new model is increased compared to those produced by the hurricane simulation model used to develop previous maps.

In preparing the new maps, the ASCE 7 standards committee decided to use multiple ultimate event or strength design maps, based on the different Occupancy Categories in conjunction with a wind load factor of 1.0 for strength design – for allowable stress design, the factor was reduced from 1.0 to 0.6. Several factors that are important to an accurate wind load standard led to this decision:

- (i) An ultimate event or strength design wind speed map makes the overall approach consistent with that used in seismic design in that they both map ultimate events and use a load factor of 1.0 for strength design.
- (ii) Utilizing different maps for the different Occupancy Categories eliminates the problems associated with using "importance factors" that vary with category. The difference in the importance factors in hurricane prone and non-hurricane prone regions for Category I structures prompted many questions and have been removed from ASCE 7-10.
- (iii) The use of multiple maps eliminates the confusion associated with the recurrence interval associated with the existing map the map was not a uniform fifty year return period map. This therefore created a situation where the level of safety provided for within the overall design was not consistent along the hurricane coast.

Because of the prescriptive nature of the IRC and the considerable number of embedded wind speed triggers throughout the code, integrating the new wind speed map into the IRC necessitated a different approach than the change proposed for the IBC. For ease of the users of the IRC, it was decided to scale down the ultimate map or strength design map to a nominal or design level basic wind speed map. This proposed new map, Figure R301.2(4)A is the ultimate map in the proposed new edition of ASCE 7 with the wind speeds divided by the square root of the load factor ($V/\sqrt{1.6}$) with contours corresponding to whole numbers. The use of a scaled down map was necessary due to the significant number of wind speed triggers in the IRC to the new ultimate maps during the next code change cycle. Another new map, Figure R301.2(4)B is introduced which indicates where wind design is required. This map replaces the 100 mph limit specified in Section R301.2.1.1 in the 2009 IRC and corresponds to 130 mph on the ultimate map for most of the hurricane prone region. Because the locations of wind-borne debris regions are tied to the ultimate maps in the proposed new map (Figure R301.2(4)C has been introduced to delineate the various wind borne debris regions for use with ASTM E1996 and E1886.

ASCE/SEI 7 has been a referenced standard of the IBC since its inception and as such it is well known to the building community. ASCE/SEI 7 is published and maintained by the Structural Engineering Institute of the American Society of Civil Engineers (SEI/ASCE). The document is a nationally recognized consensus standard developed in full compliance with the ASCE *Rules for Standards Committees*. The ASCE standards process is fully accredited by the American National Standards Institute (ANSI).

As of the submission date of this code change, the ASCE 7 Standards Committee is completing the committee balloting portion of the 2010 edition of ASCE/SEI 7. The document is designated ASCE/SEI 7-10 *Minimum Design Loads for Buildings and Other Structures* and it is expected that it will be completed and available for purchase prior to the ICC Final Action Hearings in May of 2010. Any person interested in obtaining a public comment copy of ASCE/SEI 7-10 may do so by contacting the proponent at jrossberg@asce.org.

Cost Impact: The overall, national cost impact is believed to be neutral.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEILENAME: ROSSBERG-RB-1-R202-R301-F_R301.2.4

RB15-09/10 R301.2.2

Proponent: John England, MCO, England Enterprises, Inc.

Delete and substitute as follows:

R301.2.2 Seismic provisions. The seismic provisions of this code shall apply to buildings constructed in Seismic Design Categories C, D₀, D₁-andD₂, as determined in accordance with this section.

Exception: Detached one- and two-family *dwellings* located in Seismic Design Category C are exempt from the seismic requirements of this code.

R301.2.2 Seismic Provisions The seismic provisions of this code shall apply as follows:

- 1. Townhouses in seismic design categories C, D₀, D₁ and D₂.
- 2. Detached one and two family dwelling in seismic design categories, D₀, D₁ and D₂.

Reason: The rule and exception was confusing.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: ENGLAND-RB-2-R301.2.2

RB16–09/10 R301.2.2.2.6 (New), R1001.3, R1001.4, R1003.3, R1003.4, Table R1001.1

Proponent: Homer Maiel, PE, CBO, City of San Jose, CA, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters)

1. Add new text as follows:

R301.2.2.6 Masonry or concrete chimneys. Masonry or concrete chimneys shall be reinforced and anchored to the building in accordance with Sections R1001.3, R1001.4, R1003.3 and R1003.4

2. Revise as follows:

R1001.3 Seismic reinforcing. Masonry or concrete chimneys in Seismic Design Category Categories C, D_0 , D_1 or D_2 shall be reinforced. Reinforcing shall conform to the requirements set forth in Table R1001.1 and Section R609, Grouted Masonry.

R1001.4 Seismic anchorage. Masonry or concrete chimneys in Seismic Design Categories \underline{C} , D_0 , D_1 or D_2 shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above *grade*, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements of Section R1001.4.1.

R1003.3 Seismic reinforcing. Masonry or concrete chimneys shall be constructed, anchored, supported and reinforced as required by this chapter. In Seismic Design Category Categories C, D_0 , D_1 or D_2 masonry and concrete chimneys shall be reinforced and anchored as detailed in Section R1003.3.1, R1003.3.2 and R1003.4. In Seismic Design Category Category Categories A and B or C, reinforcement and seismic anchorage is not required.

R1003.4 Seismic anchorage. Masonry and <u>or</u> concrete chimneys and foundations in Seismic Design Category Categories C, D_0 , D_1 or D_2 shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above grade, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements of Section R1003.4.1.

TABLE R1001.1

SUMMARY OF REQUIREMENTS FOR MASONRY FIREPLACES AND CHIMNEYS

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929m².

NOTE: This table provides a summary of major requirements for the construction of masonry chimneys and fireplaces. Letter references are to Figure R1001.1 which shows examples of typical construction. This table does not cover all requirements, nor does it cover all aspects of the indicated requirements. For the actual mandatory requirements of the code, see the indicated section of text.

- a. The letters refer to Figure R1001.1.
- b. Not required in Seismic Design Category Categories A and B or C.

Reason: The IBC Chapter 21 requirements for reinforcing and anchorage of masonry and concrete chimneys were extended to Seismic Design Category C by code change S193-07/08. That change appears in 2009 IBC Sections 2111.3 and 2111.4. This proposal intends to make the IRC minimum requirements for reinforcing and anchorage match the IBC because the effects of earthquakes and the risks to life safety from chimney collapse are independent of the code under which the chimney is permitted and constructed. Seismic Design Category C is defined in IRC Table R301.2.2.1.1 as the range of $0.33g < S_{DS} \le 0.50g$ for soil Site Class D. Assuming soil Site Class D, this S_{DS} range represents a mapped short period (S_S) spectral response acceleration range of $0.32g < S_S \le 0.55g$. Earthquakes generating these moderate levels of short period ground motion (e.g., Nisqually Washington Earthquake (2001), Napa California Earthquake (2000), Coalinga California Earthquake (1983) have repeatedly caused collapse or partial collapse of large numbers of unreinforced or unanchored masonry chimneys. In at least two earthquakes, Borah Peak Idaho (1983) and Landers California Earthquake (1992), masonry chimney and fireplace collapses have resulted in fatalities.

To accomplish this change, a new section R301.2.2.2.6 is added to specify that the masonry or concrete chimneys in Seismic Design Category C must comply with sections R1001.3, R1001.4, R1003.3 and R1003.4. In each of those four sections, Category C is added to the list of Seismic Design Categories where chimney reinforcing and anchorage is necessary.

In R1003.3, Category C is deleted from the list of Seismic Design Categories where chimney reinforcement and anchorage are not required. In Table R1001.1, footnote "b" is revised to delete Seismic Design Category C to be consistent with the changes to sections R1001.3, R1001.4, R1003.3 and R1003.4. Footnote "b" is used at two locations in Table R1001.1, in item H (vertical reinforcing) and in item S (anchorage).

In R1001.3, R1003.3, and R1003.4 and Table R1001.1 footnote "b" an editorial change is made to correct the word "Category" to the plural "Categories" as is currently used in section R1001.4 when more than one category is listed. Another editorial change occurs in R1003.4 where the word "and" between the words "masonry" and "concrete" is changed to "or" to match the wording used in the other three sections.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: Maiel-RB-3-R301.2.2.2.6-Ch 10

RB17-09/10

R301.2.4.1, R322.1.1

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

Revise as follows:

R301.2.4.1 Alternative provisions. As an alternative to the requirements in Section R322.3 for buildings and structures located in whole or in part in coastal high-hazard areas (V Zones) and Coastal A Zones, if delineated, ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

R322.1.1 Alternative provisions. As an alternative to the requirements in Section R322.3 for buildings and structures located in whole or in part in coastal high-hazard areas (V Zones) <u>and Coastal A Zones, if delineated</u>, ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

Reason: The IRC recognizes the Coastal A Zone as "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" (see R322.2). These conditions may be present immediately inland of coastal high hazard areas (V Zones) shown on Flood Insurance Rate Maps. Field research after numerous hurricanes and coastal storms indicates that waves in this range contribute to erosion and scour, and also damage conventional construction. The inland extent of the 1.5-ft wave may be delineated on FEMA's revised maps as the Limit of Moderate Wave Action.

This code change provides an alternative for buildings and structures in the Coastal A Zone, if delineated, to be designed and constructed according to the standard ASCE 24 Flood Resistant Design and Construction.

Cost Impact: The added cost, if any, of having a foundation designed according to ASCE 24 is offset by minimizing damage associated with scour and wave impacts in areas where wave heights between 1.5 feet and 3 feet are anticipated.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: QUINN-RB-4-R301.2.4.1

RB18-09/10

Table R301.7

Proponent: Stephen Kerr, PE, SE, Josephson Werdowatz and Associates

Revise table as follows:

TABLE R301.7

ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS ^{a, b, c, d, e}

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Rafters having slopes greater than 3:12 with no finished ceiling attached to rafters	L / 180
Interior walls and partitions	H / 180
Floors and plastered ceilings	
Ceilings with plaster or stucco finish	L / 360
All other structural members	L / 240
Exterior walls <u>– wind loads ^a with plaster or stucco finish</u>	H / 360
Exterior walls – wind loads ^a with <u>other</u> brittle finishes	H / 240
Exterior walls – wind loads ^a with flexible finishes	<u>⊢</u> <u>H</u> / 120 ^d
Lintels supporting masonry veneer walls ^e	L / 600

Note: L = span length, H = span height.

a. The wind load shall be permitted to be taken as 0.7 times the Component and Cladding loads for the purpose of the determining deflection limits herein.

b. For cantilever members, *L* shall be taken as twice the length of the cantilever.

c. For aluminum structural members or panels used in roofs or walls of sunroom additions or patio covers, not supporting edge of glass or sandwich panels, the total load deflection shall not exceed L/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed L/175 for each glass lite or L/60 for the entire length of the member, whichever is more stringent. For sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed L/120.

d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of H/180.

e. Refer to Section R703.7.2.

Reason: This proposal contains several minor editorial changes to help clarify the information presented within the Table. These changes are intended to unify the Table. The proposed changes include the following:

- Footnote callouts a, d and e were removed from the title of the table to avoid confusion because they only apply to a sub-set of the entire table. - The 'L' in the Exterior walls – wind loads with flexible finishes is changed to 'H' for consistency with the other wall structural members shown in this table.

- The word 'other' is added to Exterior walls – wind loads with brittle finishes to separate the plaster and stucco, which are brittle finish materials, from other brittle finish material which do not need the more restrictive deflection limitation.

- Stucco ceilings are added to the Floor and plastered ceilings category so that wording for the ceilings is consent with the wording of Exterior Walls. In addition, the referenced standard ASTM C926-98a Standard Specification for Application of Portland Cement-Based Plaster section Annex A2.1.6 states "Maximum allowable deflection for vertical or <u>horizontal</u> framing for plaster, not including cladding, shall be L/360."

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: KERR-RB-2-T. R301.7

RB19-09/10 Table R302.1

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

Revise table as follows:

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

TABLE R302.1

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: ORLOWSKI-RB-4-T. R302.1

RB20-09/10 R302.1

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

Revise as follows:

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

Exceptions:

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: DAVIES-RB-1-R302.1

RB21-09/10 R302.1

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

Revise as follows:

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

Exceptions:

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: TRAXLER-RB-4-R302.1

RB22-09/10 R302.2, R302.2.4

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

Revise as follows:

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

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

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

Exceptions:

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

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

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

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

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

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

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

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

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

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

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

Public Hearing: Cor	mmittee: //	AS	AM	D	
Ass	sembly: //	ASF	AMF	DF	
					ICCFILENAME: GARDNER-RB-3-THOMPSON-RB-1-R302.2

RB23–09/10 R302.2.1, Figures R302.2.1(1)-R302.2.1(2)-R302.2.1(3) (New)

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

1. Revise as follows:

R302.2.1 Continuity. The fire-resistance-rated wall or assembly separating *townhouses* shall <u>have a fire-resistance</u> rating that is 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 the fire-resistance-rated wall or assembly is not continuous, the fire resistance rating shall be deemed continuous provided one of the following conditions is met:

- <u>1.</u> <u>A minimum one hour fire-resistance rating is provided on the floor or roof assembly that interrupts the fire-resistance rated wall. Fireblocking shall be provided per Section R302.11 (see Figure R302.2.1(1)). Or</u>
- 2. Where an unrated floor or roof assembly interrupts the fire-resistance rated wall, the fire-resistance rating shall be deemed continuous provided:
 - 2.1. Where two one-hour walls are provided, a minimum of one 2x full height fireblock shall be installed in each of the one-hour walls as shown in Figure R302.2.1(2).
 - 2.2. Where one two-hour wall is provided, a minimum of two 2x full height fireblocks shall be installed on each side of the two-hour walls as shown in Figure R302.2.1(3).

2. Add new figures as follows:



FIGURE R302.2.1(1) Example assemblies that can be used to make up a one-hour rated system for separation between occupancies



FIGURE R302.2.1(2)

FIGURE R302.2.1(3)

Reason: The purpose of this code change is to clarify an existing provision within the code and to provide a prescriptive solution to that provision. First, it is necessary to clarify that is the fire-resistance rating of the wall assembly that needs to be continuous from the foundation to the underside of the roof sheathing, not necessarily the framing itself. Second, the prescriptive solution gives some guidance on one way the fire-resistance rating can be maintained, while allowing for framing members to bear on the wall. The use of full height blocking to attain the required fire-resistance rating is based on the use of sacrificial material and char rates based on ASTM E119 testing. Under ASTM E119 test conditions, lumber will char at a rate of 1 inch per 30-40 minutes. Therefore, at least 2 inches of sacrificial material is required to achieve the one hour rating. Likewise, 4 inches is required to achieve a 2 hour rating. Further information can be found in an article published and located at the following link: www.sbcmag.info/Archive/2006/sep/0609_code.pdf

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEILENIAME: WAINRIGHT-RB-3-R302.2.1

RB24-09/10 R302.2.2

Proponent: Jeffrey Anderson, representing the Chesterfield County Department of Building Inspections, Chesterfield, VA

Revise as follows:

R302.2.2 Parapets. Parapets constructed in accordance with Section 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 (1219 mm) on each side of the wall or walls and there are no openings or penetrations in the roof within 4 feet (1219 mm) of the exterior or common walls.

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: ANDERSON-RB-1-R302.2.2

RB25-09/10

R302.3

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

Revise as follows:

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

Exceptions:

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: ORLOWSKI-RB-5-R302.3

RB26-09/10 R302.5.1

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

Revise as follows:

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

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

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

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

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

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

¹ Smoke Perceptions, Myths and Misunderstandings, Cyanide Poisoning Treatment Coalition

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCEILENAME: DECRANE-RB-3-R302.5.1

RB27-09/10 R309.4

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

Revise as follows:

R309.4 Automatic garage door openers. Automatic garage door openers, if provided, shall be listed <u>and labeled</u> in accordance with UL 325.

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

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

Public Hearing: Committee:	AS	AM	D	ICCFILENAME: EUGENE-RB-7-R309.4
Assembly:	ASF	AMF	DF	

RB28-09/10 R302.4 (New)

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

Add new text as follows:

R302.4 Decks. Except as required by Section R302.2.1, decks shall be permitted to be constructed without meeting the requirements of Sections R302.1, R302.2 and R302.3.

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 R302.2.1 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.

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

Public Hearing: Committee:	AS	AM	D	ICCEILENAME: KRESS-RB-2-R302 4
Assembly:	ASF	AMF	DF	
				ICCFILEINAWIE. KRE33-KD-2-K302.4

RB29-09/10

R302.4 (New)

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

Add new text as follows:

R302.4 Decks. Decks shall be constructed in accordance with Sections R302.1, R302.2 and R302.3.

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 R302.2.1 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.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: KRESS-RB-1-R302.4

RB30–09/10 Table R302.6

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

Revise table as follows:

TABLE R302.6 DWELLING/GARAGE SEPARATION

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: HOLLAND-BUECHE-RB-3-T. R302.6

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

Proponent: Dennis Pitts, American Forest and Paper Association

Add new text and table as follows:

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

Exception:

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

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

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

TABLE R502.14 TIME ASSIGNED TO CEILING MEMBRANES

DESCRIPTION OF FINISH	TIME (MINUTES) ^A
3/8" gypsum board	<u>10</u>
½" gypsum board	<u>15</u>
5/8" gypsum board	<u>20</u>
1/2" Type X gypsum board	<u>25</u>
5/8" Type X gypsum board	<u>40</u>
Double 3/8" gypsum board	<u>25</u>
3/8" wood structural panel	<u>5</u>
1/2" wood structural panel	<u>10</u>
5/8" wood structural panel	<u>15</u>
a. Times for individual membranes are additive.	

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

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

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

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

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

Public Hearing: Committee:	AS	AM	D	ICCEII ENAME: PITTS-RR-3-R302 7-R502 14
Assembly:	ASF	AMF	DF	
				ICCFILEINAIVIE. FII I 3-RD-3-R302.7-R302.14

RB32-09/10 R302.9, R302.9.1

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

Revise as follows:

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

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

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

Reason: To correlate the IRC with the IBC. There is concern with this class of products being used in inappropriate applications in new residential construction.

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

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

ICCFILENAME: HOLLAND-BUECHE-RB-1-R302.9

RB33-09/10

R302.9.4

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

Revise as follows:

R302.9.4 Alternate test method. As an alternate to having a flame-spread index of not greater than 200 and a smoke developed index of not greater than 450 when tested in accordance with ASTM E 84 or UL 723, 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 40kWexposure, 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 m².

The interior finish shall comply with the following:

- 1. During the 40 kW exposure, flames shall not spread to the ceiling.
- 2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
- 3. Flashover, as defined in NFPA 286, shall not occur.
- 4. The peak heat release rate throughout the test shall not exceed 800 kW.
- 5. The total smoke released throughout the test shall not exceed 1,000 m².

Reason: There are three changes being made here, for consistency with the IBC.

- 1. The maximum heat release rate criterion is being added, just like it is in the IBC: heat release rate maximum of 800 kW
- 2. Textile wall and ceiling materials are permitted to be tested to NFPA 286, just like in the IBC.
- 3. The remainder of the proposal is purely editorial and intended for simplification. Clearly the interior finish should fail the criteria if the material has flame spreading to the outer extremity of the sample (meaning all the way to the end of the room or ceiling) even before the burner is raised to 160 kW. Also, the material should fail the test is flashover occurs when the burner is still at 40 kW. The present language could be interpreted to mean that a material that burns completely within a minute and/or reaches flashover does not fail the test. That should not be the case.

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

Public Hearing: Committee: AS AM D Assembly: ASF AMF DF	2-R302.9.4
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RB34-09/10 R302.10.1

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing The Extruded Polystyrene Foam Association

Revise as follows:

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 R302.10.3, shall only be required to meet the smoke developed index of not more than 450.
- 3. Foam plastic insulation shall comply with Section R316.

Reason: Foam plastic insulations and their fire performance are regulated per IRC Section R316. This new exception provides a pointer to that section and clarifies the requirements for foam plastic insulation. This is similar to that done in Section 719.1 of the IBC.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEILENAME: BEITEL-RB-5-R302 10 1

RB35-09/10 R302.11, M1501.2 (New)

Proponent: Julius Ballanco, PE, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies, Inc.

1. Revise as follows:

R302.11 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.

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).
- 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 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 Section R1003.19.
- 6. Fireblocking of cornices of a two-family *dwelling* is required at the line of *dwelling unit* separation.
- 7. At penetrations of walls by dryer exhaust duct at the dryer location in accordance with Section M1501.2.

2. Add new text as follows:

M1501.2 Dryer exhaust duct penetrations. Where a clothes dryer exhaust duct is located within a framed wall, the penetration of the wall membrane at the location of the dryer shall have the annular space sealed with noncombustible material, approved fire caulking, or a noncombustible dryer exhaust duct wall receptacle.

Reason: This change corrects the concerns expressed during the last cycle. I have modified the proposed change to remove penetration of rated walls, since such penetrations are not permitted by the Code. The remaining issues have been addressed as suggested by the Code Committee. The difference between a dyer exhaust duct penetration and other penetration is that it is in close proximity to a fuel fired appliance or electric

heating appliance. Dryers are more prone to fire than other appliances. To protect the structure, it is important to have a higher level of protection. The language in this change is consistent with the requirements found in the International Mechanical Code.
The CPSC identified 15,600 fires associated with dryers in a single year. Studies have shown that metal ducts protect the structure from the spread of fire. Additionally, noncombustible material or fire caulk around the annular space prevents the fire from spreading into the wall or ceiling cavity. The same can be accomplished with manufactured noncombustible receptacles. The noncombustible receptacles also allow for the proper storage and recoil of the transition flexible duct to a metal duct.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: BALLANCO-RB-1-R302.11

RB36-09/10

R302.12

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

Revise as follows:

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

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

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

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

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

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

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

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

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

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





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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: GALLAGHER-RB-2-R302.12

RB37-09/10 R302.12

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

Revise as follows:

R302.12 Draftstopping. In combustible construction where there is usable space both above and below the concealed space of a floor/ceiling assembly, draftstops shall be installed so that the area volume of the concealed space does not exceed 1,000 square cubic feet (92.9 m^2) (28.32 m³). Draftstopping shall divide the concealed space into approximately equal areas. Where the assembly is enclosed by a floor membrane above and a ceiling membrane below, draftstopping shall be provided in floor/ceiling assemblies under the following circumstances:

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

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

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

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

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

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

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

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

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

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







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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: GALLAGHER-RB-1-R302.12

RB38-09/10

R305.1

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

R305.1 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). Bathrooms and toilet rooms shall have a ceiling height of not less than 6 feet 8 inches (2036 mm) including above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead in showers or tubs equipped with showerheads.

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) 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.
- 2. The ceiling height above water closets and lavatories shall be permitted to be of any height.

Reason: First section R305.1 sets a minimum ceiling height for bathrooms and toilet rooms at 7 feet. Then Exception 2 reduces that ceiling height in bathrooms (but not toilet rooms) to 6'8" at the center of the front clearance area for fixtures shown in Figure R307.1 and in tubs and showers with showerheads. It is safe to assume that toilet rooms should have been included in this section. It is probably also safe to assume that ceiling heights in bathrooms and toilet rooms need only be 6'8" at any location in the room, not just in the most used areas of the room. It isn't reasonable to think that the ceiling heights in these rooms should be 7 feet but only 6'8" near the fixtures, but this is what the text implies. Since bathrooms and toilet rooms do not have "required floor areas" but rather "clearance area for fixtures", Exception 1 does not apply to bathrooms and toilet rooms. That exception only applies to required floor area. Therefore, Exception 2 is really not an exception to the charging language but is the charging language and should not be in an exception. This proposal corrects that flaw.

The third exception that states "The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose" is unenforceable and any attempt at enforcement would be arbitrary. It is unenforceable because "capable of being used for its intended purpose" is not defined and is subject to discretionary action. The converse would be what ceiling height is acceptable over a water closet? Is 5 feet acceptable? What about 5 ½ feet? Or, 6 feet? And, if in your opinion an acceptable height is 6 feet and you encounter a situation where the height is 5 ½ feet, how do you enforce your opinion? If it can't be enforced it shouldn't be in the code. There is no basis on which to write a correction order no matter what the height above the fixtures is. The language will result in a lack of uniformity. It will lead to confusion as to what is an acceptable height. It will create conflicts between building departments, contractors, and homeowners. The proposed language specifically calls out water closets and lavatories because those are the only fixtures illustrated in Figure 307.1 besides tubs/showers and there are specific height is, this proposal deletes the offending language and permits the homeowner to decide what height is most appropriate.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: DAVIDSON-RB-6-R305.1

RB39-09/10 R308.4

Proponent: William E. Koffel, Koffel Associates, Inc., representing the Glazing Industry Code Committee (GICC)

Revise as follows:

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

1. Glazing in all fixed and operable panels of swinging, sliding and bifold doors.

- 1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
- 2. Decorative glazing.

 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.

Exceptions:

- 1. Decorative glazing.
- 2. When there is an intervening wall or other permanent barrier between the door and the glazing.
- 3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position.
- 4. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.
- 5. Glazing that is adjacent to the fixed panel of patio doors which is not required to be safety glazing by another section.
- 3. Glazing in an individual fixed or operable panel that meets all of the following conditions:
 - 3.1. The exposed area of an individual pane is larger than 9 square feet (0.836 m2); and
 - 3.2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor; and
 - 3.3. The top edge of the glazing is more than 36 inches (914 mm) above the floor; and
 - 3.4. One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the glazing.

Exceptions:

- 1. Decorative glazing.
- 2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965) above the walking surface. The rail 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 cross sectional height.
- 3. Outboard panes in insulating glass units and other multiple glazed panels 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.
- 4. All glazing in railings regardless of area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
- 5. Glazing in enclosures for or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.

Exception: Glazing that is more than 60 inches (1524 mm),measured horizontally and in a straight line, from the waters edge of a hot tub, whirlpool or bathtub.

- 6. Glazing in walls and fences adjacent to indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm), measured horizontally and in a straight line, of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
- 7. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

- 1. When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail 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 cross sectional height.
- 2. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.7.6 and R312 and the plane of the glazing is more than 18 inches (457 mm) from the railing; or
- 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 walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a *guard*.

 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 glazing is less than 60 inches (1524 mm) above the nose of the tread.

Exceptions:

- 1. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.7.6 and R312 and the plane of the glass is more than 18 inches (457 mm) from the railing; or
- 2. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (864 mm) to 36 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a *guard*.

Reason: After several attempts, Exception #5 was added to the 2009 Edition of the IBC. The rationale submitted in RB42-07/08 was that "it is unlikely that the sliding doors will be reversed by the owner and people are familiar with their home environments." There was not corresponding proposal submitted to address eh issue in the same manner within dwelling units covered by the IBC.

The original rationale is flawed for the following reasons:

- 1. The new language "patio doors" instead of the original language "sliding doors" extends the application to far more doors.
- The assumption that the people are familiar with their home environment does not take into consideration guests and horseplay activities.
 The exception is too broad in nature and could be read to override the other provisions. For example, what if the panel is part of a hot tub
- enclosure? What if the panel is less than 18 inches above the floor?
- 4. The proponent based the rationale in part on Exception No. 3 but that exception only applies when the wall is perpendicular to the door.

We do not have injury data to support this proposal since historically the panel was required to be safety glazing. However, there was no technical substantiation to the change proposed last cycle to eliminate the requirement for safety glazing.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: KOFFEL-RB-1-R308.4

RB40-09/10 R308.4

Proponent: Tim Pate, City and County of Broomfield, CO, representing the Colorado Chapter ICC Code Change Committee

Revise as follows:

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

1. Glazing in all fixed and operable panels of swinging, sliding and bifold doors.

Exceptions:

- 1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
- 2. Decorative glazing.
- 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.

- 1. Decorative glazing.
- 2. When there is an intervening wall or other permanent barrier between the door and the glazing.
- 3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position.

- 4. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.
- 5. Glazing that is adjacent to the fixed panel of patio doors.
- 3. Glazing in an individual fixed or operable panel that meets all of the following conditions:
 - 3.1. The exposed area of an individual pane is larger than 9 square feet (0.836 m2); and
 - 3.2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor; and
 - 3.3. The top edge of the glazing is more than 36 inches (914 mm) above the floor; and
 - 3.4. One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the glazing.

Exceptions:

- 1. Decorative glazing.
- 2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965) above the walking surface. The rail 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 cross sectional height.
- 3. Outboard panes in insulating glass units and other multiple glazed panels 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.
- 4. All glazing in railings regardless of area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
- Glazing in enclosures for or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.

Exception: Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the waters edge of a hot tub, whirlpool or bathtub.

- 6. Glazing in walls and fences adjacent to indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm), measured horizontally and in a straight line, of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
- 7. Glazing adjacent to stairways, landings, and ramps within 36 inches (914 m) horizontally of a walking surface when the exposed surface of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

- 1. When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per lineal foot (730 N/m) without contacting the glass and be a minimum of 1 ½ inches (38 mm) in cross sectional height.
- 2 1. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.7.6 and R312 and the plane of the glazing is more than 18 inches (457 mm) from the railing; or
- 3 2. When a solid wall or panel extends from the plane of adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a guard <u>and the plane of the glazing is more than 18 inches (457 mm) from the wall or panel.</u>
- Glazing adjacent to stairways within 60 inches (1524 m) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glazing is less than 60 inches (1524 mm) above the nose of the tread.

Exceptions:

- The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.7.6 and R312 and the plane of the glazing is more than 18 inches (457 mm) from the railing; or
- 2. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (864 mm) to 36 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a guard <u>and the plane of the glazing is</u> more than 18 inches (457 mm) from the wall or panel.

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. IRC Section R308.4 was modified for the 2009 IRC by reformatting the requirements and exceptions in order to make it more user friendly but no technical changes were made.

Stairs are inherently more dangerous for tripping hazards than normal walking surfaces. It does not make sense to a allow 1 ½" wide bar or a solid wall 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 which is exactly what 2009 IRC section R308.4 #7 exception 2 requires.

The following diagrams illustrates what R308.4 #7 exception 2 allows which is the guard or handrail but also the 18" separation which is in conflict with what is allowed in #7 exception 1 or 3 which allows a rail or solid wall but does not require the 18" separation.



I have also made a minor change to change the word guardrail to guard which has already been changed throughout the rest of the Code. Finally this overall code change will now make the IRC requirements exactly the same as the IBC requirements in Section 2406.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEILENIAME: PATE-RR-1-R308 4

RB41-09/10 R310.1

Proponent: Mike Rice, Maplewood, MN, representing the Association of Minnesota Building Officials

Revise as follows:

R310.1 Emergency escape and rescue required. *Basements,* habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening. Where *basements* contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) <u>measured from the finished floor to the bottom of the clear opening above the floor</u>. 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 Section R310.2. Emergency escape and rescue openings 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 m²).

Reason: This change would clarify where the sill height is (at the bottom of the clear opening), providing uniformity and take away any confusion as to where that measurement is to be taken. The IRC Commentary describes this situation and I think it would complement the current section without a lot of change, taking away any question of where the sill height is.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: RICE (MIKE)-RB-3-R310.1

RB42-09/10 R310.1.5 (New)

Proponent: Rick Davidson, City of Maple Grove, MN

Add new text as follows:

R310.1.5 Identification. Windows installed as an emergency escape and rescue opening and meeting the requirements of Sections R310.1.1 thru R310.1.4 shall be identified as an "Emergency Escape and Rescue Opening". The identification shall be affixed to the frame or glass of the window as to be visible during inspection. The identification shall be of a type which once applied cannot be removed without being destroyed.

Reason: How do confirm that a window has safety glazing? You look for identification. How do you determine the grade of a floor joist? You look for a grade stamp. How do you confirm the R value of an insulation batt? You look for a label. Why, so the component can be identified in the field as meeting a specific standard or requirement. How do you identify whether or not a window meets emergency egress requirements? We might try measure it and then decide if it is compliant or require additional information from the contractor or window supplier. We don't require any identification for windows used as emergency escape and rescue openings like we do with most other building components. This makes it difficult to verify compliance in the field with egress requirements. Manufacturers identify windows that meet egress requirements in their catalogs. That can be verified at plan review. But a disconnect occurs when that window, or one that is close in size, is installed in the field. Field inspectors cannot carry with them the manufactures literature for the dozens or hundreds of window manufacturers. They can only rely on field measurements. Herein lays the problem. There are numerous windows specified by manufacturers as having clear openable areas that meet egress requirements or that are close to meeting requirements are of the appropriate size. We already require windows to be identified for safety glazing and energy compliance reasons. Placing identification on the window that it meets egress requirements will have a minimal increase in cost and will greatly improve timely validation and compliance in the field.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCEILENAME: DAVIDSON-RB-8-R310.1.5

RB43-09/10 R310.2.2 (New)

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

Add new text as follows:

R310.2.2 Drainage. Window wells shall be designed for proper drainage by connecting to the buildings foundation drainage system required by Section R405.1 or by an approved alternate method.

Exception: A drainage system for window wells is not required when the foundation is on well-drained soil or sand-gravel mixture soils according to the United Soil Classification System, Group I Soils, as detailed in Table R405.1.

Reason: Although many builders are addressing window well drainage, there are those that do not. As an inspector, I have seen the damage caused from not having proper window well drainage and this code change proposal could eliminate that damage. Also when there is a problem with the window well drainage the emergency escape window now becomes a hazard to the occupants. The window may become inoperable, or even blow out into the occupied room causing serious injury. This code change may increase costs to those not currently addressing the issue; however, it may prevent serious injury and costly water damage repair.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: DORNFELD-RB-1-R310.2.2

RB44-09/10

R311.3

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

R311.3 Floors and landings at exterior 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 1/4 unit vertical in 12 units horizontal (2-percent).

Exception: Exterior Doors, other than the required exit door, serving 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.

Reason: An arbitrary limit on the size of landings at balconies serves no purpose when they don't serve as the required exit door. There is also no reason to prohibit a window from opening onto one of these balconies ("only accessible from a door"). This amendment would eliminate unnecessary regulation and simplify the language.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: DAVIDSON-RB-2-R311.3

RB45-09/10 R311.3.2

Proponent: Homer Maiel, PE, CBO, City of San Jose, CA, representing the ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters)

Revise as follows:

R311.3.2 Floor elevations for other exterior doors. Doors other than the required egress door shall be provided with landings or floors not more than 7 ³/₄ inches (196 mm) below the top of the threshold <u>provided the door does not swing</u> over the landing or floor.

Exceptions: A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.

Reason: This revision is needed to make sure that Section R311.3.2 is consistent with Section R311.3.1. Tripping hazards will be equal regardless of whether a door is or is not a required egress door. The Exception to this section indicates that the door should not be swung over one-riser or two-riser stairway. However, the main body of the section fails to address that a door should not swing over a lower landing, as Section R311.3.1 clearly states.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: MAIEL-RB-4-R311.3.2

RB46–09/10 R311.7.4.1, R311.7.4.2, R311.7.4.2.1 (New), R311.7.4.3

Proponent: Rick Davidson, City of Maple Grove, MN

1. Revise as follows:

R311.7.4.1 Riser height. The maximum riser height shall be 73/4 inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). <u>Risers shall be vertical or sloped from the underside of the leading edge of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.</u>

Exception: The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

R311.7.4.2 Tread depth. The minimum tread depth shall be 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm).

2. Add new text as follows:

R311.7.4.2.1 Winder treads. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm).

3. Revise as follows:

R311.7.4.3 Profile <u>Nosings</u>. The radius of curvature at the nosing shall be no greater than 9/16 inch (14 mm). A nosing not less than 3/4 inch (19 mm) but not more than 11/4 inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosings shall not exceed 1/2 inch (12.7 mm). Risers shall be vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.

Exceptions:

- 1. A nosing is not required where the tread depth is a minimum of 11 inches (279 mm).
- 2. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

Reason: Language related to risers is relocated from the section on "Profile" to the section on "Risers", which is more appropriate. This change is strictly cut and paste. The language on winder treads is made into its own subsection of Treads to enable the user of the code to more easily find that text. The purpose of this code change is to ease use of the code.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: DAVIDSON-RB-5-R311.7.4

RB47–09/10 R311.7.4.2, R311.7.4.2.1 (New), R311.7.4.2.2 (New)

Proponent: Jake Pauls, representing self

1. Revise as follows:

R311.7.4.2 Tread depth. The minimum tread depth shall be 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's nosing leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm).

2. Add new text as follows:

R311.7.4.2.1 Uniformity of rectangular tread depths. The greatest tread depth, measured horizontally between nosings of treads as specified in R311.7.4.2 and including the top tread, within each flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

R311.7.4.2.2 Uniformity of winder treads. Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth. Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch (9.5 mm).

Reason: There is no technical change to the requirement in this proposal. It is a clarification of intent by separating out and labeling the separate issues of tread depth and the uniformity of tread depths for rectangular and winder treads, the only two forms of tread addressed in the current code. This proposed change, along with another for R311.7.4.3, is intended to clear up what appears to be widespread confusion resulting in flawed design, inspection, and ICC training plus published guidance regarding the need for every step of a flight to have uniform tread depth (or run) dimensions, measured horizontally, nosing to nosing. (Note that the change also incorporates the change of term "leading edge of tread" to "nosing" as that term was defined in the last cycle and is the term used in R311.7.4.3.) For consistency and to utilize defined terms, "nosing" should be the standard term used here.

A far too common error in design and construction of stairways is the lack of attention to keeping all tread depths, especially the top one in a flight, uniform in size, particularly where projecting nosings are provided on a flight of stairs installed as a manufactured unit which does not include the top or landing nosing projection. ICC IRC guides for inspection and for the homebuilding industry (published by ICC in conjunction with NAHB) fail to even mention these important rules. These two ICC publications are listed in the Bibliography.

The resulting non-uniformities in tread depths, with a larger top tread followed by smaller treads in the flight make the stair flight orders of magnitude more dangerous for descent-direction users. This pervasive systemic defect has also become so concerning to leading stairway safety professionals such as myself that a special website page has been created simply to deal with this issue. See

http://web.me.com/bldguse/Site/Stairways.html for information on this including the graph provided below as Figure 1 showing a large increase in the number of home stair-related injuries identified in the CPSC NEISS national estimates for the USA in the last several years. Excerpts of text from the Stairways website page are also quoted below as are excerpts from an American Society of Safety Engineers 2008 Professional Development Conference paper by Pauls and Harbuck. The full ASSE conference paper is freely accessible as a PDF download from the Downloads area of my website, http://web.me.com/bldguse/Site/Downloads.html. Generally, it is suspected that with recent greater use of manufactured stair flights, the incidence of systemic, top-of-flight non-uniformities has grown with resulting significant increases in home stair-related injuries.

Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years.



Emergency Department-treated, Stair-Related Injuries, 1974-2007

On the Stairways website page, referenced above, is the following text and photograph (here identified as Figure 2) of a typical dwelling unit stairway with the systemic top-of-flight defect in tread depth non-uniformity. Below Figure 2 is an additional photograph, Figure 3, showing what a stair flight looks like it very likely conforms to the uniformity requirements but which should be properly measured, at least at the top three steps, to confirm that there is not a rare coincidence of both larger tread depth and larger rise dimensions at the top step. Here follows the text from the website which has been publicly available since May 2009.

"While more investigation is required, it appears that a major reason for the recent 'excess' injuries related to home stairs might be a systemic defect on many home stairways (as well as some in other settings) in the USA and Canada. This defect is a non-uniformity of the nosing projection at the top of stair flights; due to the omission of a \$10 nosing piece, at the landing level, at the time of stairway construction. This makes the top tread below the landing effectively larger than all the steps below it.

This common defect greatly increases the risk of an 'overstepping misstep' on the second or third step down the flight. Such missteps can lead to a very serious fall down the stair flight, with resulting injuries.

This is why we should now give our stairways 'a second look.' Specifically we should perform the simple 'crouch and sight' test. Do this from the landing above the stair flight you wish to check. Crouch down so you are able to see all the stair nosings (the leading edges) line up. If the top, landing nosing does not line up with all the other step nosings, your stair likely has the systemic defect. Here is a home stairway with the systemic defect."



Figure 2. Typical Dwelling Unit Stairway with the Systemic, Top-of-Flight Defect.

The "Stairways" page of the website goes on to provide advice specifically for homeowners who perform the "crouch and sight" test and discover that their stairway has the systemic, top-of-flight defect.

"If your home stairway has this defect—which results from the non-uniformities of nosing projections and of what are called 'tread depth' or 'run' dimensions—and your home was recently constructed, call your local building inspection authorities and request that the stairway be re-inspected for building code compliance. Both the non-uniform nosing projection and the non-uniform tread depth or run are building code violations, for example under widely used codes in the USA.

If there has been a fall and significant injury on the non-uniform stair flight, you might also want to confer with an attorney (experienced in dealing with stair-related injury cases), especially if the home was recently constructed.

Much more information on this (and other) safety problems with stairways is found in the downloadable files associated with this website. See especially the latest papers and presentations by Jake Pauls on home stairways in the two most recently posted folders.

•Home Stairway Safety and Codes (Posted February 2009)

•Presentations at MUTN Conference in BC, Canada, April 2009

Also, in early summer 2009, watch this website for an announcement of the availability of an educational DVD package, based on the one-day workshop at the MUTN Conference in BC, Canada, in April 2009. (Contact Jake Pauls for purchase information.)"



Figure 3. Dwelling Unit Stair Very Likely Not Having the Systemic, Top-of-Flight Defect.

Any ICC chapter wishing to have their members participate in a one-day workshop (also slated for presentation in Eastern Canada on September 14, 2009) should contact Jake Pauls. It is available in a not-for-profit mode. Code authorities should be prepared to deal knowledgeably with consumers who, upon discovering the systemic defect in their homes (after performing their own "crouch-and-sight" test), contact their local building department and ask for a re-inspection of their home stairways. If there has been an injurious fall on such a stairway they should also be prepared to deal with resulting legal actions that might name the local building department as a third party defendant. They should know how to perform the measurements of the stair step geometry that are of a quality expected in such litigation actions. These measurement techniques,

usually requiring use of a spirit level or electronic level, are all described in the workshop materials posted on the above-mentioned website Downloads area and on the DVD of the Spring 2009 workshop noted above. These measurement techniques are consistent with the ICC requirements both as currently stated and as further clarified if this proposal is accepted.

In order to begin stopping all future misinterpretations of the IRC requirements for tread depth uniformity, it is hoped that all code enforcement authorities heed very carefully the current and clarified requirements of R311.7.4.2 as well as of R311.7.4.3.

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- Pauls, J. and Harbuck, S. (2008). Ergonomics-based Methods of Inspecting, Assessing and Documenting Environmental Sites of Injurious Falls Resulting from Missteps on Small Elevation Differences, Slopes and Steps. *Proceedings of the American Society of Safety Engineers Professional Development Conference & Exposition*, Las Vegas, NV, 2008. (Downloadable as file, "Pauls-Harbuck-ASSEpaper.pdf," from folder, "Home Stairway Safety and Codes," accessible from the Downloads area of http://web.me.com/bldguse/Site/Downloads.html.)

Cost Impact: The code change proposal will not increase the cost of construction. (The nosing piece required to comply with both the current code and the code as amended by this proposal costs about \$10 per flight in terms of material, in oak, at retail level.)

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: PAULS-RB1-311.7.4.2

RB48–09/10 R311.7.3 (New), R311.7.5

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers'

1. Add new text as follows:

R311.7.3 Vertical rise. A flight of stairs shall not have a vertical rise larger than 12 feet (3658 mm) between floor levels or landings.

2. Revise as follows:

R311.7.5 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. The minimum width perpendicular to the direction of travel shall be no less than the width of the flight served. The edges of landings may be curved or segmented. Landings used to turn the direction of travel less than 90 degrees but no less than 60 degrees shall not be considered winder treads provided the depth at the walk line is no less than 18 inches and the minimum depth is no less than 6 inches (152 mm). Where the stairway has a straight run the minimum depth in the direction of travel need not exceed 36 inches (914 mm).

Exception: A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing over the stairs. A flight of stairs shall not have a vertical rise larger than 12 feet (3658 mm) between floor levels or landings. The width of each landing shall not be less than the width of the stairway served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel.

Reason: There are certain attributes of landings that are intended to be or need to be regulated by the code but this section currently needs improvements to consistently determine the allowed dimensions or shape of landings. The common interpretations currently referenced in the commentary have been used to develop this proposal. Further the fractured arrangement of text following the exception is eliminated and prevents confusion of requirement and exception.

- 1. The Vertical rise section being added is actually relocated without change from below the exception in R311.7.5. The name and text is technically consistent with the IBC. The information in this section is needed to calculate the number of risers between levels, the riser height, and the tread depth of each flight or stair in a stairway. For this reason, if such a requirement is needed, it should be included with the essential elementary sections that precede the tread and riser sections to assure understanding and compliance.
- The revision adds text to R311.7.5 that clarifies what dimension is actually the width or widths of the landing. By stating that width is
 perpendicular to the direction of travel the shape of landings and the intent to allow curved and segmented corners as stated in the commentary
 is covered. The required sizes are not changed and remain the same.
- 3. Differentiation between angular shaped landings and winder treads is also needed and provided by the additional text. The text defines the minimum size that is comparable and slightly exceeds the minimum distance of travel the user experiences on the most common 90-degree landing. Please see figures 1, 2, and 3 attached. It is easy to see that the shape of the landing can be inconsequential to its width and its use in the stairway provided the minimum criteria suggested here are achieved. The clear differentiation between landings and winders stated here is important because landings separate flights and winders do not. Stair components regulated "within a flight" such as handrails, riser height, tread depth, dimensional uniformity, etc. are all dependent upon a determination that currently requires better description for consistent understanding.

R311.5.7 Stairway Landings

Figures 1,2, & 3 below illustrate the minimum dimensions proposed of a stairway landing that turns less than 90 degrees. Note: The outside of each landing is shown with both segmented and curved options that would clarified if the minimum width of the landing described, as "measured perpendicular to the line of travel" by this proposal is clarified.



4. The needed exception remains in tact without change.

5. Please note all the text deleted following the exception has been incorporated within R311.7.5 or relocated under Vertical rise as stated above.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: COOPER-RB-3-R311.7.3-R311.7.5

RB49–09/10 R311.7.7.1

Proponent: David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers'

Revise as follows:

R311.7.7.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

Exceptions:

- 1. The use of a volute, turnout, or starting easing shall be allowed over the lowest tread.
- When handrail fittings or bendings are used to provide continuous transition between flights, <u>transitions at</u> <u>winder treads</u>, the transition from handrail to guardrail, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.

Reason: Winder treads do not separate flights and the handrail transitions that must occur above them are not considered included by the text of this exception. As the original proponent of this exception adopted in 2007 this was an oversight. When using readily available fittings and bendings to provide continuity of the handrail above winder treads, especially at the side of the stair where the treads are narrower the height of the handrail may exceed the limits of 34 to 38 inches. The radical changes of angle in the short distances are best understood by studying this condition in elevation. Figure 1 shows a typical stairway plan and Figure 2 illustrates the unfolding of the elevation of the handrail and stair geometry. This additional condition should be included as it is of the same nature as those conditions already recognized and cited in the exception.



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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: COOPER-RB-2-R311.7.7.1

RB50-09/10 R311.9 (New)

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

Add new text as follows:

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

Exceptions:

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: BANG-RB-1-R311.9

RB51-09/10 R312.1, R312.2

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

R312.1 Where required. Guards shall be located along open-sided walking surfaces, including open sides of decks, porches, balconies, raised floor surfaces, stairs, ramps and landings, that are located more than 30 inches measured vertically to above the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard.

Guards shall be provided on porches, balconies, and decks enclosed with insect screening when the porch, balcony, or deck floor is located more than 30 inches (762 mm) above the floor or grade below.

R312.2 Height. Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches (914 mm) high measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads.

Exceptions:

- 1. Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
- Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Reason: The current language referencing "open sided walking surfaces" is vague, undefined and unenforceable. It isn't clear if this means *any* surface upon which someone could walk, defined walking surfaces, or only those surfaces that are part of a dwelling. One could interpret a driveway adjacent a stepped lot line being a regulated "open sided walking surface" and require a guard along its entire length. One could interpret the upper surface of a retaining wall as a walking surface requiring a guard. If a yard is a walking surface, one could interpret egress window wells as needing a guard. Is this what is intended? Conceivably we could have guards crisscrossing residential lots in willy nilly fashion whenever we have elevation changes. If a retaining wall exists on my neighbors property and there is a 3 foot drop from the top of this wall to the grade below and my driveway or my sidewalk is within 36 inches of this retaining wall, is a guard required even if the elevation change does not occur on my property? It would seem so! The code requires that I measure up to 36 inches away from the walking surface. Then, is it his responsibility to install the guard or is it mine? His lot creates the perceived hazard, not mine. If I install the guard on my property, there is still space on the other side of the guard to walk. Is the neighbor also required to install a guard? If my deck is 24 inches above grade below and 2 feet from my lot line and my neighbor has a 16 inch high retaining wall adjacent the lot line, does my deck require a guard? Is it me that creates the hazard or is it my neighbor?

The new language addressing insect screening changes the original intent of these terms. When the code states that insect screening shall not be considered a guard, is it implying that windows must have fall protection and that screening does not constitute a guard? One must ask not just how a building official might interpret this language but how might a jury interpret this language if faced with a fall from a window that had only window screening. Might they conclude the code required additional protection?

Last, the code requires that guard height be measured from "adjacent fixed seating". How far must a fixed seat be from the edge of the surface in question before it isn't considered "adjacent"? Must it be in contact with the guard? If I say my house is adjacent to the park, do I mean my house is on the immediate border of the park or some short distance away? And, if I have a fixed seat next to the edge of a walking surface, is it an open walking surface that would require a guard or not? I can no longer walk on the surface near the elevation change.

This is a horribly worded code section that cannot be understood by the public and cannot be easily interpreted by the building official. The language is vague, ambiguous, and confusing. That is the worst kind of language to try to enforce.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCFILENAME: DAVIDSON-RB-7-R312.1

RB52-09/10 R312.3

Proponent: Tiffani Kerlik, Louisville, NE, representing self

Revise as follows:

R312.3 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height which allow passage of a sphere 4 inches 2 ½ inches (102 mm) in diameter.

Exceptions:

- 1. The triangular openings at the open side of a stair, formed by the riser, tread and bottom rail of a *guard*, shall not allow passage of a sphere <u>6 inches 4 inches</u> (153 mm) in diameter.
- 2. *Guards* on the open sides of stairs shall not have openings which allow passage of a sphere 4 3/8 inches 2 1/2 inches (111 mm) in diameter.

Reason: The current code is set at a maximum of 4 inches, this allows for small children to squeeze through, which could result in death, death by hanging, or serious injury of a small child. The code for crib rail spacing should be the model and should supersede any cost savings, aesthetically pleasing excuses to keep the unsafe spacing of 4 inches.









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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: Kerlik-RB-1-R312.3

RB53-09/10 R313.1, R302.2, R302.2.4

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

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

Exceptions:

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

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

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

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

Exceptions:

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: DAVIDSON-RB-9-R313.1

RB54–09/10 R313.1, R313.2, R313.2.1

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

Revise as follows:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: ORLOWSKI-RB-1-R313

RB55-09/10

R313.1.1

Proponent: Phillip A. Brown, American Fire Sprinkler Association

Revise as follows:

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: BROWN-RB-1-R313.1.1

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

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

1. Delete without substitution:

SECTION R313 AUTOMATIC FIRE SPRINKLER SYSTEMS

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

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

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

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

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

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

2. Add new text as follows:

<u>APPENDIX P</u> AUTOMATIC FIRE SPRINKLER SYSTEMS

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

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

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

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

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

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

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

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

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

Source	Code Cycle Required	# of Fires	# of Fatalities	# of Injuries	Property Damage in Millions
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Hardwire/Battery	1992- Present	18,000	210	1,490	\$568

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCFILENAME: ORLOWSKI-RB-2-R313

RB57–09/10 R313, R313.1, R313.1.1, R313.3.2, R313.2.1

Proponent: Rick Davidson, City of Maple Grove, MN

Delete without substitution:

SECTION R313 AUTOMATIC FIRE SPRINKLER SYSTEMS

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

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

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

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

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

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

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

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

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

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

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

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

"For the purposes of this study, the term "firefighter" covers all members of organized fire departments in all States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam. It includes career and volunteer firefighters; full-time public safety officers acting as firefighters; State, territory, and Federal Government fire service personnel, including wildland firefighters; and privately employed firefighters, including employees of contract fire departments and trained members of industrial fire brigades, whether full-or part-time. It also includes contract personnel working as firefighters or assigned to work in direct support of fire service organizations.

Under this definition, the study includes not only local and municipal firefighters, but also seasonal and full-time employees of the U.S. Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, the Bureau of Fish and Wildlife, the National Park Service, and State wildland agencies. The definition also includes prison inmates serving on firefighting crews; firefighters employed by other governmental agencies, such as the U.S. Department of Energy; military personnel performing assigned fire suppression activities; and civilian firefighters working at military installations."

An "on-duty death" is explained as:

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

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

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

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

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

Fireground Operations

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

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

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

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

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

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

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

- The leading cause of fires that resulted in fatalities was arson (27%), followed by smoking (18%).
- The leading areas of fire origin in fatal residential structure fires were sleeping (29%) and lounge (21%) areas.

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

CAUSES OF FATAL FIRES

The leading cause of fatal fires in 2002 was incendiary/suspicious (arson), which accounted for 27% of fatal fires. Figure 3 compares the causes of fatal fires in all properties and in residential properties.

Smoking, long the leading cause of fatal fires, trailed as the second leading cause of all fatal fires at 18%. Arson was also the leading cause of the fatal residential structure fires (22%), but by a small margin over smoking (21%). This again is a departure from years past as smoking has long been the leading cause (by a wide margin) of fatal residential fires.

Multiple fatality fires in residential structures were most often caused by heating (26%), followed by arson (23%). By contrast, arson and smoking (each 22%) cause most single fatality residential structure fires.

Figure 4 shows the leading areas of fire origin in fatal residential structure fires. They started most frequently in sleeping (29%) and lounge areas (21%). Fires starting in kitchens account for another 15%.

SMOKE ALARM PERFORMANCE

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

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

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

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

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

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

Please approve this code change.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: DAVIDSON-RB-10-R313

RB58-09/10

R314.1

Proponent: Bob Eugene, Underwriters Laboratories, Inc.

Revise as follows:

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

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

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

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
					ICCFILENAME: EUGENE-RB-10-R314.1

RB59-09/10 R314.4

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

Revise as follows:

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

Exception:

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: MALATTIA-RB-1-R314.4

RB60–09/10 R315, R315.1.1, R315.1.2, R315.1.3, Chapter 44

Proponent: Scott Dornfeld, City of Delano, MN

1. Delete without substitution:

SECTION R315 CARBON MONOXIDE ALARMS

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

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

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

2. Delete standard as follows:

UL

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

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

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

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

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

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

Table 1 Estimated Non-Fire Carbon Monoxide Poisoning Deaths By Associated Fuel-Burning Consumer Product, 1999-2004.

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

No reports received by CPSC staff.

Source: U.S. Consumer Product Safety Commission / EPHA.

CPSC Death Certificate File, CPSC Injury or Potential Injury Incident File, CPSC In-Depth Investigation File,

National Center for Health Statistics Mortality File, 1999 - 2004.

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

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

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

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

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

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

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

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

Table 2 Estimated Non-Fire Carbon Monoxide Poisoning Deaths

Data collection is incomplete for 2003 and 2004. Italicized estimates may change in the future.
 No reports received by CPSC staff.
 Source: U.S. Consumer Product Safety Commission / EPHA. CPSC Death Certificate File, CPSC Injury or Potential Injury Incident File, CPSC In-Depth Investigation File, National Center for Health Statistics Mortality File, 1999 - 2004.

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

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

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

Lawn Mowers includes riding mowers, garden tractors and gas-fueled powered push mowers.

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

No reports received by CPSC staff.

Source: U.S. Consumer Product Safety Commission / EPHA.

CPSC Death Certificate File, CPSC In-Depth Investigation File, CPSC Injury or Potential Injury Incident File, National Center for Health Statistics Mortality File, 1999 - 2004.

File, National Center for Health Statistics Mortality File, 1999 - 2004.

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

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

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

			1999-200	4.				
S	2002-2004*				Annual	Annual Estimate		
Location of Death	Average Estimate	Average Percent	1999	2000	2001	2002	2003+	2004*
Total	166	100%	109	137	122	181	154	162
Home	119	72%	60	88	85	128	110	120
Temporary Shelter	28	17%	35	34	24	39	23	22
Auto	7	4%	7	2	10	8	8	5
Other	10	6%	7	13	3	5	10	15
Unknown	1	1%	*	*	*	2	2	*

Tab	ole б
Estimated Non-Fire Carbon Monoxide	Poisoning Deaths by Location of Death,

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

No reports received by CPSC staff.

Source: U.S. Consumer Product Safety Commission / EPHA.

CPSC Death Certificate File, CPSC In-Depth Investigation File, CPSC Injury or Potential Injury Incident File, National Center for Health Statistics Mortality File, 1999 - 2004.

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

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

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

Estimated Non-Fire Carbon Monoxide Poisoning Deaths

* The Tenth Revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) was implemented.

Source: U.S. Consumer Product Safety Commission / EPHA.



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

Regarding the matter of CO deaths and attached garages, following are excerpts from an article entitled: The Role of Catalytic Converters in Automobile Carbon Monoxide Poisoning^{*} A Case Report by Bradley Vossberg, MD and Judah Skolnick, MD, FCCP

^{*} From the Frazier Rehab Center, Jewish Hospital Health Network, Louisville, KY.

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

Closed-environment exposure to MVEGE from automobiles not equipped with catalytic converters can result in death within 30 min. The introduction of catalytic converters beginning with 1975 new-car models dropped CO emission rates to 6.00 g/min. By 1989, the average new-car
CO emission at idling was 0.22 g/min. The catalytic conversion process removes CO, hydrocarbons, and nitrogen oxide; the resultant emission is a more desirable mixture of nitrogen, CO_2 , and water. Contemporary three-way catalytic converters eliminate > 99% of CO emissions.

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

Attached garages do not pose a risk. By definition, an attached garage is three walls and a roof. A garage door is not required. There are no requirements that the garage be air tight or enclosed to a degree that would create any danger, even if CO levels were high. Clearly, expecting CO alarms to have any positive impact on CO death rates is extremely optimistic and likely unrealistic. If we are going to

require the public to spend their money on safety related devices, surely we can find a more productive area on which to spend it.

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

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

RB61–09/10 R316.4, R316.4.1 (New), R316.4.2 (New), Chapter 44 (New)

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

1. Revise as follows:

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

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

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

2. Add new standard as follows:

<u>NFPA</u>

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

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

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

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: HIRSCHLER-RB-1-R316.4

RB62-09/10 R316.5.3

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing the Cellulose Insulation Manufacturers Association (CIMA)

Revise as follows:

R316.5.3 Attics. The thermal barrier specified in Section R316.4 is not required where all of the following apply:

- 1. Attic access is required by Section R807.1.
- 2. The space is entered only for purposed of repairs or maintenance.
- 3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
 - 3.1. 1 ¹/₂-inch-thick (38mm) mineral fiber insulation;
 - 3.2. ¼-inch-thick (6.4mm) wood structural panels;
 - 3.3. 3/8-inch (9.5 mm) particleboard;
 - 3.4. ¹/₄-inch (6.4mm) hardboard;
 - 3.5. 3/8-inch (9.5mm) gypsum board; or
 - 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406mm)-;
 - 3.7. <u>1.5-inch thick (38mm) cellulose loose-fill insulation.</u>

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.

Reason: We are proposing the use of 1-1/2 inch thick cellulose loose-fill insulation as another acceptable material for use as an ignition barrier to satisfy the requirements of R314.5.3 for the protection of foam plastic insulation in attics as an alternate to the thermal barrier required by Section 314.4. We are basing this proposal on the equivalent performance to that of Item No. 1 of this section which allows 1-1/2 inch thick mineral fiber insulation that by definition includes both mineral wool and glass fiber. Presently, cellulose insulation is recognized as being equivalent to mineral fiber insulation for the purpose of providing an additional 15 minutes of protection to a fire-resistance rated wall assembly utilizing wood stud construction as specified in Table 721.6.2(5) of the 2009 International Building Code (IBC).

Furthermore, when the Cellulose Insulation Manufacturers Association (CIMA) conducted the full scale fire tests to validate the comparable performance of cellulose insulation in achieving a one-hour fire-resistance rating for wood stud wall assemblies faced with various thicknesses of gypsum wallboard, they also measured the heat transfer through the cellulose insulation within the wall cavity to determine its resistance to the movement of heat through the assembly during the ASTM E119 fire test exposure. The test data indicated that approximately 1-1/2 inches of cellulose insulation was capable of limiting the temperature increase to an average maximum temperature of 250°F for a period of 15 minutes which is the same performance specified for a thermal barrier in Section R314.4.

Therefore, we believe that this proposal to include 1-1/2 inch thick cellulose loose-fill insulation as another material acceptable for an ignition barrier is appropriate.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
· · · · · · · · · · · · · · · · · · ·	-			ICCFILENAME: THORNBERRY-RB-2-R316.5.3

RB63-09/10 R317.4

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

R317.4 Wood/plastic composites <u>deck boards, stair treads, handrails and guardrail systems</u>. Wood/plastic composites used in exterior deck boards, stair treads, handrails and guardrail systems <u>used for load supporting</u> <u>purposes shall have performance ratings established and monitored in accordance with ASTM D 7032 and</u> shall bear a *label* indicating the required performance levels and demonstrating compliance with provisions of ASTM D 7032., manufacturer or mill number, and the name or logo of the quality control agency.

Reason: To clarify the intended requirement to have performance ratings established and monitored in accordance with ASTM D7032. The addition of the words "manufacturer or mill number, and the name or logo of the quality control agency" is based on requirements for packaging and identification in D 7032 and is in addition to information contained under the definition of "label".

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: PITTS-RB-2-R317.4

RB64–09/10 R202 (New), R317.5 (New), R317.5.1 (New), Chapter 44 (New)

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

1. Add new text as follows:

PLASTIC LUMBER. a manufactured product made primarily from thermoplastic materials (filled or unfilled) and typically supplied in sizes that correspond to traditional lumber board and dimensional lumber sizes.

R317.5 Plastic lumber. Plastic lumber used in exterior deck boards shall bear a *label* indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 6662 and ASTM D 7032.

R317.5.1 Plastic lumber decks shall be installed in accordance with the manufacturer's instructions.

2. Add new standard as follows:

ASTM

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<u>D 6662-09</u> Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards
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Reason: Numerous plastic lumber decks are used throughout the US, but the IRC and IBC do not reference them. Wood-plastic composite decks, complying with ASTM D 7032, are permitted in the IRC (section R317.4). This proposal adds plastic lumber decks, with the requirements from ASTM D 7032 and also the requirements from ASTM D 6662.

ASTM D 6662 is a specification for plastic lumber decking boards that requires the plastic lumber to comply with properties based on the following ASTM standards:

ASTM D 2565 Standard Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications

ASTM D 2915 Standard Practice for Evaluating Allowable Properties for Grades of Structural Lumber

ASTM D 4329 Standard Practice for Fluorescent UV Exposure of Plastics

ASTM D 6109 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products

ASTM D 6341 Standard Test Method for Determination of the Linear Coefficient of Thermal Expansion of Plastic Lumber and Plastic Lumber Shapes Between -30 and 140°F [-34.4 and 60°C]

ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM G 151 Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

ASTM G 154 Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

ASTM G 155 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

ASTM D 7032 (already referenced in the IRC) is a Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails). It requires the material to comply with flexural properties (ASTM D 6109), accelerated decay (ASTM D 2017), Xenon-arc exposure (ASTM D 2565), resistance to termites (ASTM D 3345), structural lumber grade classifications (ASTM D 2915), and so on.

With regard to fire properties, ASTM D 6662 requires that plastic lumber meet ASTM E 84, Steiner tunnel test, with a flame spread index of no more than 200, with a material that is required to remain in place during the test. The wording with regard to ASTM E 84 flame spread testing in ASTM D 6662 is much more explicit than the wording in the test method itself. The following wording is included in the ASTM D 6662 standard:

"6.4.2 The test specimen shall either be self-supporting by its own structural characteristics or held in place by added supports along the test specimen surface. The test specimen shall remain in place throughout the test duration, without such severe sagging that it interferes with the effect of the gas flame on the test specimen. Test results are invalid if the bulk of the test specimen melts or drops to the furnace floor."

ASTM D 7032 also requires wood-plastic composite decks to comply with a flame spread index of no more than 200 when tested to ASTM E 84. However, ASTM D 7032 does not have the additional requirements that the material stay in place.

By requiring that plastic lumber comply with the requirements of ASTM D 6662 and ASTM D 7032 the code would include all physical property and fire test requirements associated with both types of decking materials. Just for information: wood normally complies with a flame spread index of no more than 200. ICC ES has an Evaluation criterion for thermoplastic composite lumber products (AC 109), based on ASTM D 7032, which is used for approving plastic lumber decks.

Structural plastic lumber combines the benefits of long lasting, weather resistant plastic lumber with the structural characteristic of dimensional wood lumber. It is made primarily from recycled plastics from post-consumer waste like plastic milk and detergent bottles. It then includes strengthening additives, UV–inhibited pigments, anti-oxidant processing aids and foaming agents for a highly stable material that is superior to wood lumber in some measures.









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

Analysis: A review of the standard proposed for inclusion in the code, ASTM D 6662-09, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: HIRSCHLER-RB-4-R202-R317.5

RB65-09/10 R318.4

Proponent: Greg Baumann, National Pest Management Association, representing the National Pest Management Association; Stephen V. Heller, representing Insulating Concrete Form Association (IFCA)

Revise as follows:

R318.4 Foam Plastic protection. In areas where the probability of termite infestation is "very heavy" <u>or "moderate to heavy"</u> as indicated in Figure R301.2(6), extruded and expanded polystyrene, polyisocyanurate and other foam plastics shall not be installed on the exterior face or under interior or exterior foundation walls or slab foundations located below *grade*. The clearance between foam plastics installed above *grade* and exposed earth shall be at least 6 inches (152 mm).

Exceptions:

- Buildings where the structural members of walls, and floors, ceiling and roofs are entirely of noncombustible materials or pressure-preservative-treated wood; or the exterior wall envelop is entirely monolithic concrete walls, including flat-wall and waffle grid ICFs, with continuous concrete from the footings to the roofline.
- 2. When in *addition* to the requirements of Section R318.1, an *approved* method of protecting the foam plastic and structure from subterranean termite damage is used.
- 3. On the interior side of basement walls.
- <u>4.</u> Exterior insulated foundation walls with barriers complying with Section R318.3 in addition to the requirements of Section R318.1 (1) or R318.1 (2).

Reason: (Baumann) Current language prohibits plastic foamboard on exterior walls below grade with exceptions based upon the areas of "very heavy" termite infestation using the code map R301.2(6), an antiquated map from the US Forest Service. This proposal updates the code language to illustrate that areas of "moderate to heavy" are also susceptible to termite attack of below grade foamboard. There are no studies which corroborate definitive borders on the map. Since the original code language was implemented, states outside of the "very heavy" areas, lacking IRC language, have modified state codes due to termite pressure. This leads to a patchwork of fixes state by state or locality by locality. Information collected from termite inspectors show damage to foamboard to be found commonly in "moderate to heavy" zones. In addition, there are measures which are available today, such as chemically treated foam, to protect the foam thus allowing an exception. The GIE *Handbook of Pest Control (2004)* notes the much wider use of foamboard since the original code was written. This proposal only restricts use below grade and can still be used above grade on exterior walls.

Exception 1. Clarifications - and recognition of concrete resilience to Termites.

Exception 4. Clarification for ICF foundations below grade, providing termite protection to prevent termites into above grade framed wall construction.

Reason: (Heller) This proposal acknowledges the protection of concrete construction from structural damage due to termites, and provide clarification for the protection available for exterior insulated foundation walls.

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

Public Hearing: Committee:	AS	AM	D	ICCEII ENAME: BAUMANN-RB-1-HEI I ER-RB-1-R318.4
Assembly:	ASF	AMF	DF	
Accentory.	/(01	7 (10)	ы	ICCFILENAME: BAUMANN-RB-1-HELLER-RB-1-R318

RB66-09/10 R321.4 (New)

Proponent: John England, MCO, England Enterprises, Inc.

Add new text as follows:

R321.4 Inspections. Elevators and platform lifts shall be inspected, tested and certified by a third party inspector before operating. A copy of the certification shall be on file with the building department. The inspector shall be approved by the Building Official before the elevator or lift is installed.

Reason: Most inspectors (department) do have the expertise or tools required to perform the proper inspector of elevators and/ or lifts. Since this is such a specialized field –the inspector should rely on a person who is an expert in the field.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCFILENAME: ENGLAND-RB-6-R321.4

RB67-09/10 R322.3.2, R322.3.3

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

Revise as follows:

R322.3.2 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:
 - 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 (0.35 rad) from the direction of approach, or
 - 1.2. Located at the base flood elevation plus 1 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 (0.35 rad) 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. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5.

R322.3.3 Foundations. Buildings and structures erected in coastal high-hazard areas shall be supported on pilings or columns and shall be adequately anchored to those pilings or columns. Pilings shall have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift). Water loading values used shall be those associated with the design flood. Wind loading values shall be those required by this code. Pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling. Pile systems design and installation shall be certified in accordance with Section R322.3.6. Mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the mat, raft or other foundation is subject to scour or erosion from wave-velocity flow conditions. Slabs, pools, pool decks and walkways shall be located and constructed to be structurally independent of buildings and structures and their foundations to prevent transfer of flood loads to the buildings and structures during conditions, scour or erosion from wave-velocity flow conditions, unless the buildings and structures and their foundational flood load.

Reason: The purpose of this code change is to clarify that an observed practice of using mat or raft foundations that are above eroded grade is not consistent with the regulations of the National Flood Insurance Program (NFIP) regarding foundations in coastal high hazard areas (V Zones). See §60.3(e)(4), below. The NFIP regulations require use of pile or column foundations in V Zones, and do not explicitly provide for use of mat or raft foundations. Note that ASCE 24 *Flood Resistant Design and Construction*, a referenced standard in the IRC, allows use of mat or raft foundations under limited circumstances; notably, it requires that such elements be at or below eroded grade. The language in R322.3.2 does not impose a limitation on the elevation of mats, and rafts and thus could lead to violations of the NFIP requirements which would also have significant cost implications for federal flood insurance premiums. ASCE 24 is permitted to be used as an alternate to the IRC provisions for coastal high hazard areas (see R301.2.4.1 and R322.1.1). In addition, designers may use ASCE 24 as guidance, even if not required.

44 CFR §60.3(e)(4) Provide that all new construction and substantial improvements in Zones V1-30 and VE, and also Zone V if base flood elevation data is available, on the community's FIRM, are elevated on pilings and columns so that . . . [remainder not shown]

Cost Impact: The code change proposal has no cost impact because it is consistent with local ordinances that are adopted by local jurisdictions for participation in the NFIP.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: QUINN-RB-5-R322.3.2

RB68-09/10 R322.3.3

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

Revise as follows:

R322.3.3 Foundations. Buildings and structures erected in coastal high-hazard areas shall be supported on pilings or columns and shall be adequately anchored to those pilings or columns. <u>The space below the elevated building shall be either free of obstruction or, if enclosed with walls, the walls shall meet the requirements of Section R322.3.4.</u> Pilings shall have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift). Water loading values used shall be those associated with the design flood. Wind loading values shall be those required by this code. Pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling. Pile systems design and installation shall be certified in accordance with Section R322.3.6. Mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with Section R401.4 indicate that soil material under the mat, raft or other foundation is subject to scour or erosion from wave-velocity flow conditions. Slabs, pools, pool decks and walkways shall be located and constructed to be structurally independent of buildings and structures and their foundations to prevent transfer of flood loads to the buildings and structures during conditions of flooding, scour or erosion from wave-velocity flow conditions are designed to resist the additional flood load.

Reason: The purpose of this code change is to improve consistency with the regulations of the National Flood Insurance Program (NFIP) regarding elevated buildings in coastal high hazard areas (V zones). See §60.3(e)(5), below. NFIP regulations require the space below elevated buildings to be either free of obstruction or have walls that meet certain requirements which are in the IRC at Section R322.3.4. Obstructions other than breakaway walls that are below elevated buildings contribute to damage by increasing loads on foundations or by contributing to the debris load during flood conditions. The NFIP's guidance on this requirement was revised in 2008, NFIP Technical Bulletin #5, *Free-of-Obstruction Requirements for Buildings Located in Coastal High Hazard Areas in accordance with the National Flood Insurance Program* (http://www.fema.gov/plan/prevent/floodplain/techbul.shtm).

44 CFR §60.3(e)(5) Provide that all new construction and substantial improvements within Zones V1-30, VE, and V on the community's FIRM have the space below the lowest floor <u>either free of obstruction</u> or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. [emphasis added; remainder not shown]

Cost Impact: The code change proposal has no cost impact because it is consistent with local ordinances that are adopted by local jurisdictions for participation in the NFIP.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: QUINN-RB-8-R322.3.3

RB69-09/10 R401.3

Proponent: Jim Olk, City of Farmers Branch, TX, representing Building Officials Association of Texas

Revise as follows:

R401.3 Drainage. Surface drainage shall be diverted to a storm sewer conveyance or other *approved* point of collection that does not create a hazard. *Lots* shall be graded to drain surface water away from <u>the building</u> foundation walls. The *grade* shall fall a minimum of 6 inches (152 mm)within the first 10 feet (3048 mm).

Exception: Where *lot lines*, walls, slopes or other physical barriers prohibit 6 inches (152 mm) of fall within 10 feet (3048 mm), drains or swales shall be constructed to ensure drainage away from the structure. Impervious surfaces within 10 feet (3048 mm)of the building foundation shall be sloped a minimum of 2 percent away from the building.

Reason: Over saturation of the soil adjacent to all types of foundations can cause differential soil movement which can lead to foundation failure. For this provision the term foundation walls needs to be expanded to include the perimeter of slab foundations in addition to other types of foundations. Adding the term "the building" and deleting the term "walls" make the provision applicable to all types of foundations.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: OLK-RB-2-R401.3

RB70–09/10 R403.1, Figure R403.1(1) (New)

Proponent: Jason Thompson, National Concrete Masonry Association, representing the Masonry Alliance for Codes and Standards

1. Revise as follows:

R403.1 General. All exterior walls shall be supported on continuous solid or fully grouted masonry or concrete footings, crushed stone footings, wood foundations, or other *approved* structural systems which shall be of sufficient design to accommodate all loads according to Section R301 and to transmit the resulting loads to the soil within the limitations as determined from the character of the soil. Footings shall be supported on undisturbed natural soils or engineered fill. Concrete footing shall be designed and constructed in accordance with the provisions of Section R403 or in accordance with ACI 332.

At transitions between footings located at different elevations, precast concrete lintels complying with Figure R403.1(1) shall be permitted.

2. Add new figure as follows:



Required Reinf	orcement for Each 4	in. by 8 in. Lintel	Required Reinforcement for Each 6 in. by 8 in. Lintel			
Clear Span, S	Top Bar Size	Bottom Bar Size	<u>Clear Span, S</u>	<u>Top Bar Size</u>	Bottom Bar Size	
<u>4'-0"</u>	<u>No. 3</u>	<u>No. 3</u>	<u>4'-0"</u>	<u>No. 3</u>	<u>No. 3</u>	
<u>4'-8"</u>	<u>No. 3</u>	<u>No. 3</u>	<u>4'-8"</u>	<u>No. 3</u>	<u>No. 3</u>	
<u>5'-4"</u>	<u>No. 3</u>	<u>No. 3</u>	<u>5'-4"</u>	<u>No. 3</u>	<u>No. 3</u>	
<u>6'-0"</u>	<u>No. 3</u>	<u>No. 3</u>	<u>6'-0"</u>	<u>No. 3</u>	<u>No. 3</u>	
<u>6'-8"</u>	<u>No. 3</u>	<u>No. 3</u>	<u>6'-8"</u>	<u>No. 3</u>	<u>No. 4</u>	
<u>7'-4"</u>	<u>No. 3</u>	<u>No. 4</u>	<u>7'-4"</u>	<u>No. 3</u>	<u>No. 5</u>	
<u>8'-0"</u>	No. 3	No. 5	8'-0"	No. 3	No. 5	

1. All reinforcing bars shall comply with ASTM A615, Grade 60.

Minimum 28 day compressive strength of the lintel concrete shall be 3,000 psi.
 The above lintels are designed to carry only the masonry apex area dead load

3. The above lintels are designed to carry only the masonry apex area dead load above the lintel plus the lintel selfweight. The triangular masonry apex area is based on a 45-degree slope extended to the peak of the triangle from center of bearing at both ends of the lintel. No other loads on the lintel, within the triangular apex area, are considered in the above table.

FIGURE 403.1(1) DISCONTINUOUS FOOTERS

Reason: Situations often arise in the field whereby it is not practical to have a continuous footing around the perimeter of a residence, such as at the transition between a basement wall and a stem wall below a garage, which is further complicated due to excavating around the basement. A common solution to this situation is to span between the stem wall footer and basement wall footer using a precast lintel to support surcharge loads applied from above.

This change proposes to introduce an alternative design and construction option to allow discontinuous footers when complying with the requirements of the proposed new Figure 403.1(1). Similar detailing has been used successfully for years in various regions of the country.

The detailing options presented here are applicable only to structures assigned to SDC A, B, and C. For higher seismic design categories, the provisions of Section R403.1.3 are still applicable.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: THOMPSON-RB-3-R403.1-F. R403.1(1)

RB71–09/10 R403.1, R404.6 (New)

Proponent: Dennis Pitts, American Forest & Paper Association

1. Revise as follows:

R403.1 General. All exterior walls shall be supported on continuous solid or fully grouted masonry or concrete footings, crushed stone footings, wood foundations, <u>pier and beam foundations</u>, or other approved structural systems which shall be of sufficient design to accommodate all loads according to Section R301 and to transmit the resulting loads to the soil within the limitations as determined from the character of the soil. Footings shall be supported on undisturbed natural soils or engineered fill. Concrete footings shall be designed and constructed in accordance with the provisions of R403 or in accordance with ACI 332.

2. Add new text as follows:

R404.6 Pier and beam foundations. Pier and beam foundations shall be permitted when of a design approved by the building official.

Reason: The IRC recognizes a number of different methods of foundation construction but is silent on pier and beam construction, a common construction method in some areas of the country. Although the proposed wording permits something already allowed by Section R104.11, *Alternate Materials, Design and Methods of Construction and Equipment*, it makes a clear statement about the acceptability of pier and beam foundations.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: PITTS-RB-10-R403.1-R404.6

RB72-09/10 R403.1.3

Proponent: Homer Maiel, PE, CBO, City of San Jose, CA, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay Chapters)

Revise as follows:

R403.1.3 Seismic reinforcing. Concrete footings located in Seismic Design Categories D_0 , D_1 and D_2 , as established in Table R301.2(1), shall have minimum reinforcement. Bottom reinforcement shall be located a minimum of 3 inches (76 mm) clear from the bottom of the footing.

In Seismic Design Categories D_0 , D_1 and D_2 where a construction joint is created between a concrete footing and a stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing, have a standard hook and extend a minimum of 14 inches (357 mm) into the stem wall.

In Seismic Design Categories D_0 , D_1 and D_2 where a grouted masonry stem wall is supported on a concrete footing and stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing and have a standard hook.

In Seismic Design Categories D₀, D₁ and D₂ masonry stem walls without solid grout and vertical reinforcing are not permitted.

Exception: In detached one- and two-family *dwellings* which are three stories or less in height and constructed with stud bearing walls, plain concrete footings without longitudinal reinforcement supporting walls and isolated plain concrete footings supporting columns or pedestals are permitted.

Reason: In seismic design categories D_0 , D_1 and D_2 , the flexural demands placed upon footings by the variety of braced wall panels configurations described in IRC Chapter 6, some of which require a hold-down device at one end or each end make the use of plain concrete footings unacceptable. The footing is an integral part of the seismic force load path and deserves to be constructed in as robust a manner as the braced wall panels it is supporting. The exception to use plain concrete isolated footing pads at columns or pedestals is retained because these are not use to support or anchor braced walls unless designed in accordance with accepted engineering practice per Section R602.10.7 Item 2.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: MAIEL-RB-2-R403.1.3

RB73-09/10 R202 (New), R403.1.6

Proponent: Gary Ehrlich, National Association of Home Builders (NAHB)

1. Add new definitions as follows:

SILL PLATE. A horizontal wood member anchored to the foundation and supporting floor joists.

SOLE PLATE. A horizontal wood member at the bottom of a wood stud wall, attached to a concrete slab.

2. Revise as follows:

R403.1.6 Foundation anchorage. Where wood sill and sole plates and cold-formed steel framed walls are supported directly on continuous foundations walls or monolithic slabs with integral footings required by the provisions of this code, they shall be anchored to the foundation in accordance with this section.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of *braced wall panels* at building interiors on monolithic slabs <u>with integral footings</u>, and all wood sill plates shall be anchored to the foundation with <u>½ inch (12.7 mm) diameter</u> anchor bolts spaced a maximum of 6 feet (1829 mm) on center <u>or approved anchors or anchor straps</u> <u>spaced as required to provide equivalent anchorage to the ½-inch-diameter (12.7 mm) anchor bolts</u>. Bolts shall be at least ½ inch (12.7 mm) in diameter and shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundations with integral footings that are not part of a *braced wall panel* shall be positively anchored with *approved* fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.

Exceptions:

- 1. Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts.
- 2 1. Walls 24 inches (610 mm) total length or shorter connecting offset *braced wall panels* shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).
- 3 <u>2</u>. Connection of walls 12 inches (305 mm) total length or shorter connecting offset *braced wall panels* to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).

Reason: The purpose of this proposal is to revise the language for anchorage of light-frame wood and cold-formed steel stud walls to the foundations of the house. Without these revisions, we are concerned that the code will present an enforcement nightmare for plan reviewers and inspectors, and lead to anchor bolts and continuous footings being required where they are not necessary and have not traditionally been provided.

The ICC Ad-Hoc Committee on Wall Bracing revised this section during the 2007/2008 code cycle with the intent of insuring that sufficient anchorage is provided on braced wall lines and panels inside a dwelling to transfer lateral loads to either monolithic (thickened) slab foundations or continuous footings. While we agree that providing a continuous load path is important, the change was overly broad in its application and will present an enforcement problem. For instance, the first sentence of the 2009 IRC Section R403.1.6 effectively requires all light-frame walls to be provided with anchor bolts to the foundation. Thus, a non-bearing interior partition that is not part of a braced wall line but which just happens to sit atop a foundation wall or continuous foundation (e.g. at a partial basement, crawlspace, or interior knee wall) would be required to be fastened to the wall or footing below with 1/2" diameter anchor bolts at 6 foot spacing. We are also concerned the new language (in particular the change for walls on interior monolithic slabs) does not explicitly permit anchor bolts to be replaced by wedge anchors, expansion bolts, mudsill straps, or other equivalent anchorage, and also that it may require thickened slabs or continuous footings where they have not traditionally been provided or are not required by other sections of the IRC.

Further, there was no technical justification provided for the increased anchorage requirements. Whole-building structural tests have shown that our current methods of construction are stronger than current engineering practice and engineering design standards give them credit for. An actual house in the field tested by researchers in New Zealand performed 50% better than predicted by engineering design, even with sill plates attached only by single nails, rather than anchor bolts. We also note that the bottom plate of a braced wall line on the interior and supported on floor framing (including a raised floor system over a crawlspace or pier-and-beam foundation) can be attached to the framing with 3-16d nails at 16" spacing, but the same plate on a continuous footing will require 1/2" anchor bolts at 7" spacing. Thus, by implementing these new requirements for additional anchor bolts on braced wall lines inside our structures we are essentially contradicting 40 years of research into light-frame wood construction. We are not aware of any racking failures on interior braced wall lines that would justify adding bolts to these lines.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: EHRLICH-RB-5-R202-R403.1.6

RB74-09/10

R403.1.6

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

R403.1.6 Foundation anchorage. Sill plates and walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section. <u>Wood sill plates or wood bottom plates shall have full bearing on the foundation system.</u>

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of *braced wall panels* at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet (1829 mm) on center. Bolts shall be at least ½ inch (12.7 mm) in diameter and shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates

on monolithic slab foundation that are not part of a *braced wall panel* shall be positively anchored with *approved* fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.

Exceptions:

- 1. Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts.
- 2. Walls 24 inches (610 mm) total length or shorter connecting offset *braced wall panels* shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).
- 3. Connection of walls 12 inches (305 mm) total length or shorter connecting offset *braced wall panels* to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).

Reason: Full bearing is required to prevent cross-grain bending stresses of the wood sill plate or wood bottom plate. Further, the 2001 Wood Frame Construction Manual (WFCM) for One- and Two-Family Dwellings, which is adopted by reference in the IRC, states the following: "3.2.1.7 ... Sill plates or bottom plates shall have full bearing on the foundation system."

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

Public Hearing: Committee:	AS	AM	D	ICCEII ENAME: PITTS-RB-16-R403 1 6
Assembly:	ASF	AMF	DF	
				ICCI ILLINAMIL. FTI I S-RD-TO-R403.1.0

RB75–09/10 R403.1.6

Proponent: Mark Ferm, Boise, ID

Revise as follows:

R403.1.6 Foundation anchorage. Sill plates and walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section. Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of *braced wall panels* at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet (1829 mm) on center. Bolts shall be at least ½ inch (12.7 mm) in diameter and shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a *braced wall panel* shall be positively anchored with *approved* fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.

Exceptions:

- 1. Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts.
- 2. Walls 24 inches (610 mm) total length or shorter connecting offset *braced wall panels* shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).
- 3. Connection of walls 12 inches (305 mm) total length or shorter connecting offset *braced wall panels* to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent *braced wall panels* at corners as shown in Figure R602.10.4.4(1).
- 4. Bolts located not more than 12 inches from plate ends may be omitted when sill plate is spliced as required by 602.3.2
- 5. Bolts located not more than 12 inches from end of sill plates may be omitted when floor sheathing is nailed directly to sill plate.

Reason: This splicing technique is used in other areas of the code (301.2.2.2.2.2, 502.6.1,602.11.2) Furthermore with the different trades concrete, carpentry with one trade setting the anchor bolts and another installing the sill plate. In addition to this the different lumber lengths and species make proper layout difficult.

Cost Impact: Slight impact + or -.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCEILENAME: FERM-RB-1-R403 1 6

RB76-09/10 R403.1.9 (New)

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

Add new text as follows:

R403.1.9 Patio cover and screen enclosure footings. In areas with a frost line depth of zero as specified in Table R301.2 (1), a *patio cover* or *screen enclosure* shall be permitted to be supported on a slab on grade without footings, provided the slab conforms to the provisions of Section R506 of this code, is not less than 3.5 inches (89 mm) thick, and the columns support live and dead loads of less than 750 pounds (3.34 kN) per column.

Reason: This language has long been included in Appendix H of the code. The requirements are specific to this section and therefore should be included here.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: WALKER-RB-4-R403.1.9

RB77-09/10 R404.1.1, R404.1.2

Proponent: Robert Rice, Josephine County Building Safety, representing the Southern Oregon Chapter of ICC

Revise as follows:

R404.1.1 Design of masonry foundation walls. Masonry foundation walls shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of ASCE 5 or NCMA TR68-A. <u>Construction drawings shall state the standard used and shall show, with sufficient clarity, the detailed requirements of Section R404 or the applicable standard.</u> When TMS 402/ACI 530, NCMA TR68-A or the provisions of this section are used to design masonry foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the jurisdiction having authority.

R404.1.2 Concrete foundation walls. Concrete foundation walls that support light-frame walls shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332 or PCA 100. Concrete foundation walls that support above-grade concrete walls that are within the applicability limits of Section R611.2 shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332 or PCA 100. <u>Construction drawings shall state the standard used and shall show, with sufficient clarity, the detailed requirements of Section R404 or the applicability limits of Section R611.2 shall be designed and constructed in accordance with the provisions walls that support above-grade concrete walls that are not within the applicability limits of Section R611.2 shall be designed and constructed in accordance with the provisions of ACI 318, ACI 332 or PCA 100. When ACI 318, ACI 332, PCA 100 or the provisions of this section are used to design concrete foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the jurisdiction having authority.</u>

Reason: Section R404 and the various standards contain different requirements and it should be made clear on the project drawings which standard are being used. In addition to the different requirements between standards, the requirements vary based on wall height, retained earth height, sill bolt anchoring, joist or blocking connection to sill, etc In order to do a plan check or inspection this information needs to be shown on the construction drawings.

Cost Impact: This proposal does not change the construction requirements of the code and will not change the cost of construction.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: RICE-RB-1-R404.1.1

RB78–09/10 R404.1.2.3.6.1, R611.4.4 (New), Chapter 44 (New)

Proponent: Stephen V. Heller, representing the Insulating Concrete Form Association (ICFA)

1. Revise as follows:

R404.1.2.3.6.1 Stay-in-place forms. Stay-in place concrete forms shall comply with this section.

- 1. Surface burning characteristics. The flame-spread index and smoke-developed index of forming material, other than foam plastic, left exposed on the interior shall comply with Section R302. The surface burning characteristics of foam plastic used in insulating concrete forms shall comply with Section R316.3.
- 2. Interior covering. Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the building as required by Section R316. Where gypsum board is used to protect the foam plastic, it shall be installed with a mechanical fastening
 - system. Use of adhesives in addition to mechanical fasteners is permitted.
- 3. Exterior wall covering. Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an *approved* exterior wall covering complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.
- 4. Termite hazards. In areas where hazard of termite damage is very heavy in accordance with Figure R301.2(6), foam plastic insulation shall be permitted below *grade* on foundation walls in accordance with one of the following conditions:
 - 4.1. Where in addition to the requirements in Section R318.1, an *approved* method of protecting the foam plastic and structure from subterranean termite damage is provided.
 - 4.2. The structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-preservative-treated wood.
 - 4.3. On the interior side of *basement* walls.
- 5. Flat IFC wall system forms shall conform to ASTM E 2634.

2. Add new text as follows:

R611.4.4 Flat ICF walls systems. Flat ICF wall system forms shall conform to ASTM E 2634.

3. Add new standard to Chapter 44 as follows:

ASTM

<u>E 2634—08</u> Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems

Reason: This proposal adds ASTM E2634 to the code to help users determine acceptance of Flat Wall ICF forming systems.

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

Analysis: A review of the standard proposed for inclusion in the code, ASTM E 2634-08, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEII ENAME: HELLER-RB-2-R404 1 2 3 6 1-R611 4 4-CH 44

RB79–09/10

R404.1.5.3

Proponent: Bruce D. Spicher, Orangeburg County, SC

Revise as follows:

R404.1.5.3 Pier and curtain wall foundations. Use of pier and curtain wall foundations shall be permitted to support light-frame construction not more than two stories in height, provided the following requirements are met:

1. All load-bearing walls shall be placed on continuous concrete footings placed integrally with the exterior wall footings.

- 2. The minimum actual thickness of a load-bearing masonry wall shall be not less than 4 inches (102 mm) nominal or 33/8 inches (92 mm) actual thickness, and shall be bonded integrally with piers spaced in accordance with Section R606.9.
- 3. Piers shall be constructed in accordance with Section R606.6 and Section R606.6.1, and shall be bonded into the load-bearing masonry wall in accordance with Section R608.1.1 or Section R608.1.1.2.
- 4. The maximum height of a 4-inch (102 mm) load-bearing masonry foundation wall supporting wood-frame walls and floors shall not be more than 4 feet (1219 mm).
- 5. Anchorage shall be in accordance with Section R403.1.6, Figure R404.1.5(1), or as specified by engineered design accepted by the *building official*.
- 6. The unbalanced fill for 4-inch (102 mm) foundation walls shall not exceed 24 inches (610 mm) for solid masonry or 12 inches (305 mm) for hollow masonry.
- 7. In Seismic Design Categories D0, D1 and D2, prescriptive reinforcement shall be provided in the horizontal and vertical direction. Provide minimum horizontal joint reinforcement of two No.9 gage wires spaced not less than 6 inches (152 mm) or one 1/4 inch (6.4 mm) diameter wire at 10 inches (254 mm) on center vertically. Provide minimum vertical reinforcement of one No. 4 bar at 48 inches (1220 mm) on center horizontally grouted in place.

Reason: This section allows pier curtain walls in Seismic D zones up to a maximum height of 48" with pier spacing at 48". This leaves an area approximately 32" wide between piers and 48" in height. Note (2) calls for masonry curtain wall to be integrally bonded with piers as shown in Figure R404.1.5(1).

The area between the piers (32" x 48") has no vertical support or horizontal support. You cannot provide wall tie bonding as required by 608.1.2. Figure R404.1.5(1) is showing a strap similar to Simpson's PA51. The figure is showing this strapping running through the 3.5" masonry bonding units. To insert this strap through the hollow cavity of 3.5" masonry unit is impossible.

To construct this pier curtain wall in a Seismic D zone and meet all the requirements of the 2009 IRC for masonry foundation walls is not only impractical, it is impossible.

Cost Impact: As far as an increase in construction cost to move from pier curtain walls to a CMU wall with labor included, it is actually less expensive to install a CMU wall (concrete block 8 x 16) than it is to erect a pier curtain wall. As stated, you can meet all the requirements of the code with a CMU wall, where as a pier curtain wall in a Seismic D zone you cannot.

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

ICCFILENAME: SPICHER-RB-1-R404.1.5.3

RB80–09/10 R404.1.9 (New), R404.1.9.1 (New), R404.1.9.2 (New), R404.1.9.3 (New), R404.1.9.4 (New), R404.1.9.5 (New), R602.10.7

Proponent: Gary Ehrlich, National Association of Home Builders (NAHB)

1. Add new text as follows:

R404.1.9 Isolated masonry piers. Isolated masonry piers shall be constructed in accordance with this section and the general masonry construction requirements of Section R606. Hollow masonry piers shall have a minimum nominal thickness of 8 in. (203 mm), with a nominal height not exceeding four (4) times the nominal thickness and a nominal length not exceeding three (3) times the nominal thickness. Where hollow masonry units are solidly filled with concrete or grout, piers shall be permitted to have a nominal height not exceeding ten (10) times the nominal thickness. Footings for isolated masonry piers shall be sized in accordance with Section R403.1.1.

R404.1.9.1 Pier cap. Hollow masonry piers shall be capped with 4 inches (102 mm) of solid masonry or concrete, a masonry cap block, or shall have cavities of the top course filled with concrete or grout unless a sill plate of 2-inch (51 mm) minimum nominal thickness and bearing on two face shells is provided. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm). Where required, termite protection for the pier cap or sill plate shall be provided in accordance with Section R318.

R404.1.9.2 Masonry piers supporting floor girders. Masonry piers supporting wood girders complying with Tables R502.5(1) and R502.5(2) shall be permitted in accordance with this section. Piers supporting girders for interior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 10 feet (3 048 mm) from top of footing to bottom of sill plate or girder. Piers supporting girders for exterior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 4 feet (1 220 mm) from top of footing to bottom of sill plates shall be anchored to the pier or footing in accordance with Section R403.1.6 or Figure R404.1.5(1).

R404.1.9.3 Masonry piers supporting braced wall panels. Masonry piers supporting braced wall panels shall be constructed in accordance with Figure R602.10.7.

R404.1.9.4 Seismic design of masonry piers. Masonry piers in all dwellings located in Seismic Design Category D0, D1, D2, and townhouses in Seismic Design Category C, shall be designed in accordance with accepted engineering practice.

R404.1.9.5 Masonry piers in flood hazard areas. Masonry piers for dwellings in flood hazard areas shall be designed in accordance with Section R322.

2. Revise as follow:

R602.10.7 Braced wall panel support. Braced wall panel support shall be provided as follows:

- 1. Cantilevered floor joists, supporting *braced wall lines*, shall comply with Section R502.3.3. Solid blocking shall be provided at the nearest bearing wall location. In Seismic Design Categories A, B and C, where the cantilever is not more than 24 inches (610 mm), a full height rim joist instead of solid blocking shall be provided.
- <u>Raise floor system</u> Elevated post or pier foundations exceeding 4 feet (1 220 mm) in height and supporting braced wall panels shall be designed in accordance with accepted engineering practice. <u>Raised floor system</u> masonry pier foundations not exceeding 4 feet (1 220 mm) in height, and isolated masonry piers in basements, shall be permitted to be designed in accordance with Section R404.1.9.
- 3. Masonry stem walls with a length of 48 inches (1220 mm) or less supporting *braced wall panels* shall be reinforced in accordance with Figure R602.10.7. Masonry stem walls with a length greater than 48 inches (1220 mm) supporting *braced wall panels* shall be constructed in accordance with Section R403.1 *Braced wall panels* constructed in accordance with Sections R602.10.3.2 and R602.10.3.3 shall not be attached to masonry stem walls.

Reason: The purpose of this proposal is to introduce provisions for isolated masonry piers used as foundations for raised wood floor systems. Masonry pier foundations are a common construction method. However, besides a brief mention in R606.6, no other guidance is given for the construction of these piers, other than a reference in R602.10.6 calling for engineered design of piers supporting braced wall panels.

Language is proposed for Chapter 4 to provide prescriptive guidance for isolated masonry piers constructed inside a basement or crawlspace. The language proposed for R404.1.9 for masonry piers is based on the empirical design limits contained in the MSJC. The language is adopted from the paragraph on Foundation Piers in NCMA's TEK Note 5-3A: "Concrete Masonry Foundation Wall Details". Further limits are provided for piers supporting floor girders, braced wall panels, and for piers in high-seismic or flood hazard areas.

The language in R602.10.6 is modified and coordinated with the proposed R404.1.9 language to allow prescriptive design of short exterior masonry piers and of isolated interior masonry piers complying with R404.1.9. Taller masonry piers supporting an elevated deck, sunroom, or other substantially raised portion of a dwelling are relegated to engineered design. It was the original intent of R602.10.6 to address these full-height piers, not to require engineered design for every raised wood floor/crawlspace regardless of pier height.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
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RB81-09/10 R404.4

Proponent: Robert Rice, Josephine County Building Safety, representing the Southern Oregon Chapter of ICC

Revise as follows:

R404.4 Retaining walls. Retaining walls that are not laterally supported at the top and that retain in excess of 24 inches (610 mm) of unbalanced fill shall be designed in accordance with accepted engineering practice to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning. <u>Concrete or masonry foundation walls that have permanent lateral support at the top and bottom shall be in accordance with R404.1.</u>

Reason: This proposal is to clarify that the type of "Retaining walls" referred to in section R404.5 are designed as free-standing (cantilevered) retaining walls. This type of wall is very different from the "Concrete and masonry foundation" walls referred to in Section R404.1 where there is lateral support required at top and bottom. If the provisions of the two were combined it could result in a wall that is subject to failure. In the design provisions of the concrete or masonry foundation walls with lateral support at the top and bottom the vertical reinforcement, at distance "d" per Tables R404.1.1(2) through R404.1.1(5), is on the tension side of the wall which is the side away from the soil. In a retaining wall was restrained at the top, as referred to in R404.5, the reinforcement should be on the soil side. If, for instance, a cantilevered retaining wall was restrained at the top no prescriptive provisions contained in the IRC for the design of this type of wall. An engineered design would be required for a free-standing cantilevered retaining wall.

Cost Impact: The intent of this proposal is to clarify the existing requirements and no new requirements have been added. There will be no increase in the cost of construction.

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

RB82–09/10 R405.1, R405.1.1 (New), R405.2, R405.2.1, R405.2, R405.2.2, R405.3

Proponent: James Jorgensen, PE, City of Lenexa, KS, representing the Metropolitan Kansas Chapter of ICC

1. Revise as follows:

R405.1 Concrete or masonry foundations. Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below *grade*. Drainage tiles, gravel or crushed stone drains, perforated pipe or other *approved* systems or materials shall be installed at or below the <u>floor level of the</u> area to be protected and shall discharge by gravity or mechanical means into an *approved* drainage system <u>in accordance</u> with Section R405.3. Gravel or crushed stone drains shall extend at least 1 foot (305 mm) beyond the outside edge of the footing and 6 inches (152 mm) above the top of the footing, <u>be at least 12 inches deep</u>, and be covered <u>surrounded by with</u> an *approved* filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper., and The drainage tiles or perforated pipe shall be placed on a minimum of 2 inches (51 mm) of washed gravel or crushed rock at least one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches (152 mm) of the same material. <u>Perforated pipe drains shall be covered with an approved filter membrane or an approved filter membrane shall surround the gravel/crushed rock covering the drain. Drains shall be placed level or at a positive slope to the point of collection for removal from the structure.</u>

Exceptions:

- A drainage system is not required when the foundation is installed on well-drained ground or sand-gravel mixture soils according to the Unified Soil Classification System, Group I Soils, as detailed in Table R405.1.
- 2. Perforated pipe drains may be placed on top of a concrete footing in lieu of a bed of gravel or rock provided it is below the floor level of the usable space.

2. Add new text as follows:

R405.1.1 Perforated pipe drains. Perforated pipe drains and drain tile shall have a minimum interior diameter of 4 inches.

3. Revise as follows:

R405.2 Wood foundations. Wood foundations enclosing habitable or usable spaces located below *grade* shall be adequately drained in accordance with Sections R405.2.1 through, R405.2.32 and R405.3.

R405.2.1 Base. A porous layer of gravel, crushed stone or coarse sand shall be placed to a minimum thickness of 4 inches (102 mm) under the *basement* floor. Provision shall be made for automatic draining of this layer and the gravel or crushed stone wall footings. <u>To drain the base layer, interior drains complying with Section R405.1 shall be</u> provided below the base layer, around the perimeter of the enclosed area and connected to the drainage system.

R405.2.2 Vapor retarder Moisture barrier. A 6-mil-thick (0.15 mm) polyethylene vapor retarder moisture barrier shall be applied over the porous layer with the *basement* floor constructed over the polyethylene.

R405.2 <u>R405.3</u> **Drainage system.** In other than Group I soils, <u>an approved drainage system shall be provided to a sump shall be provided to drain the porous base</u> layer and footings. <u>The system shall discharge by gravity or mechanical means and shall be capable of removing any accumulated water and discharging it to an approved location to move water away from the structure. Where drainage is by mechanical means a sump shall be provided. The sump shall be at least 24 inches (610 mm) in diameter or 20 inches square (0.0129 m2), shall extend at least 24 inches (610 mm) below the bottom of the *basement* floor and shall be capable of positive gravity or mechanical drainage to remove any accumulated water. The drainage system shall discharge into an *approved* sever system or to daylight. For gravity drainage systems solid pipe shall be provided between the termination point and the connection at the structure and shall terminate in a manner to facilitate cleaning.</u>

Reason: The foundation drainage requirements in the code need clarification to be a more effective component of the code. These requirements have not been updated for many years. A frequent complaint on existing homes is water infiltration into the basement areas. More and more basement areas are used as primary living space. Repairs to dwellings resulting from ineffective installation of the foundation drainage system are costly and is preventable. The codes lack of clarity on this issue leads to ineffective enforcement.

In R405.1 the location of the drains "at or below" the floor level allows for installations that may be ineffective at removing water from the foundation area by allowing water to enter the usable space before it can be drained away. Clarifying that the drains must be below the floor level (top of the floor surface) provides more clarity. Where gravel or crushed stone drains are used the code does not specify a depth of the drain, only that it extends 6 inches above the level of the footing. Since the minimum floor thickness is 4 inches the drain is above the level of the floor which is ineffective. Many standards that address drainage systems require that stone drains be completely enclose to prevent fines from clogging the drainage system. Simply covering the material with a filter membrane does not prevent fines from clogging the drains.

The term "approved filter membrane" does not provide good direction for code officials or builders. Although my research indicates that many roadway projects use AASHTO M288-00 for class 3 for use in drains and French drains I am not sure if this is what is commonly supplied with prefabricated socks for perforated drains. Clarification can be provided in a future code change.

The current code required gravel and stone drains to be covered with a filter membrane, however; the code is silent on the requirements for the protection of perforated drains. To prevent fines from penetrating the openings in the perforated pipe protection by a filter membrane is required around the pipe or around the stone/gravel covering the pipe.

The requirements for removal of water by gravity or mechanical means as been moved to the section on drainage where it can more comprehensively addressed.

The code does not specify a minimum size for drain tile therefore a minimum size of 4 inches interior diameter has been provided. Three inches may be acceptable for some smaller dwellings with short distances to the point of collection but the cost difference is minimal and 4 inches is more effective.

Drains should not have sharp rises or falls that provide for collection points for fine material leading to clodding of the drains over time, therefore a provision for providing a level or positive slope has been added. Section R405.2.1 has been modified to clarify that to drain the porous layer below the base drains complying the R405.1 are required and they shall be installed around the perimeter of the space and below the base layer. Drainage system R405.3. Current Section R405.2.3 only applies to wood foundations. R405.1 only requires that the drains from the protected area discharge to an approved location without clarifying the process. It is inconsistent for wood foundations to be very specific regarding the sump and drainage of the porous layer and have no clarify for concrete and masonry foundations. R405.3 includes the old language in R405.1 for drainage by gravity or mechanical means and adds clarification that for gravity drains the termination point should be such that it could be cleaned of any accumulated debris at the termination from the house to the termination point.

Cost Impact: There may be a slight increase in the initial cost of construction if a jurisdiction did not previously require that perforated drains or crushed gravel drains be protected with an approved filter membrane or provide a means of draining the base layer under basement floors.

Public Hearing: Committee:	AS ASE	AM AME	D DF	
Accention in the second s		7 (1711	Bi	ICCFILENAME: JORGENSEN-RB-1-R405.1

RB83-09/10 R408.3

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing the Extruded Polystyrene Foam Association

Revise as follows:

R408.3 Unvented crawl space. Ventilation openings in under-floor spaces specified in Sections R408.1 and R408.2 shall not be required where:

- Exposed earth is covered with a continuous Class I vapor retarder. Joints of the vapor retarder shall overlap by 6 inches (152 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (152 mm) up the stem wall and shall be attached and sealed to the stem wall <u>or insulation</u>; and
- 2. One of the following is provided for the under-floor space:
 - 2.1. Continuously operated mechanical exhaust ventilation at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7m2) of crawlspace floor area, including an air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.9;
 - 2.2. Conditioned air supply sized to deliver at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m²) of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.9;
 - 2.3. Plenum in existing structures complying with Section M1601.5, if under-floor space is used as a plenum.

Reason: This code proposal gives the user and /or installer the option to tape or seal to the insulation rather than the stem wall. This option allows the foam to be installed first, then the vapor retarder. This will ease installation and provide greater flexibility without compromising the function of the vapor retarder itself.

A companion code proposal to the IBC is not required since the existing language is not in the IBC.

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

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

ICCFILENAME: BEITEL-RB-6-R408.3

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

Proponent: Jeff Hugo, CBO, National Fire Sprinkler Association

1. Add new text as follows:

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

2. Add new standard to Chapter 44 as follows:

NFPA

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

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

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

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

Bibliography:

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: HUGO-RB-1-R501.3

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

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

1. Add new text as follows:

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

Exceptions:

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

2. Add new standard to Chapter 44 as follows:

NFPA

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: WAINRIGHT-RB-8-R501.3

RB86-09/10 R501.3 (New)

Proponent: Sal DiCristina, representing Code Solutions, Inc.

Add new text as follows:

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

Exceptions:

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

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

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

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

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

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEILENAME: DICRISTINA-RB-1-R501.3

RB87-09/10 R501.3 (New)

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

Add new text as follows:

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

Exceptions:

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

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

The floor they were operating on was unprotected lightweight construction that collapsed without warning. In the ensuing investigation, the National Institute for Occupational Safety and Health released report F2006-26¹. 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, NIOSH² 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 2006-24³ 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 F2007-07⁴. In this Fire Fighter Death in the Line-of-Duty report, NIOSH recommends "building code officials and local authorities having jurisdiction should consider modifying the current codes to require that lightweight trusses are protected with a fire barrier on both the top and the bottom". The report further states "In this incident, the floor trusses for the first floor did not have any protection on the bottom cord, which immediately exposed the trusses to fire in the basement. Unfinished basements are very common throughout the country. Basements typically house additional fire exposures such as alternative heating sources, hot water heaters, clothes dryers, etc.. It is critical for trusses and lightweight engineered wood I-beams that are used in a load-bearing assembly to be protected with a thermal barrier such as gypsum wallboard. The function of the thermal barrier is a critical factor in the fire performance of the assembly".

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

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

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

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

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

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

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

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

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



Floor assembly where Fire Engineer Arnie Wolf was killed



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



Even lighterweight materials – Georgia Pacific XJ-85

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: DECRANE-RB-1-R501.3

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

Proponent: Joseph Fleming, representing the Boston Fire Department

1. Add new text as follows:

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

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

2. Add new standard to Chapter 44 as follows:

NFPA

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

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

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

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

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

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

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

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

ICCFILENAME: FLEMING-RB-2-R502.14

RB89–09/10

R502.1.3, R602.1.1, R802.1.2

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

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

R602.1.1 End-jointed lumber. Approved end-jointed lumber identified by a grade mark conforming to Section R602.1 may be used interchangeably with solid-sawn members of the same species and grade. <u>End-jointed lumber used in</u> an assembly required elsewhere in this code to have a fire resistance rating shall have the designation "Heat Resistant Adhesive" or "HRA" included in its grade mark.

R802.1.2 End-jointed lumber. Approved end-jointed lumber identified by a grade mark conforming to Section R802.1 may be used interchangeably with solid-sawn members of the same species and grade. End-jointed lumber used in an assembly required elsewhere in this code to have a fire resistance rating shall have the designation "Heat Resistant Adhesive" or "HRA" included in its grade mark.

Reason: The American Lumber Standards Committee (ALSC) recently added elevated-temperature performance requirements for end-jointed lumber adhesives intended for use in fire resistance-rated assemblies. End-jointed lumber manufactured with adhesives which meet the new requirements is being designated as "Heat Resistant Adhesive" or "HRA" on the grade stamp. Heat Resistant Adhesives are required to be qualified in accordance with one of two new ASTM standards, *D7374-08 Practice for Evaluating Elevated Temperature Performance of Adhesives Used in End-Jointed Lumber* and *D7470-08 Practice for Evaluating Elevated Temperature Performance of End-Jointed Lumber Studs*. End-jointed lumber manufactured with a Heat Resistant Adhesive under an auditing program of an ALSC-accredited grading agency is allowed to carry the HRA mark on the grade-stamp. End-jointed lumber manufactured with an adhesive not qualified as a Heat Resistant Adhesive will be designated as "Non-Heat Resistant Adhesive" or "non-HRA" on the grade stamp. Lumber carrying the HRA mark is permitted to be used interchangeably with solid-sawn members of the same species and grade in fire-rated applications.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: PITTS-RB-11-R502.1.3-R602.1.1-R802.1.2

RB90–09/10 Table R301.5, R311.7.4.4, R311.7.7.4, R312.4, R502.1.7, R502.2.2.4, R507 (New), R507.1 (New), R507.2 (New), Table R507.2 (New), R507.2.1 (New), R507.2.2 (New), R507.2.3 (New), Figure R507.2.3 (New), R507.3 (New), R507.3.1 (New)

Proponent: Dennis Pitts, American Forest & Paper Association

1. Revise as follows:

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

(No changes to table values)

a. through d. (No changes)
e. See Section R502.2.2 <u>R507.1</u> for decks attached to exterior walls.
f. through i. (No changes)

R311.7.4.4 Exterior wood/plastic composite stair treads. Wood/plastic composite stair treads shall comply with the provisions of Section R317.4 R507.3.

R311.7.7.4 Exterior wood/plastic composite handrails. Wood/plastic composite handrails shall comply with the provisions of Section R317.4 <u>R507.3</u>.

R312.4 Exterior wood/plastic composite guards. Wood/plastic composite *guards* shall comply with the provisions of Section R317.4 <u>R507.3</u>.

2. Delete without substitution:

R502.1.7 Exterior wood/plastic composite deck boards. Wood/plastic composites used in exterior deck boards shall comply with the provisions of Section R317.4.

R502.2.2.4 Exterior wood/plastic composite deck boards. Wood/plastic composite deck boards shall be installed in accordance with the manufacturer's instructions.

3. Add new sections with relocated text as follows:

SECTION R507 DECKS

R502.2.2 <u>R507.1</u> **Decks.** Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self- supporting. For decks with cantilevered framing members, connections to exterior walls or other framing members, shall be designed and constructed to resist uplift resulting from the full live load specified inTableR301.5 acting on the cantilevered portion of the deck.

R502.2.2.1 <u>R507.2</u> Deck ledger connection to band joist. For decks supporting a total design load of 50 pounds per square foot (2394 Pa) [40 pounds per square foot (1915 Pa) live load plus 10 pounds per square foot (479 Pa) dead load], the connection between a deck ledger of pressure preservative-treated Southern Pine, incised pressure-preservative-treated Hem-Fir or *approved* decay- resistant species, and a 2-inch (51 mm) nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with 1/2-inch (12.7 m) lag screws or bolts with washers in accordance with Table R502.2.2.1 <u>R507.2</u>. Lag screws, bolts and washers shall be hot-dipped galvanized or stainless steel.

TABLE R502.2.2.1 R507.2FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGERAND A 2-INCH NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST^{c, f, g}(Deck live load = 40 psf, deck dead load = 10 psf)

(No change to table values)

a. through c. (No change)

- d. Lag screws and bolts shall be staggered in accordance with Section R502.2.2.1.1 R507.2.1.
- e. through h. (No change)

R502.2.2.1.1 R507.2.1 Placement of lag screws or bolts in deck ledgers. The lag screws or bolts shall be placed 2 inches (51 mm)in from the bottom or top of the deck ledgers and between 2 and 5 inches (51 and 127 mm) in from the ends. The lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger.

R502.2.2.2 R507.2.2 Alternate deck ledger connections. Deck ledger connections not conforming to Table R502.2.2.1 R507.2 shall be designed in accordance with accepted engineering practice. Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck ledgers shall not be supported on stone or masonry veneer.

R502.2.2.3 <u>R507.2.3</u> <u>Deck lateral load connection.</u> The lateral load connection required by Section R502.2.2 <u>R507.1</u> shall be permitted to be in accordance with Figure R502.2.2.3 <u>R507.3</u>. Hold-down tension devices shall be installed in not less than two locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N).

FIGURE 502.2.2.3 R507.2.3 DECK ATTACHMENT FOR LATERAL LOADS

(No change to figure)

R317.4 <u>R507.3</u> Wood/plastic composites. Wood/plastic composites used in exterior deck boards, stair treads, handrails and guardrail systems shall bear a *label* indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 7032.

R317.4.1 R507.3.1 Wood/plastic composites shall be installed in accordance with the manufacturer's instructions.

Reason: The IRC is seeing an increasing number of deck-related revisions. Rather than scatter them throughout the code, particularly in inappropriate locations, it seems logical to create a deck-related section to provide a single location for the existing provisions. These revisions, which make no technical changes, are proposed for the following reasons:

- 1. The references in Table R301.5 and Sections R311.5.3.4, R311.7, and R312.3 are changed to reflect the relocation of the existing text in R319.4.
- 2. R502.1.7 and R502.2.2.4 are deleted because the requirements are repeated in the relocated text of the current R319.4.
- Various subsections addressing decks are being relocated from the portion of the chapter dealing with general wood floor construction.
 The text of the current R319.4 is now in a section dealing with protection from decay. There doesn't appear to be anything about the text of existing Sec. R319.4 that deals with that subject matter. It's being relocated unchanged to the new section on decks, a more appropriate place for it

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

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

ICCFILENAME: PITTS-RB-12-T. R301.5-R311-R502-R507

RB91–09/10 R202 (New), R502.1.8 (New), R602.1.4 (New), R802.1.6 (New), Chapter 44 (New)

Proponent: Edward L. Keith, PE, APA-The Engineered Wood Association

1. Add new definition as follows:

STRUCTURAL COMPOSITE LUMBER. Structural members manufactured using wood elements bonded together with exterior adhesives. Examples of structural composite lumber are:

Laminated veneer lumber (LVL). A composite of wood veneer elements with wood fibers primarily oriented along the length of the member. Veneer thickness shall not exceed 0.25 in. (6.4 mm).

Parallel strand lumber (PSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.25 in. (6.4 mm) and the average length shall be a minimum of 300 times the least dimension.

Laminated strand lumber (LSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 in. (2.54 mm) and the average length shall be a minimum of 150 times the least dimension.

Oriented strand lumber (OSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 in. (2.54 mm) and the average length shall be a minimum of 75 times the least dimension.

2. Add new text as follows:

R502.1.8 Structural composite lumber. Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D5456.

R602.1.4 Structural composite lumber. Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D5456.

R802.1.6 Structural composite lumber. Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D5456.

3. Add new standard to Chapter 44 as follows:

ASTM D5456-09 Standard Specification for Evaluation of Structural Composite Lumber Products

Reason: ASTM Standard D5456 09 is the standard by which structural composite lumber is evaluated. Structural composite lumber and this standard are already recognized in the 2006 IBC. Products manufactured to this standard are increasingly available in the market place and being used in residential construction even though not specifically recognized by the IRC. These products are being used as beams, headers, long length studs, floor and roof framing; and other applications where high strength, long length, and/or dimensional stability make sawn lumber unacceptable.

Recognition of the appropriate code-recognized standard on the identification marks required by the IRC will provide the designer, builder, plans examiner and building inspector with the assurance that structural composite lumber products are being manufactured with the appropriate quality control systems in place and that the design properties of the product are properly derived and maintained during production.

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

Analysis: The proposed new standard, ASTM D 5456, is currently referenced in the International Building Code.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: KEITH-RB-6-R202-R502.1.8-CH 44

RB92-09/10 R502.2.2, R502.2.2.3

Proponent: Steven Winkel, FAIA, PE, Kelly Cobeen, PE, SE, Building Seismic Safety Council (BSSC) of the National Institute of Building Sciences, representing FEMA/BSSC Code Resource Support Committee

Revise as follows:

R502.2.2 Decks. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self- supporting. For decks with cantilevered framing members, connections to exterior walls or other framing members, shall be designed and constructed to resist uplift resulting from the full live load specified in Table R301.5 acting on the cantilevered portion of the deck.

R502.2.2.3 Deck lateral load connection. The lateral load connection required by Section R502.2.2 shall be permitted to be in accordance with Figure R502.2.2.3. Where the lateral load connection is provided in accordance with Figure 502.2.2.3, hold-down tension devices shall be installed in not less than two locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 lb (6672 N).

Reason: Sections R502.2.2 and R502.2.2.3 are modified to clarify the intent in response to user comments. Section R502.2.2 is intending to clarify that vertical and lateral load design of decks is always required. Removing the words "as applicable" clarifies that it is always applicable. The second sentence of R502.2.2.3 is modified to indicate that the hold down device quantity and load capacity mentioned are only applicable when the Figure R502.2.2.3 detail is being used to meet the requirement of R502.2.2. If another connection detail is being used, then the connection quantity and load capacity are not applicable. These clarifications are believed to confirm the ICC staff interpretation on this topic.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	ICCFILENAME: WINKEL-COBEEN-RB-1-R502.2.2

RB93-09/10

R502.2.2.1.1

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

R502.2.2.1.1 Placement of lag screws or bolts in deck ledgers. The lag screws or bolts shall be placed not less than 2 inches (51 mm)in from the top of the deck ledger, ³/₄ inches (19 mm) from the bottom of the deck ledger, 2 inches (51 mm) from the bottom of rimboard, bottom or top of the deck ledgers and between 2 and 5 inches (51 and 127 mm) in from the ends of the deck ledger. The lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger.

Reason: Placement provisions for lag screws and bolts in deck ledgers were added to the IRC last cycle; however, questions arose when designers compared the placement requirements with 2005 *National Design Specification*[®] (*NDS*[®]) for Wood Construction requirements for similar connections. The proposed changes bring the placement requirements into agreement with the minimum requirements in the 2005 *NDS*.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: PITTS-RB4-R502.2.2.1.1

RB94-09/10 R502.2.2.3, Figure R502.2.2.3

Proponent: Diana M. Hanson, representing North American Deck and Railing Association, Inc. (NADRA)

Delete without substitution:

R502.2.2.3 Deck lateral load connection. The lateral load connection required by Section R502.2.2 shall be permitted to be in accordance with FigureR502.2.2.3. Hold-down tension devices shall be installed in not less than two locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N).

FIGURE R502.2.2.3 DECK ATTACHMENT FOR LATERAL LOADS

Reason: The language of R502.2.2.3 is ambiguous resulting in potential misinterpretation by builders of decks and code officials. The phrasing "may be permitted to be" when coupled with the referenced Figure R502.2.2.3, results in a misunderstanding that this *example* of how to meet the lateral load requirement of R502.2.2, is a requirement, when in fact it is not.

This section has been the cause of much confusion and misunderstanding since its adoption in 2007. The language of 502.2.2.3 and the related figure is merely a suggestion, not a prescription for the only way to achieve a compliant lateral connection, yet NADRA has had to field inquiries and hold discussions with many builders and code officials who understandably misinterpret this code section and figure.

R502.2.2.3 and related Figure R502.2.2.3 add 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 builder and the code official, raising the likelihood of increased costs to both materials and labor.

IRC 2009, R101.3 Purpose, states "The purpose of this code is to provide *minimum requirements* to safeguard the public safety..." [emphasis added]. The Figure 502.2.2.3 is taken directly from the FEMA 2007 publication which is specifically for seismic areas. Suggesting that good building practices should meet seismic area requirements is not in line with R101.3.

Further, the language of 502.2.2.3 stating "not less than two" hold-down tension devices makes little sense when the size of the deck being attached is not taken into account.

For the above stated reasons, we propose that Figure 502.2.2.3 and the language of R502.2.2.3 suggesting its use, be removed from the IRC.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: HANSON-RB-2-R502.2.2.3-F. R502.2.2.3

RB95-09/10 R502.8, Figure R502.8

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

R502.8 <u>Cutting</u> drilling and notching. Structural floor members shall not be cut, bored or notched in excess of the limitations specified in this section. See Figure R502.8.



FIGURE R502.8 CUTTING, NOTCHING AND DRILLING

(Revise the top drawing, "Floor joist – Center Cuts" by changing the note that applies to the notch near the right support as follows: D/6 Max. <u>–for members less than 4" nominal dimension (102 mm)</u>

Reason: The revision to the title of R502.8 reflects content of the section which includes "cuts". The revision to the Figure R502.8 notation reflects the text of the code as well as provisions of the NDS[®].

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCEILENAME: PITTS-RB-15-R502 8-E_R502 8

RB96–09/10 R502.11.2, R505.1.3, R802.10.3, R804.3.7

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

Revise as follows:

R502.11.2 Bracing. Trusses shall be braced to prevent rotation and provide lateral stability in accordance with the requirements specified in the *construction documents* for the building and on the individual truss design drawings. In the absence of specific bracing requirements, trusses shall be braced in accordance with the Building Component Safety Information (BCSI 1-03) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses.

R505.1.3 Floor trusses. Cold-formed steel trusses shall be designed, braced and installed in accordance with AISI S100, Section D4. In the absence of specific bracing requirements, trusses shall be braced in accordance with the Cold-Formed Steel Building Component Safety Information (CFSBCSI)-, Guide to Good Practice for Handling, Installing & Bracing of Cold-Formed Steel Trusses. Truss members shall not be notched, cut or altered in any manner without an approved design.

R802.10.3 Bracing. Trusses shall be braced to prevent rotation and provide lateral stability in accordance with the requirements specified in the *construction documents* for the building and on the individual truss design drawings. In the absence of specific bracing requirements, trusses shall be braced in accordance with the Building Component Safety Information (BCSI 1-03) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses.

R804.3.7 Roof trusses. Cold-formed steel trusses shall be designed and installed in accordance with AISI S100, Section D4. In the absence of specific bracing requirements, trusses shall be braced in accordance with the Cold-Formed Steel Building Component Safety Information (CFSBCSI) Guide to Good Practice for Handling, Installing & Bracing of Cold-Formed Steel Trusses. Trusses shall be connected to the top track of the load-bearing wall in accordance with Table R804.3, either with two No.10 screws applied through the flange of the truss or by using a 54 mil (1.37 mm) clip angle with two No.10 screws in each leg.

Reason: The purpose of this code change is to update the references to Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses, to the most current version. The name of this document has changed, removing the "1-03" from the title and is now referenced simply as "BCSI".

For steel trusses, the references for bracing are updated to reflect the most current industry document, Cold-Formed Steel Building Component Safety Information, Guide to Good Practice for Handling, Installing & Bracing of Cold-Formed Steel Trusses. (CFSBCSI).

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

Public Hearing: Committee:	AS	AM	D	ICCFILENAME: WAINRIGHT-RB-5-R502.11.2-R802.10.3
Assembly:	ASF	AMF	DF	

RB97-09/10 R505.2, R603.2, R804.2

Proponent: Bonnie Manley, representing the American Iron and Steel Institute

Revise as follows:

R505.2 Structural framing. Load-bearing cold-formed steel floor framing members shall comply with Figure R505.2(1) and with the dimensional and minimum thickness requirements specified in Tables R505.2(1) and R505.2(2). Tracks shall comply with Figure R505.2(2) and shall have a minimum flange width of 11/4 inches (32 mm). The <u>size of the</u> maximum inside bend radius <u>used</u> for the design of members shall be the greater of 3/32 inch (2.4 mm) minus half the base steel thickness or 1.5 times the base steel thickness.

R603.2 Structural framing. Load-bearing cold-formed steel wall framing members shall comply with Figure R603.2(1) and with the dimensional and minimum thickness requirements specified in Tables R603.2(1) and R603.2(2). Tracks shall comply with Figure R603.2(2) and shall have a minimum flange width of 11/4 inches (32 mm). The <u>size of the</u> maximum inside bend radius <u>used</u> for <u>the design of</u> members shall be the greater of 3/32 inch (2.4 mm) minus half the base steel thickness or 1.5 times the base steel thickness.

R804.2 Structural framing. Load-bearing cold-formed steel roof framing members shall comply with Figure R804.2(1) and with the dimensional and minimum thickness requirements specified in Tables R804.2(1) and R804.2(2). Tracks shall comply with Figure R804.2(2) and shall have a minimum flange width of 11/4 inches (32 mm). The <u>size of the</u> maximum inside bend radius <u>used</u> for <u>the design of</u> members shall be the greater of 3/32 inch (2.4 mm) minus half the base steel thickness or 1.5 times the base steel thickness.

Reason: This code change makes a minor modification to the determination of the appropriate inside bend radius in the three applicable places in the IRC. The purpose of this change is to correct a small oversight from last cycle and bring the IRC provisions into agreement with the underlying AISI documents – AISI S230-07, AISI S200-07 and AISI S201-07.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: MANLEY-RB-1-R505.2-R603.2-R804.2

RB98–09/10 R505.2, R603.2, R804.2

Proponent: Michael C. Kerner, representing Dietrich Industries, Inc.

Revise as follows:

R505.2 Structural framing. Load-bearing cold-formed steel floor framing members shall comply with Figure R505.2(1) and with the dimensional and minimum thickness requirements specified in Tables R505.2(1) and R505.2(2). Tracks shall comply with Figure R505.2(2) and shall have a minimum flange width of 11/4 inches (32 mm). The maximum inside bend radius for members shall be the greater of 3/32 inch (2.4 mm) minus half the base steel thickness.

R603.2 Structural framing. Load-bearing cold-formed steel wall framing members shall comply with Figure R603.2(1) and with the dimensional and minimum thickness requirements specified in Tables R603.2(1) and R603.2(2). Tracks shall comply with Figure R603.2(2) and shall have a minimum flange width of 11/4 inches (32 mm). The maximum inside bend radius for members shall be the greater of 3/32 inch (2.4 mm) minus half the base steel thickness.

R804.2 Structural framing. Load-bearing cold-formed steel roof framing members shall comply with Figure R804.2(1) and with the dimensional and minimum thickness requirements specified in Tables R804.2(1) and R804.2(2). Tracks shall comply with Figure R804.2(2) and shall have a minimum flange width of 11/4 inches (32 mm). The maximum inside bend radius for members shall be the greater of 3/32 inch (2.4 mm) minus half the base steel thickness.

Reason: The modification of this particular requirement was brought forward incorrectly last cycle from the underlying AISI documents – AISI S230-07, AISI S200-07 and AISI S201-07. The sentence recommended for deletion should only apply to the design of the structural members, something that is not needed in the IRC, hence the request for the change.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: KERNER-RB-1-R505.2-R603.2-R804.2

RB99-09/10 R506.1

Proponent: James R. Baty II, Technical Director for the Concrete Foundations Association, representing the Concrete Foundations Association, the American Concrete Institute and ACI Committee 332 – Residential Concrete

Revise as follows:

R506.1 General. Concrete slab-on-ground floors shall be <u>designed and constructed in accordance with the provisions</u> <u>of this section or ACI 332</u>. Floors shall be a minimum 3.5 inches (89 mm) thick (for expansive soils, see Section R403.1.8). The specified compressive strength of concrete shall be as set forth in Section R402.2.

Reason: ACI 332-10 has incorporated the design guidance for slabs-on-ground including post-tensioned slabs and should be an allowable reference for residential slabs in the IRC similar to reference for materials, footings and foundation walls.

Cost Impact: No projected cost impact to industry as practice required to meet the stated standards are within current guidelines.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCEILENAME: BATY-RB-1-R506 1

RB100-09/10

R506.2.3

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

R506.2.3 Vapor retarder. A 6 mil (0.006 inch; 152 µm) polyethylene or *approved* vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where no base course exists.

Exception: The vapor retarder may be omitted:

- 1. From detached garages, utility buildings and other unheated accessory structures.
- 2. For unheated storage rooms having an area of less than 70 square feet (6.5 m2) and carports.
- 3. From driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.
- 4. Where approved by the building official, based on local site conditions.

Reason: When this code change was approved last year, the proponent argued that "attached garages have a high probability of being enclosed at a later date and converted to additional living space like a bedroom or den. These living spaces are typically conditioned which increases the temperature difference between the interior space and the ground below the floor slab which can contribute to moisture migration upward into the living space through the slab." High probability!!! While this may occur in homes built 30-40 years ago, there were no statistics or other supporting documentation to indicate this is occurring with homes built today. Three stall garages are by far the most common garage being constructed with new single family dwellings. These garages are 700 to 1000 square feet. Their size and location in the home do not lend themselves to conversion to living space. And if the space were to be converted to living space in the future, there is nothing to prevent an owner from placing a vapor retarder on top of the slab at the time of the conversion just like is done with a crawl space. Since the code does not require the floor to be concrete, only that it be noncombustible, the floor surface could be pavers, compacted sand, asphalt, or other materials that contained no vapor retarder because none would be required for these surfaces. Conversion of garages with these floor surfaces would present no more of a problem than a slab without a vapor retarder. Furthermore, to establish a rule (and spend the money) to address a conversion that in all likelihood will never occur is poor public policy and establishes a precedent that the IRC Committee should avoid at all costs. Besides the cost to the contractor in labor and materials, this requirement most often means an additional inspection by the building department which in turn will mean higher permit fees. The current code language serves no public purpose and warrants this change.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: DAVIDSON-RB-3-R506.2.3

RB101-09/10

R601.3, R601.3.1, Table R601.3.1, R601.3.2, R601.3.3, R703.1.3 (New), R703.1.3.1 (New), Table R703.1.3.1 (New), R703.1.3.2 (New), R703.1.3.3 (New)

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

Revise as follows:

<u>**R703.1.3**</u> R601.3 Vapor retarders. Class I or II vapor retarders are required on the interior side of frame walls in Zones 5, 6, 7, 8 and Marine 4.

Exceptions:

- 1. Basement walls.
- 2. Below grade portion of any wall.
- 3. Construction where moisture or its freezing will not damage the materials.

<u>R703.1.3.1</u> R601.3.1 Class III vapor retarders. Class III vapor retarders shall be permitted where any one of the conditions in Table R601.3.1 is met.

TABLE <u>R703.1.3.1</u>R601.3.1 CLASS III VAPOR RETARDERS

(No change to table values or footnote)

<u>R703.1.3.2</u> R601.3.2 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly.

The following shall be deemed to meet the class specified:

Class I: Sheet polyethylene, unperforated aluminum foil. Class II: Kraft-faced fiberglass batts. Class III: Latex or enamel paint.

<u>R703.1.3.</u>3 R601.3.3 Minimum clear air spaces and vented openings for vented cladding. For the purposes of this section, vented cladding shall include the following minimum clear air spaces. Other openings with the equivalent vent area shall be permitted.

- 1. Vinyl lap or horizontal aluminum siding applied over a weather resistive barrier as specified in Table R703.4.
- 2. Brick veneer with a clear airspace as specified in Section R703.7.4.2.
- 3. Other approved vented claddings.

Reason: The purpose of this proposal is to editorially relocate (again) the provisions on vapor retarders to Section R703 which were moved from Chapter 11 last cycle. The overwhelming majority of the provisions in Chapter 6 deal with the structural resistance of various wall materials (e.g. wood, cold-formed steel, masonry) to gravity, wind, and seismic loads. Vapor retarders have nothing to do with structural capacity. Thus, it was inappropriate to place these requirements in Chapter 6. Moving the vapor retarder provisions to a new Section R703.1.3 will put them where the rest of the provisions for weather resistance and water resistance of exterior wall systems are located.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: EHRLICH-RB-7-R601.3-R703.1.3

RB102-09/10 R202 (New), R602.3

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

1. Add new definition as follows:

EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resistive barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments such as cornices, soffits, fascias, gutters and leaders.

2. Revise as follows:

R602.3 Design and construction. Exterior walls of wood-frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3.(2) or in accordance with AF&PA's NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(1) through R602.3(4). <u>When used as wall bracing in accordance with Section R602.10 or other structural framing purposes in accordance with this chapter</u>. <u>Structural</u> wall sheathing shall be fastened directly to structural framing members. <u>Exterior wall coverings and</u>, <u>when placed on the exterior side of an exterior wall</u>, shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). <u>Wood structural panel sheathing used for exterior wall covering purposes shall comply with Section R703</u>.

Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

Exception: Jack studs, trimmer studs and cripple studs at openings in walls that comply with Tables R502.5(1) and R502.5(2).

Reason: The definition of "exterior wall covering" from IBC Chapter 14 is introduced to the IRC for appropriate and consistent usage regardless of building type or occupancy. The proposed revision to section R602.3 then applies this definition and, as an editorial proposal, helps to clarify requirements for sheathing installation on exterior walls. Wall sheathing that is used for structural purposes (e.g., bracing) is addressed in Chapter 6 Wall Framing while wall sheathing that is used solely for exterior wall covering purposes is appropriately addressed in Chapter 7 Wall Covering. The special reference to wood structural panels at the exclusion of listing specific requirements for other sheathing types is deleted because the requirements for applicable wall sheathing materials, including wood structural panels, are adequately addressed by reference to Tables R602.3(1) through R602.3(4). This change will help ensure consistent use of the terms "exterior wall covering" and "wall sheathing" in the IRC and better organize the code to address distinct requirements depending on the application or function of wall sheathing.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: CRANDELL-RB-1-R202-R602.3

RB103-09/10 Table R602.3(2)

Proponent: Randall Shackelford, representing Simpson Strong-Tie Co.

Revise as follows:

TABLE R602.3(2) ALTERNATE ATTACHMENTS TO TABLE R602.3(1)

		SPACING OF FASTENERS Edges (inches) Intermediate		
NOMINAL MATERIAL	DESCRIPTION ^{a,b} OF FASTENER AND	Edges (inches)	Intermediate	
THICKNESS (inches)	LENGTH		supports (inches)	
Wood structural panels su	ubfloor, roof ^g and wall sheathing to framing and	particleboard wall shea	thing to framing ^t	
a. through f. (No change)				

Specified alternate attachments for roof sheathing shall be permitted for windspeeds less than 100 mph. g. Fasteners attaching wood structural panel roof sheathing to gable end wall framing shall be installed using the spacing listed for panel edges.

(Portions of table and footnotes not shown remain unchanged)

Reason: This proposal has two purposes.

- Clarify that Table R602.3(2) is only to be used as alternate fastening for the locations listed in Table R602.3(1). The title of the table is altered 1. to clarify that these alternate attachments only apply to the fastenings specified in Table R602.3(1). There are other fastening requirements in the IRC that do not use the same fastener size and spacing as in Table R602.3(1), so it needs to be clarified that these fastenings do not apply. For example, fastening of braced wall method ABW uses 8d nails at 6" o.c. for one story and 4" o.c. for first of two story buildings, methods PFH and CS-PF use two rows of 8d nails at 3" o.c., and method PFG uses 8d nails at 3" o.c. The alternates in Table R602.3(2) are only designed to be an alternate to 6d nails at 6" o.c. at edges and 12" o.c. at intermediate panel supports.
- Add a footnote g to clarify that these alternate attachments are not to be used when the basic windspeed is 100 mph or greater. Refer to the 2. calculations below. They show that two of the three methods specified for 1/2" roof sheathing do not provide adequate withdrawal resistance to withstand 100 mph winds.

Calculations:

Use the Component and Cladding suction pressures of Table R301.2(2) to calculate the demand pressures on roof sheathing fasteners. Use Roof Slope of >10 degrees up to 30 degrees (not worst case). Use Zone 3, 10 sq. ft. effective wind area.

Actual withdrawal demand will depend on fastener spacing. Table R301.2(2) specifies 6" and 8" spacing for fasteners to intermediate supports (highest demand fastener)

Calculated Demand (multiply pressure by support spacing by fastener spacing):

From Table R301.2(2), P = -34.8 psf. Assume Trusses or rafters 24" o.c, Spruce Pine Fir species. 8" spacing: (-34.8)(2)(8/12)= -46.4 psf. 6" spacing: (-34.8)(2)(6/12)= -34.8 psf.

Pressure would be higher for lower slope roof (10 degrees or less) or for Exposure C location.

Use ICC-ES ESR-1539, Table 2 to calculate withdrawal capacity for the listed sheathing fasteners for sheathing up to ½" thick. Per Table 2, footnote 4, use the lesser of the actual penetration or 1.34 to calculate withdrawal capacity.

Fastener	Listed withdrawal	Calculation	Withdrawal Capacity	Fastener Spacing	Fastener Demand	OK?
Staple, 15 ga x 1¾"	23 lbs/in.	(23)(1.25)(1.6)=46 lbs.	46 lbs.	8"	-46.4 psf	NO (?)
Nail (2¼ × 0.099")	15 lbs/in	(15)(1.34)(1.6)=32.16 lbs.	32 lbs.	6"	-34.8 psf	NO
Staple, 16 ga x 1¾"	20 lbs/in	(20)(1.25)(1.6)= 40 lbs.	40 lbs.	6"	-34.8 psf	YES

Bibliography

ICC-ES ESR-1539, Table 2, http://www.icc-es.org/reports/index.cfm.

Cost Impact: The code change proposal could increase costs if these alternate fasteners were used in high wind areas. I do not know for sure because while larger fasteners will have to be used, fewer of them will be required so it may balance out.

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

RB104–09/10 R602.7, R602.7.1 (New), Table R602.7.1 (New), Figures R602.7.1(1)-(2) (New)

Proponent: Joseph Lstiburek, Building Science Corporation

1. Revise as follows:

R602.7 Headers. For header spans see Tables R502.5(1) and R502.5(2). <u>Alternative header applications in</u> accordance with this section shall be permitted.

2. Add new text, table and figures as follows:

R602.7.1 Single member headers in exterior bearing walls. Single member headers in exterior bearing walls shall be permitted in accordance with Table R602.7.1. Single headers shall be framed top and bottom with a flat-wise 2x member. To make up the remaining space, cripples shall be installed above the header. See Figure R602.7.1(1). Alternatively, the header can be sized to fill the space between the wall top plate and a flat-wise 2x member. See Figure R602.7.1(2). The header assembly shall bear on a minimum of one jack stud at each end.

TABLE R602.7.1 SPANS FOR MINIMUM No.2 GRADE SINGLE HEADER FOR EXTERIOR BEARING WALLS^{a,b,c}

	SIZE	Wood Species			(GROUND	SNOW L	OAD (psf)		
SINGLE				<u>≤ 20^d</u>			<u>30</u>			<u>50</u>	
HEADERS						<u>Buildi</u>	ng Width	(feet) ^e			
SUPPORTING			<u>20</u>	<u>28</u>	<u>36</u>	<u>20</u>	<u>28</u>	<u>36</u>	<u>20</u>	<u>28</u>	<u>36</u>
Roof and Ceiling	<u>2x8</u>	Spruce-Pine-Fir	<u>4-10</u>	<u>4-2</u>	<u>3-8</u>	<u>4-3</u>	<u>3-8</u>	<u>3-3</u>	<u>3-7</u>	<u>3-0</u>	<u>2-8</u>
		<u>Hem-Fir</u>	<u>5-1</u>	<u>4-4</u>	<u>3-10</u>	<u>4-6</u>	<u>3-10</u>	<u>3-5</u>	<u>3-9</u>	<u>3-2</u>	<u>2-10</u>
		Douglas-Fir or Southern Pine	<u>5-3</u>	<u>4-6</u>	<u>4-0</u>	<u>4-7</u>	<u>3-11</u>	<u>3-6</u>	<u>3-10</u>	<u>3-3</u>	<u>2-11</u>
	<u>2x10</u>	Spruce-Pine-Fir	<u>6-2</u>	<u>5-3</u>	<u>4-8</u>	<u>5-5</u>	<u>4-8</u>	<u>4-2</u>	<u>4-6</u>	<u>3-11</u>	<u>3-1</u>
		Hem-Fir	<u>6-6</u>	<u>5-6</u>	<u>4-11</u>	<u>5-8</u>	<u>4-11</u>	<u>4-4</u>	<u>4-9</u>	<u>4-1</u>	<u>3-7</u>
		Douglas-Fir or Southern Pine	<u>6-8</u>	<u>5-8</u>	<u>5-1</u>	<u>5-10</u>	<u>5-0</u>	<u>4-6</u>	<u>4-11</u>	<u>4-2</u>	<u>3-9</u>
	<u>2x12</u>	Spruce-Pine-Fir	<u>7-6</u>	<u>6-5</u>	<u>5-9</u>	<u>6-7</u>	<u>5-8</u>	<u>4-5</u>	<u>5-4</u>	<u>3-11</u>	<u>3-1</u>
		Hem-Fir	<u>7-10</u>	<u>6-9</u>	<u>6-0</u>	<u>6-11</u>	<u>5-11</u>	<u>5-3</u>	<u>5-9</u>	<u>4-8</u>	<u>3-8</u>
		Douglas-Fir or Southern Pine	<u>8-1</u>	<u>6-11</u>	<u>6-2</u>	7-2	<u>6-1</u>	<u>5-5</u>	<u>5-11</u>	<u>5-1</u>	<u>4-6</u>
Roof, ceiling and	<u>2x8</u>	Spruce-Pine-Fir	<u>3-10</u>	<u>3-3</u>	<u>2-11</u>	<u>3-9</u>	<u>3-3</u>	<u>2-11</u>	3-5	<u>2-11</u>	$\frac{2-7}{2}$
one center-		Hem-Fir Develop Fir or Southern Bing	$\frac{4-0}{4}$	3-5	3-1	3-11	3-5	3-0	<u>3-7</u>	3-0	2-8
bearing noor	2×10	Douglas-Fil of Southern Fille	4-1	<u>3-7</u>	<u>3-2</u>	4-1	<u>3-0</u>	<u>3-1</u>	<u>3-0</u>	27	2-9
	2x10	<u>Spruce-Fille-Fill</u> Hom Fir	<u>4-11</u> 5 1	<u>4-2</u> 4 5	<u>3-0</u> 2 11	<u>4-10</u> 5.0	$\frac{4-1}{4}$	<u>3-0</u> 2 10	<u>4-4</u> 1.6	$\frac{3-7}{2.11}$	$\frac{2-10}{24}$
		Douglas-Fir or Southern Pine	5-3	<u>4-5</u> 4-6	<u>3-11</u> 4-1	<u>5-0</u> 5-2	4-4 4-5	<u>3-10</u> 4-0	<u>4-0</u> 4-8	<u>4-0</u>	<u>3-4</u> 3-7
	2x12	Spruce-Pine-Fir	5-8	4-2	3-4	5-5	4-0	3-6	4-9	3-6	2-10
		Hem-Fir	<u>5-11</u>	<u>4-11</u>	<u>3-11</u>	<u>5-10</u>	<u>4-9</u>	<u>4-2</u>	<u>5-5</u>	<u>4-2</u>	<u>3-4</u>
		Douglas-Fir or Southern Pine	<u>6-1</u>	<u>5-3</u>	<u>4-8</u>	<u>6-0</u>	<u>5-2</u>	<u>4-10</u>	<u>5-7</u>	<u>4-10</u>	<u>4-3</u>
Roof, ceiling and	<u>2x8</u>	Spruce-Pine-Fir	<u>3-5</u>	<u>2-11</u>	<u>2-7</u>	<u>3-4</u>	<u>2-11</u>	<u>2-7</u>	<u>3-3</u>	<u>2-10</u>	<u>2-6</u>
one clear span		<u>Hem-Fir</u>	<u>3-7</u>	<u>3-1</u>	<u>2-9</u>	<u>3-6</u>	<u>3-0</u>	<u>2-8</u>	<u>3-5</u>	<u>2-11</u>	<u>2-7</u>
<u>floor</u>		Douglas-Fir or Southern Pine	<u>3-8</u>	<u>3-2</u>	<u>2-10</u>	<u>3-7</u>	<u>3-1</u>	<u>2-9</u>	<u>3-6</u>	<u>3-0</u>	<u>2-9</u>
	<u>2x10</u>	Spruce-Pine-Fir	<u>4-4</u>	<u>3-7</u>	<u>2-10</u>	<u>4-3</u>	<u>3-6</u>	<u>2-9</u>	<u>4-2</u>	<u>3-4</u>	<u>2-7</u>
		Hem-Fir	$\frac{4-7}{4-9}$	<u>3-11</u>	$\frac{3-5}{2}$	$\frac{4-6}{4-7}$	<u>3-10</u>	<u>3-3</u>	$\frac{4-4}{4-6}$	<u>3-9</u>	<u>3-1</u>
	0.40	Douglas-Fir or Southern Pine	<u>4-8</u>	<u>4-0</u>	<u>3-7</u>	<u>4-7</u>	<u>4-0</u>	<u>3-6</u>	<u>4-6</u>	3-10	<u>3-5</u>
	<u>2X12</u>	Spruce-Pine-Fir	<u>4-11</u> 5.6	<u>3-1</u>	2-10	<u>4-9</u> 5.6	<u>3-0</u>	<u>2-9</u>	<u>4-0</u> 5 4	<u>3-4</u> 2 11	$\frac{2-1}{2}$
		Douglas-Fir or Southern Pine	<u>5-8</u>	<u>4-3</u> 4-11	<u>3-5</u> 4-4	<u>5-0</u> 5-7	<u>4-2</u> 4-10	<u>3-3</u> 4-3	<u>5-4</u> 5-6	<u>4-8</u>	<u>3-1</u> 4-2
For SI: 1 inch=25.4 mm, 1 pound per square foot = 0.0479 kPa.

- a. Spans are given in feet and inches.
- b. Table is based on a maximum roof-ceiling dead load of 15 psf.
- c. <u>The header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header in lieu of the required jack stud.</u>
- d. The 20 psf ground snow load condition shall apply only when the roof pitch is 9:12 or greater. In conditions where the ground snow load is 30 psf or less and the roof pitch is less than 9:12, use the 30 psf ground snow load condition.
- e. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.



FIGURE R602.7.1(1) SINGLE MEMBER HEADER IN EXTERIOR BEARING WALL



FIGURE R602.7.1(2) ALTERNATE SINGLE MEMBER HEADER WITHOUT CRIPPLE

Reason: This proposal provides a means of implementing advanced, energy-saving wall construction practices for limited conditions where single headers can be used. Thus, insulation can be placed together with the single header to prevent heat loss through headers which otherwise create a thermal short-circuit in exterior walls. The table is evaluated in accordance with the NDS-2005 and ASCE 7-05 building loads. For ease-of-use, the table format is consistent with the principle header tables found in Chapter 5 of the code. The single header practice has been used successfully in thousands of homes since originally developed under the optimal value engineering "OVE" banner by the NAHB and HUD in the 1960's and more recently under the HUD/PATH and DOE Build America programs.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: LSTIBUREK-RB-1-R602.7

RB105-09/10 Table R602.3(1), R602.3.5 (new), Section R602.10 (including figures and tables), Table R802.11

Proponent: Chuck Bajnai, Chesterfield County, VA, Chairman, ICC Ad-Hoc Committee on Wall Bracing

1. Revise Table R602.3(1) as follows:

	FASTENER SCHEDULE FOR STRU	ICTURAL MEMBERS						
		NUMBER AND TYPE OF						
ITEM	DESCRIPTION OF BUILDING ELEMENTS	FASTENER ^{a,b,c}	SPACING OF FASTENERS					
Roof								
1	Blocking between joists or rafters to top plate, toe nail	3-8d (2 ½" x 0.113")						
2	Ceiling joists to plate, toe nail	3-8d (2 ½" x 0.113")						
3	Ceiling joist not attached to parallel rafter, laps over partitions, face nail	3-10d						
4	Collar tie to rafter, face nail, or 1-1/4" x 20 gage ridge strap	3-10d (3" x 0.128")						
5	Rafter to plate, toe nail	2-16d (3 ½ "x 0.135")						
	Roof rafters to ridge, valley or hip rafters:							
6	toe nail	4-16d (3 ½" x 0.135")						
-	face nail	3-16d (3 ½" x 0.135")						
	Wall	(,						
7	Built-up corner studs –face nail	10d (3" x 0.128")	24" o.c.					
8	Abutting stude at intersecting wall corners, face nail	16d (3 ½" x 0.135")	12"00					
<u> </u>	Built-up header two pieces with 1/2"spacer	$16d (3\frac{1}{2} \times 0.135)$	16" o.c. along each edge					
<u>9 10</u>	Continued header, two pieces	$16d (3\frac{1}{3} \times 0.135)$	16" o.c. along each edge					
<u> </u>	Continuous beader to stud, toe pail	100 (3/2 × 0.103)						
11 12	Double stude, face pail	$10d(2" \times 0.128")$	24" o c					
12 12	Double studs, lace hall	10d (3 × 0.128)	24 0.0.					
<u>+2 13</u>	Double top plates, late fiall	100 (3 x 0.128)	24 0.0.					
13 <u>14</u>	nail in lapped area	8-16d (3½" × 0.135")	-					
14 <u>15</u>	Sole plate to joist or blocking, face nail	16d (3½" × 0.135")	16" o.c.					
15 <u>16</u>	Sole plate to joist or blocking at braced wall panels	3-16d (3½" × 0.135")	16" o.c.					
		3-8d (2 ½" x 0.113")	-					
16 <u>17</u>	Stud to sole plate, toe nail	or						
		2-16d (3½" × 0.135")	-					
17 <u>18</u>	Top or sole plate to stud, end nail	2-16d (3½" × 0.135")	-					
18 <u>19</u>	Top plates, laps at corners and intersections, face nail	2-10d (3" x 0.128")	-					
40.00		2-8d (2 ½" x 0.113")	-					
19 <u>20</u>	1 brace to each stud and plate, face hall	2 staples 1 ³ / ₄ "	-					
20.24	1" 6" cheathing to each bearing face pail	2-8d (2 ½" x 0.113")	-					
20 <u>21</u>	1 × 6 sheathing to each bearing, face hall	2 staples 1 ³ / ₄ "	-					
24.22	1" 0" cheathing to each bearing face noil	2-8d (2 ½" x 0.113")	-					
2+ <u>22</u>	1 × 8 sheathing to each bearing, face hall	3 staples 1 ³ / ₄ "	-					
00.00	Widesthesd", O" checkbing to each bearing free soil	3-8d (2 ½" x 0.113")	-					
22 <u>23</u>	wider than 1 × 8 sheathing to each bearing, race hall	4 staples 1 ³ / ₄ "	-					
	Floor	· · ·						
23 24	Joist to sill or girder, toe nail	3-8d (2 ½" x 0.113")	-					
26 25	Rim joist to top plate, toe nail (roof applications also)	8d (2 ½" x 0.113")	6" o.c.					
26	Rim joist or blocking to sill plate, toe nail	8d (2 ½" x 0.113")	6" o.c.					
		2-8d (2 ½" x 0.113")	-					
24 <u>27</u>	1" x 6" subfloor or less to each joist, face nail	2 staples 1 ³ / ₄ "	_					
25 28	2" subfloor to joist or girder, blind and face nail	2-16d (3½" × 0.135")	-					
20 20								
27 29	2" planks (plank & beam – floor & roof)	2-16d (3½" × 0 135")	at each bearing					
<u> </u>		2 100 (0/2 × 0.100)	Nail each laver as follows:					
			32" o c at top and bottom and					
28 <u>30</u>	Built up girders and beams, 2-inch lumber layers	10d (3" x 0.128")	standered Two nails at ends					
			and at each splice					
20.31	Ledger strip supporting joists or refters	3-16d (3½" × 0 135")	At each joist or rafter					
23 31		$0^{-100}(0/2 \land 0.100)$						

TABLE R602.3(1)

(Remainder of table unchanged except item numbers)

2. Move existing Section R602.10.1.2.1 to new Section R602.3.5 and revise as follows:

<u>R602.3.5</u> R602.10.1.2.1 Braced wall panel uplift load path. Braced wall panels located at exterior walls that support roof rafters or trusses (including stories below top story) shall have the framing members connected in accordance with one of the following:

- 1. Fastening in accordance with Table R602.3(1) where:
 - 1.1. The basic wind speed does not exceed 90 mph (40 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, or
 - 1.2. The net uplift value at the top of a wall does not exceed 100 plf (146 N/mm). The net uplift value shall be determined in accordance with Section R802.11 and shall be permitted to be reduced by <u>40</u> plf (<u>57</u> N/mm) for each full wall above <u>and 40 plf (57 N/mm) for each floor platform above</u>.
- 2. Where the net uplift value at the top of a wall exceeds 100 plf (146 N/mm), installing approved uplift framing connectors to provide a continuous load path from the top of the wall to the foundation <u>or to a point where the</u> uplift force is 100 plf (146 N/mm) or less. The net uplift value shall be as determined in Item 1.2 above.
- 3. Wall sheathing and fasteners designed in accordance with accepted engineering practice to resist combined uplift and shear forces.

3. Delete footnote "f" as follows:

TABLE R802.11

REQUIRED STRENGTH OF TRUSS OR RAFTER CONNECTIONS TO RESIST WIND UPLIFT FORCES^{a, b, c, e, f} (Pounds per connection)

(No change to table values)

a. through e. (No change)

f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 600-pound rated connector is used on the roof framing, a 500-pound rated connector is permitted at the next floor level down).

4. Delete Section R602.10 and replace with the following:

R602.10 Wall bracing. Buildings shall be braced in accordance with this section. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1.

R602.10.1 Braced wall lines. For the purpose of determining the amount and location of bracing required in each story level of a building, braced wall lines shall be designated as straight lines on the building plan placed in accordance with this section.

R602.10.1.1 Length of a braced wall line. The length of a braced wall line shall be the distance between its ends. The end of a braced wall line shall be the intersection with a perpendicular braced wall line or an angled braced wall line as permitted in Section R602.10.1.4. In the absence of an intersecting braced wall line, the end shall be the farthest exterior wall of the building as shown in Figure R602.10.1.1.



FIGURE R602.10.1.1 BRACED WALL LINES

R602.10.1.2 Offsets along a braced wall line. All exterior walls parallel to a braced wall line shall be permitted to offset up to 4 feet (1219 mm) from the designated braced wall line location as shown Figure R602.10.1.1. Interior walls used as bracing shall be permitted to offset up to 4 feet (1219 mm) from a braced wall line through the interior of the building as shown in Figure R602.10.1.1.

R602.10.1.3 Spacing of braced wall lines. There shall be a minimum of two braced wall lines in both the longitudinal and transverse direction as shown in Figure R602.10.1.1. Intermediate braced wall lines through the interior of the building shall be permitted. The spacing between parallel braced wall lines shall be in accordance with Table R602.10.1.3.

				BRACED WALL LINE SPACING CRITERIA		
APPLICATION	CONDITION	BUILDING TYPE	<u>Maximum</u> Spacing	Exception to Maximum Spacing		
Wind bracing	<u>85 mph to</u> <110 mph	<u>Detached,</u> townhouse	<u>60 feet</u>	None		
	<u>SDC A - C</u>	Detached	Use wind brac	Use wind bracing		
	SDC A – B Townhouse		Use wind bracing			
Seismic	<u>SDC C</u>	<u>Townhouse</u>	<u>35 feet</u>	Up to 50 feet with adjustment of required length of bracing per Table R602.10.3(4)		
bracing	SDC D ₀ , D ₁ , D ₂	Detached, townhouses, one- and two-story only	<u>25 feet</u>	Up to 35 feet to allow for a single room not to exceed 900 sq ft. Spacing of all other braced wall lines shall not exceed 25 feet.		
	SDC D ₀ , D ₁ , D ₂	<u>Detached,</u> <u>townhouse</u>	<u>25 feet</u>	Up to 35 feet when length of required bracing per Table R602.10.3(3) is adjusted in accordance with Table R602.10.3(4).		

TABLE R602.10.1.3 BRACED WALL LINE SPACING

For SI: 1 foot = 304.8 mm

R602.10.1.4 Angled walls. Any portion of a wall along a braced wall line shall be permitted to angle out of plane for a maximum diagonal length of 8 feet (2438 mm). Where the angled wall occurs at a corner, the length of the braced wall line shall be measured from the projected corner as shown in Figure R602.10.1.4. Where the diagonal length is greater than 8 feet (2438 mm), it shall be considered a separate braced wall line and shall be braced in accordance with Section R602.10.1.



FIGURE R602.10.1.4 ANGLED WALLS

R602.10.2 Braced wall panels. Braced wall panels shall be full-height sections of wall that shall be continuous in the same plane. Braced wall panels shall be constructed and placed along a braced wall line in accordance with this section and the bracing methods specified in Section R602.10.4.

R602.10.2.1 Braced wall panel uplift load path. The bracing lengths in Table R602.10.3(1) apply only when uplift loads are resisted per Section R602.3.5.

R602.10.2.2 Locations of braced wall panels. A braced wall panel shall begin within 10 feet (3810 mm) from each end of a braced wall line as determined in Section R602.10.1.1. The distance between adjacent edges of two braced wall panels shall be no greater than 20 feet (6096 mm) as shown in Figure R602.10.2.2



FIGURE R602.10.2.2 LOCATION OF BRACED WALL PANELS

<u>R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D₀, D₁ and D₂. Braced wall panels shall be located at each end of a braced wall line.</u>

Exception: Braced wall panels constructed of Methods WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a braced wall line provided each end complies with the following.

- 1. A minimum 24 in. wide (610 mm) panel for Methods WSP, CS-WSP, CS-G, CS-PF and 32 in. (813 mm) wide panel for Method CS-SFB is applied to each side of the building corner as shown in Condition 4 of Figure R602.10.7.
- 2. The end of each braced wall panel closest to the end of the braced wall line shall have an 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below as shown in Condition 5 of Figure R602.10.7.

R602.10.2.3 Minimum number of braced wall panels. Braced wall lines with a length of 16 feet (4877 mm) or less shall have a minimum of one braced wall panel. Braced wall lines greater than 16 feet (4877 mm) shall have a minimum of two braced wall panels.

R602.10.3 Required length of bracing. The required length of bracing along each braced wall line shall be determined as follows.

- 1. <u>All buildings in Seismic Design Categories A and B shall use Table R602.10.3(1) and the applicable adjustment factors in Table R602.10.3(2).</u>
- 2. Detached buildings in Seismic Design Category C shall use Table R602.10.3(1) and the applicable adjustment factors in Table R602.10.3(2).
- 3. Townhouses in Seismic Design Category C shall use the greater value determined from Table R602.10.3(1) or R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4) respectively.
- 4. All buildings in Seismic Design Categories D₀, D₁ and D₂ shall use the greater value determined from Table R602.10.3(1) or R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4) respectively.

Only braced wall panels parallel to the braced wall line shall contribute towards the required length of bracing of that braced wall line. Braced wall panels along an angled wall meeting the minimum length requirements of Tables R602.10.5 and R602.10.5.2 shall be permitted to contribute its projected length to the braced wall line as shown in Figure R602.10.1.4. Any braced wall panel on an angled wall at the end of a braced wall line shall contribute its projected length for only one of the braced wall lines at the projected corner. In no case shall the required length of bracing along a braced wall line after adjustments be less than 48 inches (1219 mm) total.

TABLE R602.10.3(1) BRACING REQUIREMENTS BASED ON WIND SPEED

EXPOSURE CATEGORY B <u>30 FT MEAN ROOF HEIGHT</u> <u>10 FT EAVE TO RIDGE HEIGHT</u> <u>10 FT WALL HEIGHT</u> 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE ^a				
<u>Basic</u> <u>Wind</u> <u>Speed</u> (mph)	Story Location	<u>Braced Wall Line</u> <u>Spacing</u> (feet)	Method LIB ^b	<u>Method GB °</u> (Double Sided)	<u>Methods</u> <u>DWB, WSP, SFB,</u> <u>PBS, PCP, HPS,</u> <u>CS-SFB ^d</u>	<u>Methods</u> <u>CS-WSP, CS-G,</u> <u>CS-PF</u>	
		<u>10</u>	<u>3.5</u>	3.5	<u>2.0</u>	<u>1.5</u>	
		<u>20</u>	<u>6.0</u>	6.0	<u>3.5</u>	<u>3.0</u>	
		<u>30</u>	<u>8.5</u>	8.5	<u>5.0</u>	<u>4.5</u>	
	$\Delta \square \square$	<u>40</u>	<u>11.5</u>	11.5	<u>6.5</u>	<u>5.5</u>	
		<u>50</u>	<u>14.0</u>	14.0	<u>8.0</u>	<u>7.0</u>	
		<u>60</u>	<u>16.5</u>	16.5	<u>9.5</u>	<u>8.0</u>	
		<u>10</u>	<u>6.5</u>	6.5	<u>3.5</u>	<u>3.0</u>	
< 85		<u>20</u>	<u>11.5</u>	11.5	<u>6.5</u>	<u>5.5</u>	
(mph)	$\wedge \ominus \square$	<u>30</u>	<u>16.5</u>	16.5	<u>9.5</u>	<u>8.0</u>	
· · · · ·	$ \leftrightarrow \mid \mid \mid$	<u>40</u> 50	<u>21.5</u>	21.5	<u>12.5</u>	<u>10.5</u>	
		<u>50</u>	<u>26.5</u>	26.5	<u>15.0</u>	<u>13.0</u>	
		<u>60</u>	<u>31.5</u>	31.5	<u>18.0</u>	<u>15.5</u>	
	^	<u>10</u>	<u>NP</u>	9.0	<u>5.5</u>	<u>4.5</u>	
	$\wedge \ominus$	20		17.0	14.0	<u>8.5</u>	
	$\wedge \ominus \square$	<u>30</u>		24.0	18.0	<u>12.0</u> 15.5	
		<u>40</u> 50		30.0	22.5	10.0	
		<u>50</u> 60	NP	46.5	26.5	22.5	
		10	3.5	3.5	2.0	2.0	
	^	20	7.0	7.0	4.0	3.5	
	$\land \square$	30	9.5	9.5	5.5	5.0	
	$\triangle \square \square$	40	12.5	12.5	7.5	6.0	
		50	15.5	15.5	9.0	7.5	
		60	18.5	18.5	10.5	9.0	
		<u>10</u>	7.0	7.0	4.0	3.5	
< 00	$ \cdot $	<u>20</u>	<u>13.0</u>	13.0	<u>7.5</u>	<u>6.5</u>	
(mph)	$\land \bigtriangleup \sqcup$	<u>30</u>	<u>18.5</u>	18.5	<u>10.5</u>	<u>9.0</u>	
<u>(mpn)</u>	$\triangle \square \square$	<u>40</u>	<u>24.0</u>	24.0	<u>14.0</u>	<u>12.0</u>	
		<u>50</u>	<u>29.5</u>	29.5	<u>17.0</u>	<u>14.5</u>	
		<u>60</u>	<u>35.0</u>	35.0	<u>20.0</u>	<u>17.0</u>	
		<u>10</u>	NP	10.5	<u>6.0</u>	<u>5.0</u>	
	$ \wedge \Theta $	<u>20</u>	NP	19.0	<u>11.0</u>	<u>9.5</u>	
	$\wedge \leftrightarrow \vdash$	<u>30</u>	<u>NP</u>	27.5	<u>15.5</u>	13.5	
	$ \rightarrow \vdash \vdash $	<u>40</u> 50		35.5	<u>20.5</u> 25.0	21.5	
		<u>50</u> 60		44.0 52.0	20.0	<u>21.3</u> 25.5	
		10	<u>NF</u> 4.5	J2.0	2.5	25.5	
	~	20	<u>4.5</u>	8.5	<u>2.5</u> 5.0	4.0	
	$\land \square$	30	12.0	12.0	7.0	6.0	
	$\triangle \square \square$	40	15.5	15.5	9.0	7.5	
< 100		<u>5</u> 0	19.0	19.0	11.0	9.5	
≤ 100 (mpb)		60	22.5	22.5	13.0	11.0	
<u>(mpn)</u>							
		10	8.5	8.5	5.0	4.5	
		20	<u>16.0</u>	16.0	9.0	8.0	
		30	23.0	23.0	13.0	11.0	

EXPOSURE CATEGORY B <u>30 FT MEAN ROOF HEIGHT</u> <u>10 FT EAVE TO RIDGE HEIGHT</u> <u>10 FT WALL HEIGHT</u> 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE ^a				
<u>Basic</u> <u>Wind</u> <u>Speed</u> (mph)	Story Location	Braced Wall Line Spacing (feet)	Method LIB ^b	<u>Method GB [°]</u> (Double Sided)	<u>Methods</u> <u>DWB, WSP, SFB,</u> <u>PBS, PCP, HPS,</u> <u>CS-SFB</u> ^d	<u>Methods</u> <u>CS-WSP, CS-G,</u> <u>CS-PF</u>	
	\land	<u>40</u>	<u>29.5</u>	29.5	<u>17.0</u>	<u>14.5</u>	
		<u>50</u>	<u>36.5</u>	36.5	<u>21.0</u>	<u>18.0</u>	
		<u>60</u>	<u>43.5</u>	43.5	<u>25.0</u>	<u>21.0</u>	
		<u>10</u>	<u>NP</u>	12.5	<u>7.5</u>	<u>6.0</u>	
		<u>20</u>	<u>NP</u>	23.5	<u>13.5</u>	<u>11.5</u>	
		<u>30</u>	<u>NP</u>	34.0	<u>19.5</u>	<u>16.5</u>	
	$\Delta \square \square$	<u>40</u>	<u>NP</u>	44.0	<u>25.0</u>	<u>21.5</u>	
		<u>50</u>	<u>NP</u>	54.0	<u>31.0</u>	<u>26.5</u>	
		<u>60</u>	<u>NP</u>	64.0	<u>36.5</u>	<u>31.0</u>	
		<u>10</u>	<u>5.5</u>	5.5	<u>3.0</u>	<u>3.0</u>	
	$ \cdot $	<u>20</u>	<u>10.0</u>	10.0	<u>6.0</u>	<u>5.0</u>	
		<u>30</u>	<u>14.5</u>	14.5	<u>8.5</u>	<u>7.0</u>	
	$\Delta \square \square$	<u>40</u>	<u>18.5</u>	18.5	<u>11.0</u>	<u>9.0</u>	
		<u>50</u>	<u>23.0</u>	23.0	<u>13.0</u>	<u>11.5</u>	
		<u>60</u>	<u>27.5</u>	27.5	<u>15.5</u>	<u>13.5</u>	
		<u>10</u>	<u>10.5</u>	10.5	<u>6.0</u>	<u>5.0</u>	
< 110	$\land \bigtriangleup$	<u>20</u>	<u>19.0</u>	19.0	<u>11.0</u>	<u>9.5</u>	
(mph)	$\land \land \vdash$	<u>30</u>	<u>27.5</u>	27.5	<u>16.0</u>	<u>13.5</u>	
<u>(p)</u>		<u>40</u>	<u>36.0</u>	36.0	<u>20.5</u>	<u>17.5</u>	
		<u>50</u>	<u>44.0</u>	44.0	<u>25.5</u>	<u>21.5</u>	
		<u>60</u>	<u>52.5</u>	52.5	<u>30.0</u>	<u>25.5</u>	
	•	<u>10</u>	<u>NP</u>	15.5	<u>9.0</u>	<u>7.5</u>	
		<u>20</u>	<u>NP</u>	28.5	<u>16.5</u>	<u>14.0</u>	
	$\land \leftrightarrow \vdash$	<u>30</u>	<u>NP</u>	41.0	23.5	20.0	
		<u>40</u>	<u>NP</u>	53.0	30.5	26.0	
		<u>50</u>	<u>NP</u>	65.5	<u>37.5</u>	32.0	
		<u>60</u>	<u>NP</u>	77.5	<u>44.5</u>	<u>37.5</u>	

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

- a. Linear interpolation shall be permitted.
- b. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches (203 mm).
- c. The length of bracing for Method GB is based on a double sided application. Where GB is used in a one sided application (or in combination of single sided and double sided application), the single sided GB shall only contribute half as much as the double sided GB towards the minimum required length of bracing in this table.
- d. Method CS-SFB does not apply where the wind speed is greater than 100 mph.

TABLE R602.10.3(2) WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON	<u>Story/</u> SUPPORTING	CONDITION	ADJUSTMENT FACTOR ^{a,b} (multiply length from Table R602.10.3(1) by this factor)	APPLICABLE METHODS
	<u>One story</u> structure	B C D	<u>1.00</u> <u>1.20</u> <u>1.50</u>	
Exposure category	<u>Two-story</u> <u>structure</u>	B C D	<u>1.00</u> <u>1.30</u> <u>1.60</u>	
	<u>Three-story</u> <u>structure</u>	B C D	<u>1.00</u> <u>1.40</u> 1.70	
	Roof only	<u>≤5 ft</u> <u>10 ft</u> <u>15 ft</u> 20 ft	0.70 <u>1.00</u> <u>1.30</u> 1.60	
Roof eave-to-ridge height	Roof + 1 floor	<u>≤5 ft</u> <u>10 ft</u> <u>15 ft</u> 20 ft	0.85 1.00 1.15 1.30	<u>All methods</u>
	Roof + 2 floors	<u>≤5 ft</u> <u>10 ft</u> <u>15 ft</u> 20 ft	0.90 <u>1.00</u> <u>1.10</u> Not permitted	
Wall height adjustment	Any story	8 ft 9 ft 10 ft 11 ft 12 ft	0.90 0.95 1.00 1.05 1.10	
Number of braced wall lines (per plan direction)	Any story	3 4 <u>≥5</u>	<u>1.30</u> <u>1.45</u> <u>1.60</u>	
Additional 800 lb hold-down device	Top story only	Fastened to the end studs of each braced wall panel and to the foundation or framing below	<u>0.80</u>	<u>DWB, WSP, SFB, PBS,</u> <u>PCP, HPS</u>
Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	<u>1.40</u>	DWB, WSP, SFB,PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
Gypsum board fastening	Any story	4 in. o.c.at panel edges, including top and bottom plates, and all horizontal joints blocked	0.7	GB

For SI: 1 foot = 305 mm, 1 lb = 4.48 N.

<u>a. Linear Interpolation shall be permitted.</u>
 <u>b. The total adjustment factor is the product of all applicable adjustment factors.</u>

TABLE R602.10.3(3) BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

SOIL CLAS WALL HEIG 10 PSF FLC 15 PSF ROG BRACED W	<u>S D ^b</u> GHT = 10 FT DOR DEAD LOAD DF/CEILING DEAD LOAD (ALL LINE SPACING < 25	FT	MINIMUM 1	IOTAL LENGTH (FEET) C <u>BI</u>	DF BRACED WALL PA RACED WALL LINE ^a	NELS REQUIRED /	ALONG EACH
Seismic Design Category	Story Location	Braced Wall Line Length (ft)	<u>Method</u> <u>LIB °</u>	<u>Method GB</u> (Double Sided) ^d	<u>Methods</u> <u>DWB, SFB, PBS,</u> <u>PCP, HPS,</u> <u>CS-SFB [°]</u>	Method WSP	<u>Methods</u> <u>CS-WSP, CS-G,</u>
		10 20 <u>30</u>	2.5 5.0 7.5	2.5 5.0 7.5	2.5 5.0 7.5	<u>1.6</u> <u>3.2</u> <u>4.8</u> 6.4	<u>1.4</u> <u>2.7</u> <u>4.1</u> 5.4
C		50 50 10 20	<u>12.5</u> <u>NP</u> NP	<u>12.5</u> <u>4.5</u> 9.0	<u>12.5</u> <u>4.5</u> 9.0	<u>8.0</u> <u>3.0</u> 6.0	<u>6.8</u> <u>2.6</u> 5.1
(townhouses only)		<u>30</u> 40 50	NP NP NP	<u>13.5</u> <u>18.0</u> <u>22.5</u>	<u>13.5</u> <u>18.0</u> <u>22.5</u>	<u>9.0</u> <u>12.0</u> <u>15.0</u>	<u>7.7</u> <u>10.2</u> <u>12.8</u>
		<u>10</u> <u>20</u> <u>30</u> <u>40</u>	NP NP NP NP	<u>6.0</u> <u>12.0</u> <u>18.0</u> <u>24.0</u>	<u>6.0</u> <u>12.0</u> <u>18.0</u> <u>24.0</u>	<u>4.5</u> <u>9.0</u> <u>13.5</u> <u>18.0</u>	<u>3.8</u> 7.7 <u>11.5</u> 15.3
		<u>50</u> <u>10</u>	<u>NP</u>	<u>30.0</u> <u>2.8</u>	<u>30.0</u> <u>2.8</u>	<u>22.5</u> <u>1.8</u>	<u>19.1</u> <u>1.6</u>
		20 30 40 50	NP NP NP NP	<u>5.5</u> <u>8.3</u> <u>11.0</u> 13.8	<u>5.5</u> <u>8.3</u> <u>11.0</u> 13.8	<u>3.6</u> <u>5.4</u> <u>7.2</u> 9.0	<u>3.1</u> <u>4.6</u> <u>6.1</u> 7.7
<u>D</u> 0		10 20 <u>30</u> 40	NP NP NP NP	<u>5.3</u> <u>10.5</u> <u>15.8</u> 21.0	<u>5.3</u> <u>10.5</u> <u>15.8</u> 21.0	<u>3.8</u> 7.5 11.3 15.0	<u>3.2</u> <u>6.4</u> <u>9.6</u> 12.8
		50 10	NP NP	<u>26.3</u> <u>7.3</u>	<u>26.3</u> <u>7.3</u>	<u>18.8</u> <u>5.3</u>	<u>16.0</u> <u>4.5</u>
		<u>20</u> <u>30</u> <u>40</u> 50	NP NP NP NP	<u>14.5</u> <u>21.8</u> <u>29.0</u> 36.3	<u>14.5</u> <u>21.8</u> <u>29.0</u> 36.3	<u>10.5</u> <u>15.8</u> <u>21.0</u> 26.3	<u>9.0</u> <u>13.4</u> <u>17.9</u> 22.3
		10 20 <u>30</u> 40	NP NP NP NP	3.0 6.0 9.0 12.0	<u>3.0</u> 6.0 9.0 12.0	2.0 4.0 6.0 8.0	<u>1.7</u> <u>3.4</u> <u>5.1</u> <u>6.8</u>
<u>D</u> 1		50 10 20 30	NP NP NP NP	<u>15.0</u> <u>6.0</u> <u>12.0</u> <u>18.0</u> 24.0	<u>15.0</u> <u>6.0</u> <u>12.0</u> <u>18.0</u> 24.0	<u>10.0</u> <u>4.5</u> <u>9.0</u> <u>13.5</u>	8.5 3.8 7.7 11.5
		<u>40</u> 50 <u>10</u>	NP NP NP	<u>24.0</u> <u>30.0</u> <u>8.5</u>	<u>24.0</u> <u>30.0</u> <u>8.5</u>	<u>18.0</u> 22.5 <u>6.0</u>	<u>15.3</u> <u>19.1</u> <u>5.1</u>
		20 30 40 50	NP NP NP	<u>17.0</u> 25.5 <u>34.0</u> 42.5	<u>17.0</u> <u>25.5</u> <u>34.0</u> 42.5	<u>12.0</u> <u>18.0</u> <u>24.0</u> 30.0	<u>10.2</u> <u>15.3</u> <u>20.4</u> 25.5
		10 20 30 40	NP NP NP	4.0 8.0 12.0 16.0 20.0	4.0 8.0 12.0 16.0	2.5 5.0 7.5 10.0	2.1 4.3 6.4 8.5
		30 10 20 30 40		7.5 15.0 22.5 30.0 27.5	7.5 15.0 22.5 30.0	<u>5.5</u> <u>11.0</u> <u>16.5</u> <u>22.0</u> 27.5	<u>4.7</u> <u>9.4</u> <u>14.0</u> <u>18.7</u> 23.4
<u>D2</u>		10 20 30 40		NP NP NP NP	NP NP NP NP	NP NP NP NP	NP NP NP NP
		<u>20</u>					

For SI: 1 foot 305 mm

- a. Linear interpolation shall be permitted.
- b. Wall bracing lengths are based on a soil site class "D." Interpolation of bracing length between the S_{ds} values associated with the Seismic Design Categories shall be permitted when a site-specific S_{ds} value is determined in accordance with Section 1613.5 of the International Building Code.
- c. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches (203 mm).
- d. The length of bracing for Method GB is based on a double sided application. Where GB is used in a one sided application (or in combination of single sided and double sided application), the single sided GB shall only contribute half as much as the double sided GB towards the minimum required length of bracing in this table.
- e. Method CS-SFB applies in SDC C only.

TABLE R602.10.3(4) SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ADJUSTMENT BASED ON:	<u>Story/</u> Supporting	CONDITION	ADJUSTMENT FACTOR ^{a,b} (Multiply length from Table R602.10.3(1) by this factor)	APPLICABLE METHODS
Story height (Section 301.3)	Any story	<u>≤10 ft</u> >10 ft ≤ 12 ft	<u>1.0</u> 1.2	
Braced wall line spacing, townhouses in SDC C	Any story	<u>≤35 ft</u> ≥35 ft ≤ 50 ft	1.0 1.43	
$\frac{\text{Braced wall line spacing, in}}{\text{SDC } D_0, D_1, D_2^{\underline{c}}}$	Any story	<u><25 ft ≤30 ft</u> <u>>30 ft ≤ 35 ft</u>	<u>1.2</u> <u>1.4</u>	
Wall dead load	Any story	<u>> 8 ft < 15 ft</u> <u><8 psf</u>	<u>1.0</u> 0.85	All methods
Roof/ceiling dead load for wall	Roof only or roof plus one or two stories	<u><15 psf</u>	<u>1.0</u>	
supporting	Roof only Roof plus one or two stories	<u>>15 psf ≤ 25 psf</u> >15 psf ≤ 25 psf	<u>1.2</u> <u>1.1</u>	
Walls with stone or masonry veneer	Any story	See Sec	tion R703.7	
		Omitted from		DWB WSP SEB PBS
Interior gypsum board finish (or equivalent)	Any story	inside face of braced wall panels	<u>1.5</u>	<u>PCP, HPS,</u> <u>CS-WSP, CS-G,</u> <u>CS-SFB</u>

For SI: 1 psf = 47,8 N/m².

a. Linear interpolation shall be permitted.

b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.

c. <u>The length-to-width ratio for the floor/roof *diaphragm* shall not exceed 3:1. The top plate lap splice nailing shall be a minimum of 12-16d nails on each side of the splice.</u>

<u>R602.10.4 Construction methods for braced wall panels</u>. Intermittent and continuously sheathed braced wall panels shall be constructed in accordance with this section and the methods listed in Table R602.10.4.

TABLE R602.10.4 BRACING METHODS

METHODS,				CONNECTION CRITERIA ^a		
	MATERIAL	MINIMUM THICKNESS	FIGURE	Fasteners	<u>Spacing</u>	
	LIB	1x4 wood or approved		Wood: 2-8d common nails or 3- 8d (2 ½" x 0.113") nails	Wood: per stud and top and bottom plates	
	Let-in-bracing	<u>60° angles for maximum</u> <u>16" stud spacing</u>		Metal strap: per manufacturer	Metal: per manufacturer	
	DWB	$\frac{3/4"}{4}$		<u>2-8d (2½" x 0.113") nails</u> or	Per stud	
	Diagonal wood boards	(<u>1 nominal)</u> for maximum 24" stud spacing		<u>2 - 1¾" staples</u>		
	<u>WSP</u>	3		Exterior sheathing per Table R602.3(3)	<u>6" edges</u> 12" field	
	<u>Wood structural</u> <u>panel</u> (See Section R604)	<u> </u>		Interior sheathing per Table R602.3(1) or R602.3(2)	Varies by fastener	
	050			$\frac{1\frac{1}{2}" \log x \ 0.12" dia.}{(for \frac{1}{2}" thick sheathing)}$	<u>3" edges</u> <u>6" field</u>	
	<u>SFB</u> Structural fiberboard	$\frac{1/2"}{1/2"}$ or $\frac{25}{32"}$ for maximum 16" stud		$\frac{1^{3}/_{4}" \log x \ 0.12" \text{ dia.}}{(\text{for }^{25}/_{32}" \text{ thick sheathing})}$		
	sheathing	spacing		galvanized roofing nails or		
S	<u>GB</u> ^d			8d common (2½"x0.131) nails Nails or screws per Table	For all braced wall panel	
ethod	Gypsum board	<u>1/2"</u>		R602.3(1) for exterior locations	locations: 7" edges (including top and bottom	
ng Me	(double sided)			R702.3.5 for interior locations	<u>plates)</u> <u>7" field</u>	
Brac	PBS	$\frac{3_{8}}{10}$ or $\frac{1_{2}}{10}$		For 3/8", 6d common (2"x0.113) nails	<u>3" edges</u> <u>6" field</u>	
nittent	Particleboard sheathing (See Section R605)	for maximum16" stud spacing		For ½", 8d common (2½"x0.131) nails		
Interr	PCP	See Section R703.6		<u>1½", 11 gage, ⁷/₁₆" head nails</u> or	<u>6" o.c. on all framing</u> members	
	Portland cement plaster	for maximum 16" stud spacing		$\frac{7}{16}$, 16 gage staples		
	ПВ6	7/		0.092" dia., 0.225" head nails	4" edges	
	Hardboard panel siding	for maximum 16" stud spacing		penetration into studs		
		<u>opdoing</u>		See Section R602.10.6.1	See Section R602.10.6.1	
	ABW	³ /8"				
	Alternate braced wall		┢┪╨╨╨╨╨╨╨╨┾┪┈			
	<u>PFH</u>	3.		See Section R602.10.6.2	See Section R602.10.6.2	
	Portal frame with hold-downs	$\underline{J}_{\underline{8}}$				
	PFG			See Section R602.10.6.3	See Section R602.10.6.3	
	Portal frame	<u>'/₁₆"</u>				
				Exterior sheathing per Table	6" edges	
thing	<u>US-WSP</u>	³ /8"	FIN	R602.3(3) Interior sheathing per Table	12" field Varies by fastener	
<u>Sheat</u> ods	wood structural panel			R602.3(1) or R602.3(2)		
uous Methi	CS-G ^{b,c}			See Method CS-WSP	See Method CS-WSP	
Contin	Continuously sheathed wood structural panel	³ /8"				
	adjacent to garage openings					

METHODS.		5101125	CONNECTION	CTION CRITERIA [®]	
MATERIAL	MINIMUM THICKNESS	FIGURE	Fasteners	<u>Spacing</u>	
<u>CS-PF</u>	7		See Section R602.10.6.4	See Section R602.10.6.4	
Continuously sheathed portal frame	<u>'/₁₆"</u>				
CS-SFB Continuously sheathed structural fiberboard	¹ /2" or ²⁵ /32" for maximum 16" stud spacing		$\frac{1\frac{1}{2}" \log x \ 0.12" dia.}{(for \frac{1}{2}" thick sheathing)}$ $\frac{1^{3}\underline{4}" \log x \ 0.12" dia.}{(for \frac{2^{2}}{32}" thick sheathing)}$ $\frac{1}{3} \frac{1}{4} \frac{1}{32} \frac{1}{3$	<u>3" edges</u> <u>6" field</u>	

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

- <u>a.</u> Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories <u>C</u>, D₀, D₁ and D₂.
- b. Applies to panels next to garage door opening when supporting gable end wall or roof load only. May only be used on one wall of the garage. In Seismic Design Categories D₀, D₁, and D₂, roof covering dead load may not exceed 3 psf (0.14 kN/m²).
- c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R502.5(1). A full height clear opening shall not be permitted adjacent to a Method CS-G panel.
- d. "Double sided" GB shall mean that a full length/full height panel of GB sheathing is applied to both sides of the stud wall. GB bracing panels are not required to be aligned back to back they may be offset from each other so long as their length's comply with Table R602.10.5. Where all of the GB is on one side of the studs or where there is a combination of "double sided" GB and "single sided" GB, the single sided GB shall contribute half of its actual length towards the minimum required length (i.e. 96" of single sided GB is equivalent to 48" of double sided GB).

R602.10.4.1 Mixing methods. Mixing of bracing methods shall be permitted as follows:

- 1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
- 2. Mixing intermittent bracing methods from braced wall line to braced wall line within a story shall be permitted. Within Seismic Design Categories A, B and C or in regions where the basic wind speed is less than or equal to 100 mph, mixing of intermittent bracing and continuous sheathing methods from braced wall line to braced wall line within a story shall be permitted.
- 3. Mixing intermittent bracing methods along a braced wall line shall be permitted in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest value of all intermittent bracing methods used.
- 4. Mixing of continuous sheathing methods CS-WSP, CS-G and CS-PF along a braced wall line shall be permitted.
- 5. In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing of intermittent bracing methods along the interior portion of a braced wall line with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same braced wall line shall be permitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3). The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the braced wall line.

R602.10.4.2 Continuous sheathing methods. Continuous sheathing methods require structural panel sheathing to be used on all sheathable surfaces on one side of a braced wall line including areas above and below openings and gable end walls and shall meet the requirements of Section R602.10.7.

R602.10.4.3 Braced wall panel interior finish material. Braced wall panels shall have gypsum wall board installed on the side of the wall opposite the bracing material. Gypsum wall board shall be not less than $\frac{1}{2}$ inch (12.7 mm) in thickness and be fastened with nails or screws in accordance with Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum wall board. Spacing of fasteners at panel edges for gypsum wall board opposite Method LIB bracing shall not exceed 8 inches (203 mm). Interior finish material shall not be glued in Seismic Design Categories D_0 , D_1 and D_2 .

Exceptions:

- 1. Interior finish material is not required opposite wall panels that are braced in accordance with Method GB, ABW, PFH, PFG and CS-PF, unless otherwise required by Section R302.6.
- 2. An approved interior finish material with an in-plane shear resistance equivalent to gypsum board shall be permitted to be substituted, unless otherwise required by Section R302.6.
- 3. Except for Method LIB, gypsum wall board is permitted to be omitted provided the required length of bracing in Tables R602.10.3(1) and R602.10.3(3) is multiplied by the appropriate adjustment factor in Tables R602.10.3(2) and R602.10.3(4) respectively, unless otherwise required by Section R302.6.

R602.10.5 Minimum length of a braced wall panel. The minimum length of a braced wall panel shall comply with Table R602.10.5. For Methods CS-WSP and CS-SFB, the minimum panel length shall be based on the adjacent clear opening height in accordance with Table R602.10.5 and Figure R602.10.5. When a panel has an opening on either side of differing heights, the taller opening height shall be used to determine the panel length.

R602.10.5.1 Contributing length. For purposes of computing the required length of bracing in Table R602.10.3(1) and R602.10.3(3), the contributing length of each braced wall panel shall be as specified in Table R602.10.5.

		<u>MINIMUM LENGTH ^a</u> (in)					
<u>1</u>	METHOD			Wall Heigh	<u>nt</u>		<u>CONTRIBUTING LENGTH</u> (in)
		<u>8 ft</u>	<u>9 ft</u>	<u>10 ft</u>	<u>11 ft</u>	<u>12 ft</u>	
<u>DWG, WSP, SF</u>	B, PBS, PCP, HPS, GB [₫]	<u>48</u>	<u>48</u>	<u>48</u>	<u>53</u>	<u>58</u>	<u>Actual ^b</u>
LIB		<u>55</u>	<u>62</u>	<u>69</u>	<u>NP</u>		<u>Actual ^b</u>
	<u>SDC A, B and C, wind</u> <u>speed</u> <u>< 110 mph</u>	<u>28</u>	<u>32</u>	<u>34</u>	<u>38</u>	<u>42</u>	48
	SDC D _o , D ₁ and D ₂ , wind speed < 110 mph	<u>32</u>	<u>32</u>	<u>34</u>	<u>NP</u>	<u>NP</u>	<u>40</u>
	Supporting roof only	<u>16</u>	<u>16</u>	<u>16</u>	<u>18 ^d</u>	<u>20 ^d</u>	48
PFH	Supporting one story and roof	<u>24</u>	<u>24</u>	<u>24</u>	<u>27 ^d</u>	<u>29 ^d</u>	<u>48</u>
PFG		<u>24</u>	27	<u>30</u>	<u>33 ^e</u>	<u>36 ^e</u>	1.5 x Actual ^b
<u>CS-G</u>		<u>24</u>	<u>27</u>	<u>30</u>	<u>33</u>	<u>36</u>	Actual ^b
CS-PF		<u>16</u>	<u>18</u>	<u>20</u>	<u>22 '</u>	24	<u>Actual</u>
	Adjacent clear opening height (in)	24	27	30	22	26	
	68	26	27	30	33	36	
	72	20	27	30	33	36	
	76	30	29	30	33	36	
	80	32	30	30	33	36	
	84	35	32	32	33	36	
	88	38	35	33	33	36	
	92	43	37	35	35	36	
<u>CS-WSP,</u>	96	48	41	38	36	36	
<u>CS-SFB</u>	<u>100</u>		44	40	38	38	
	<u>104</u>		49	43	<u>40</u>	<u>39</u>	Actual ^b
	108		<u>54</u>	<u>46</u>	<u>43</u>	<u>41</u>	
	<u>112</u>			<u>50</u>	<u>45</u>	<u>43</u>	
	<u>116</u>			<u>55</u>	<u>48</u>	<u>45</u>	
	<u>120</u>			<u>60</u>	<u>52</u>	<u>48</u>	
	<u>124</u>				<u>56</u>	<u>51</u>	
	<u>128</u>				<u>61</u>	<u>54</u>	
	<u>132</u>				<u>66</u>	<u>58</u>	
	<u>136</u>					<u>62</u>	
	140				L	66	
	<u>144</u>					<u>72</u>	

TABLE R602.10.5 MINIMUM LENGTH OF BRACED WALL PANELS

For SI: 1 inch = 25.4 mm

NP = Not permitted

- a. Linear interpolation shall be permitted.
- b. Use the actual length when it is greater than or equal to the minimum length.
- c. As specified in Table R602.10.4, Method GB is intended to be double sided. Where all of the GB is on one side of the studs or where there is a combination of "double sided" GB and "single sided" GB, the single sided GB shall contribute half of its actual length towards the minimum required length (i.e. 96" of single sided GB is equivalent to 48" of double sided GB).
- d. Maximum header height for PFH is 10' per Figure R602.10.6.2, but wall height may be increased to 12' with pony wall.
- e. Maximum opening height for PFG is 10' per Figure R602.10.6.3, but wall height may be increased to 12' with pony wall.
- f. Maximum opening height for CS-PF is 10' per Figure R602.10.6.4, but wall height may be increased to 12' with pony wall



FIGURE R602.10.5 BRACED WALL PANELS WITH CONTINUOUS SHEATHING

R602.10.5.2 Partial credit. For Methods DWB, WSP, SFB, PBS, PCP and HPS in Seismic Design Categories A, B and C, panels between 36 inches and 48 inches in length shall be considered a braced wall panel and shall be permitted to partially contribute towards the required length of bracing in Table R602.10.3(1) and R602.10.3(3), and the contributing length shall be determined from Table R602.10.5.2.

TABLE R602.10.5.2 PARTIAL CREDIT FOR BRACED WALL PANELS LESS THAN 48 INCHES IN ACTUAL LENGTH

Actual Length of Braced	Contributing Length of Braced Wall Panel (in) ^a				
Wall Panel (in)	8 ft Wall Height	9 ft Wall Height			
48	<u>48</u>	<u>48</u>			
42	<u>36</u>	<u>36</u>			
<u>36</u>	27	<u>N/A</u>			

For SI: 1 inch = 25.4mm

a. Linear interpolation shall be permitted.

R602.10.6 Construction of Methods ABW, PFH, PFG and CS-PF. Methods ABW, PFH, PFG and CS-PF shall be constructed as specified in Sections R602.10.6.1 through R602.10.6.4.

R602.10.6.1 Method ABW: Alternate braced wall panels. Method ABW braced wall panels shall be constructed in accordance with Figure R602.10.6.1. The hold-down force shall be in accordance with Table R602.10.6.1.

TABLE R602.10.6.1 MINIMUM HOLD-DOWN FORCES FOR METHOD ABW BRACED WALL PANELS

SEISMIC DESIGN CATEGORY AND		HOLD DOWN FORCE (Ib)						
WIND SPEED	SUPPORTING/STORY	Height of Braced Wall Panel						
		<u>8 ft</u>	<u>9 ft</u>	<u>10 ft</u>	<u>11 ft</u>	<u>12 ft</u>		
SDC A, B and C	One story	<u>1800</u>	<u>1800</u>	<u>1800</u>	<u>2000</u>	<u>2200</u>		
Wind speed < 110 mph	First of two story	<u>3000</u>	<u>3000</u>	<u>3000</u>	<u>3300</u>	<u>3600</u>		
SDC D_0 , D_1 and D_2	<u>One story</u>	<u>1800</u>	<u>1800</u>	<u>1800</u>	<u>NP</u> ^a	<u>NP</u> ^a		
Wind speed < 110 mph	First of two story	3000	3000	3000	NP ^a	NP ^a		

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N

NP = Not Permitted.



FIGURE R602.10.6.1 METHOD ABW: ALTERNATE BRACED WALL PANEL

R602.10.6.2 Method PFH: Portal frame with hold-downs. Method PFH braced wall panels shall be constructed in accordance with Figure R602.10.6.2.



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

FIGURE R602.10.6.2 METHOD PFH: PORTAL FRAME WITH HOLD-DOWNS

R602.10.6.3 Method PFG: Portal frame at garage door openings in Seismic Design Categories A, B and C. Where supporting a roof or one story and a roof, a Method PFG braced wall panel constructed in accordance with Figure R602.10.6.3 is permitted on either side of garage door openings.



FIGURE R602.10.6.3 METHOD PFG: PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C

R602.10.6.4 Method CS-PF: Continuously sheathed portal frame. Continuously sheathed portal frame braced wall panels shall be constructed in accordance with Figure R602.10.6.4 and Table R602.10.6.4. The number of continuously sheathed portal frame panels in a single braced wall line shall not exceed four.

TABLE R602.10.6.4 TENSION STRAP CAPACITY REQUIRED FOR RESISTING WIND PRESSURES PERPENDICULAR TO METHOD PFH, PFG AND CS-PF BRACED WALL PANELS

MINIMUM	MAXIMUM	MAXIMUM	MAXIMUM	TENSION STRAP CAPACITY REQUIRED (Ib) ^{a, b}							
WALL STUD FRAMING	PONY	TOTAL	OPENING	Basic Wind Speed (mph)							
NOMINAL SIZE			WIDTH	<u>85</u>	<u>90</u>	<u>100</u>	<u>85</u>	<u>90</u>	<u>100</u>		
AND GRADE		<u>HEIGHT (II)</u>	<u></u>		<u>Exposure B</u>			<u>Exposure C</u>	<u>.</u>		
	<u>0</u>	<u>10</u>	<u>18</u>	<u>1000</u>	<u>1000</u>	<u>1000</u>	<u>1000</u>	<u>1000</u>	<u>1000</u>		
			9	1000	<u>1000</u>	<u>1000</u>	1000	<u>1000</u>	<u>1275</u>		
	<u>1</u>	<u>10</u>	<u>16</u>	1000	<u>1000</u>	<u>1750</u>	<u>1800</u>	<u>2325</u>	<u>3500</u>		
			<u>18</u>	<u>1000</u>	<u>1200</u>	<u>2100</u>	<u>2175</u>	<u>2725</u>	<u>DR</u>		
	<u>2</u>	<u>10</u>	<u>9</u>	<u>1000</u>	<u>1000</u>	<u>1025</u>	<u>1075</u>	<u>1550</u>	<u>2500</u>		
<u>2x4 No. 2</u>			<u>16</u>	<u>1525</u>	<u>2025</u>	<u>3125</u>	<u>3200</u>	<u>3900</u>	<u>DR</u>		
<u>Grade</u>			<u>18</u>	<u>1875</u>	<u>2400</u>	<u>3575</u>	<u>3700</u>	<u>DR</u>	<u>DR</u>		
			<u>9</u>	<u>1000</u>	<u>1200</u>	<u>2075</u>	<u>2125</u>	<u>2750</u>	<u>4000</u>		
	<u>2</u>	<u>12</u>	<u>16</u>	2600	<u>3200</u>	DR	DR	DR	<u>DR</u>		
			<u>18</u>	<u>3175</u>	<u>3850</u>	DR	DR	DR	<u>DR</u>		
	4	12	<u>9</u>	<u>1775</u>	<u>2350</u>	<u>3500</u>	3550	DR	<u>DR</u>		
	±	<u>12</u>	<u>16</u>	<u>4175</u>	<u>DR</u>	<u>DR</u>	DR	DR	<u>DR</u>		
			<u>9</u>	<u>1000</u>	<u>1000</u>	<u>1325</u>	<u>1375</u>	<u>1750</u>	<u>2550</u>		
	<u>2</u>	<u>12</u>	<u>16</u>	<u>1650</u>	<u>2050</u>	<u>2925</u>	<u>3000</u>	<u>3550</u>	<u>DR</u>		
2v6 Stud Grade			<u>18</u>	2025	<u>2450</u>	<u>3425</u>	<u>3500</u>	<u>4100</u>	<u>DR</u>		
			<u>9</u>	<u>1125</u>	<u>1500</u>	2225	<u>2275</u>	<u>2775</u>	<u>3800</u>		
	<u>4</u>	<u>4</u> <u>12</u>	<u>16</u>	2650	<u>3150</u>	DR	DR	DR	<u>DR</u>		
	_		<u>18</u>	<u>3125</u>	<u>3675</u>	DR	DR	DR	DR		

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N

a. DR = design required

b. <u>Strap shall be installed in accordance with manufacturer's recommendations.</u>



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N

FIGURE R602.10.6.4 METHOD CS-PF: CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

R602.10.7 Ends of braced wall lines with continuous sheathing. Each end of a braced wall line with continuous sheathing shall have one of the conditions shown in Figure R602.10.7.



FIGURE R602.10.7 END CONDITIONS FOR BRACED WALL LINES WITH CONTINUOUS SHEATHING

R602.10.8 Braced wall panel connections. Braced wall panels shall be connected to floor framing or foundations as follows:

- Where joists are perpendicular to a braced wall panel above or below, a rim joist, band joist or blocking shall be provided along the entire length of the braced wall panel in accordance with Figure R602.10.8(1).
 Fastening of top and bottom wall plates to framing, rim joist, band joist and/or blocking shall be in accordance with Table R602.3(1).
- 2. Where joists are parallel to a braced wall panel above or below, a rim joist, end joist or other parallel framing member shall be provided directly above and below the braced wall panel in accordance with Figure R602.10.8(2). Where a parallel framing member cannot be located directly above and below the panel, full-depth blocking at 16 inch (406 mm) spacing shall be provided between the parallel framing members to each side of the braced wall panel in accordance with Figure R602.10.8(2). Fastening of blocking and wall plates shall be in accordance with Table R602.3(1) and Figure R602.10.8(2).
- 3. Connections of braced wall panels to concrete or masonry shall be in accordance with Section R403.1.6.



For SI: 1 inch = 25.4 mm





For SI: 1 inch = 25.4 mm

FIGURE R602.10.8(2) BRACED WALL PANEL CONNECTION WHEN PARALLEL TO FLOOR/CEILING FRAMING

R602.10.8.1 Braced wall panel connections for Seismic Design Categories D_0 , D_1 and D_2 . Braced wall panels shall be fastened to required foundations in accordance with Section R602.11.1, and top plate lap splices shall be face-nailed with at least eight 16d nails on each side of the splice.

R602.10.8.2 Connections to roof framing. Exterior braced wall panels shall be connected to roof framing as follows.

- 1. Parallel rafters or roof trusses shall be attached to the top plates of braced wall panels in accordance with Table R602.3(1).
- 2. For Seismic Design Categories A, B and C and wind speeds less than 100 mph (45 m/s):
 - 2.1. Where the distance from the top of the rafters or roof trusses and perpendicular top plates is 9.25 inches (235 mm) or less, the rafters or roof trusses shall be connected to the top plates of braced wall panels in accordance with Table R602.3(1) and blocking need not be installed.
 - 2.2. Where the distance from the top of the rafters and perpendicular top plates is between 9.25 inches (235 mm) and 15.25 inches (387 mm) the rafters shall be connected to the top plates of braced wall panels with blocking in accordance with Figure R602.10.8.2(1) and attached in accordance with Table R602.3(1).
 - 2.3. Where the distance from the top of the roof trusses and perpendicular top plates is between 9.25 inches (235 mm) and 15.25 inches (387 mm) the roof trusses shall be connected to the top plates of braced wall panels with blocking in accordance with Table R602.3(1).
- 3. For Seismic Design Categories D₀, D₁ and D₂ or wind speeds of 100 mph (45 m/s) or greater, where the distance between the top of rafters or roof trusses and perpendicular top plates is 15.25 inches (387 mm) or less, rafters or roof trusses shall be connected to the top plates of braced wall panels with blocking in accordance with Figure R602.10.8.2(1) and attached in accordance with Table R602.3(1).
- 4. For all Seismic Design Categories and wind speeds, where the distance between the top of rafters or roof trusses and perpendicular top plates exceeds 15.25 inches (387 mm), perpendicular rafters or roof trusses shall be connected to the top plates of braced wall panels in accordance with one of the following methods
 - 4.1. In accordance with Figure R602.10.8.2(2),
 - 4.2. In accordance with Figure R602.10.8.2(3),
 - 4.3. With full height engineered blocking panels designed for values listed in American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM). Both the roof and floor sheathing shall be attached to the blocking panels in accordance with Table R602.3(1).
 - 4.4. Designed in accordance with accepted engineering methods.
- 5. Lateral support for the rafters and ceiling joists shall be provided in accordance with Section R802.8.
- 6. Lateral support for trusses shall be provided in accordance with Section R802.10.3.



For SI: 1 inch = 25.4 mm

FIGURE R602.10.8.2(1) BRACED WALL PANEL CONNECTION TO PERPENDICULAR RAFTERS



For SI: 1 inch = 25.4 mm

- a. Methods of bracing shall be as described in Section R602.10.2 method DWB, WSP, SFB, GB, PBS, PCP OR HPS
- b. Provide ventilation (not shown) per Section R806.





For SI: 1 inch = 25.4 mm

- a. Methods of bracing shall be as described in Section R602.10.2 method DWB, WSP, SFB, GB, PBS, PCP OR HPS
- b. Provide ventilation (not shown) per Section R608.

FIGURE R602.10.8.2(3) BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

R602.10.9 Braced wall panel support. Braced wall panel support shall be provided as follows:

- 1. Cantilevered floor joists complying with Section R502.3.3 shall be permitted to support braced wall panels.
- 2. Elevated post or pier foundations supporting braced wall panels shall be designed in accordance with accepted engineering practice.
- 3. Masonry stem walls with a length of 48 inches (1220 mm) or less supporting braced wall panels shall be reinforced in accordance with Figure R602.10.9. Masonry stem walls with a length greater than 48 inches (1220 mm) supporting braced wall panels shall be constructed in accordance with Section R403.1 Methods ABW and PFH shall not be permitted to attach to masonry stem walls.
- 4. Concrete stem walls with a length of 48" or less, greater than 12 inches tall and less than 6 inches thick shall have reinforcement sized and located in accordance with Figure R602.10.9.



For SI: 1 in=305 mm

FIGURE R602.10.9 MASONRY STEM WALLS SUPPORTING BRACED WALL PANELS

R602.10.9.1 Braced wall panel support for Seismic Design Category D_2 . In one-story buildings located in Seismic Design Category D_2 , braced wall panels shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). In two story buildings located in Seismic Design Category D_2 , all braced wall panels shall be supported on continuous foundations.

Exception: Two-story buildings shall be permitted to have interior braced wall panels supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:

- 1. The height of cripple walls does not exceed 4 feet (1219 mm).
- 2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
- 3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

R602.10.10 Panel joints. All vertical joints of panel sheathing shall occur over, and be fastened to common studs. Horizontal joints in braced wall panels shall occur over, and be fastened to common blocking of a minimum 1-1/2 inch (38 mm) thickness.

Exceptions:

- 1. <u>Blocking at horizontal joints shall not be required in wall segments that are not counted as braced wall panels.</u>
- 2. Where the length of bracing provided is at least twice the required length of bracing from Tables R602.10.3(1) and R602.10.3(3) blocking at horizontal joints shall not be required in braced wall panels constructed using Methods WSP, SFB, GB, PBS or HPS.
- 3. When Method GB panels are installed horizontally, blocking of horizontal joints is not required.

R602.10.11 Cripple wall bracing. In Seismic Design Categories other than D_2 , cripple walls shall be braced with a length and type of bracing as required for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3) with the following modifications for cripple wall bracing:

- 1. The length of bracing as determined from Tables R602.10.3(1) and R602.10.3(3) shall be multiplied by a factor of 1.15, and
- 2. The wall panel spacing shall be decreased to 18 feet (5486 mm) instead of 25 feet (7620 mm).

R602.10.11.1 Cripple wall bracing in Seismic Design Categories D_0 , D_1 and D_2 . In addition to the requirements of Section R602.10.11, where braced wall lines at interior walls occur without a continuous foundation below, the length of parallel exterior cripple wall bracing shall be one and one-half times the length required by Table R602.10.3(3). Where cripple walls braced using Method WSP cannot provide this additional length, the capacity of the sheathing shall be increased by reducing the spacing of fasteners along the perimeter of each piece of sheathing to 4 inches (102 mm) on center.

In Seismic Design Category D₂, cripple walls shall be braced in accordance with Tables R602.10.3(3) and R602.10.3(4).

R602.10.11.2 Redesignation of cripple walls. In any Seismic Design Category, cripple walls shall be permitted to be redesignated as the first story walls for purposes of determining wall bracing requirements. If the cripple walls are redesignated, the stories above the redesignated story shall be counted as the second and third stories respectively.

Reason: As the wall bracing section evolved, it has become more universal and flexible, but, as a result, it has grown in size and complexity. After the Ad Hoc committee's "engineering" work was complete and integrated into the 2009 IRC, we heard back from end users that this section of the code was extremely challenging. The committee therefore wanted to focus on making the 2012 IRC easier to read, easier to understand and easier to use.

The BIG BANG: To accommodate over 30 separate editorial and technical "simplification" proposals, the Ad Hoc Committee agreed to delete Section R602.10 in its entirety, and replace it with one single change - rather than try to strikeout and insert individual tables, code sections and figures. The decision to integrate all the individual code changes into a single change was due in part to the complexity and interconnectivity of the pieces, and the necessity to "visualize" the final product in its totality. Everything in this single change had unanimous support among committee members and was deemed to be non-controversial in nature.

There are several other changes being proposed by committee members that are being submitted independent of this integrated change because of their scope and nature. Some have the unanimous backing of the committee, but may generate discussion from the floor, and others are being offered separately by individual members of the committee because of their content.

Non-technical changes:

Many of the code changes are reorganizational in nature from the 2009 IRC; we moved similar ideas and concepts together to read more smoothly, we merged or deleted unnecessary or duplicated pieces, and made editorial clarifications and improvements.

Technical changes:

The significant technical changes incorporated into this new section are listed below.

• Table R602.3(1):

A new row was added to the table that incorporates the nailing requirements of 2009 IRC Figure R602.10.4.4(1) thus
eliminating the large and complex figure. All other requirements of the eliminated figure are already covered elsewhere in
the IRC. A new requirement for fastening the rim board to sill plate was added to complete the load path from braced wall
panels to the foundation.

• Section R602.10.1.1:

 A new figure was added to replace several less effective figures: it clarifies offsets, BWL spacing, and explains how to handle the situation when an intersecting braced wall line is not present to define the length of BWL – it now explains that the end of the building will determine its length.

• Section R602.10.2.2 and R602.10.2.3:

- For consistency, the distance from the end of a BWL to the first BWP was unified at 10 feet for all SDCs and wind speeds.
- The required summation of end distances was eliminated (2009 IRC Section R602.10.1.4); in its place, braced wall lines up to 16 feet in length may have only one braced wall panel.
- o BWP spacing was changed from 25' o.c.to a 20' edge-to-edge spacing to make it easier to measure.
- o Another new figure was introduced to better demonstrate how BWPs may be located along the walls of the house.

• Section R602.10.3:

- The contribution from BWP on an angled wall was clarified.
- Tables R602.10.3(1) and (3):
 - Method GB was redefined as a <u>one sided, 4' application only</u>, because of the problem with interpreting what "double sided GB" meant. To compensate, the required length of bracing for a braced wall line with Method GB was doubled in these two tables.
 - o Method CS-SFB was integrated into the tables as well.
- Section R602.10.5:
 - Section R602.10.5 was deleted and the provisions for the use of Continuous Sheathing- Structural Fiberboard Sheathing were placed in the appropriate sections
- Section R602.10.4.1, Item 5:
 - The option to mix intermittent and continuous methods on a single braced wall line was provided. When a braced wall line begins on the exterior of the building and continues through the interior, the designer can brace the interior portions with intermittent methods and utilize the advantages of continuous sheathing on the exterior portions.
- Figure R602.10.6.2:

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- The option for a pony wall atop a PFH portal frame was added so that all portal frames (including PFG and CS-PF) allow the pony wall extension above the header.
- Figure R602.10.7:
 - A new end condition was added. Condition 3 allows no return panels or hold-downs if a 4 foot braced wall panel is located at the end of the braced wall line.

The uplift load path section, previously R602.10.1.2.1, was clarified, strengthened and moved to become Section R602.3.5.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: Bainai-AHWB-RB-1-CH 6

RB106–09/10 R602.9, Table R602.10.1.2(2), R602.10.9, R602.10.9.1, R602.10.9.2, R602.10.9.3, R602.11.2

Proponent: Chuck Bajnai, Chesterfield County, VA, Chairman, ICC Ad-Hoc Committee on Wall Bracing

1. Revise as follows:

R602.9 Cripple walls. Foundation cripple walls shall be framed of studs not smaller than the studding above. When exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional *story*.

Cripple walls with a stud height less than 14 inches (356 mm) shall be <u>continuously</u> sheathed on at least one side with a wood structural panels that is fastened to both the top and bottom plates in accordance with Table R602.3(1), or the cripple walls shall be constructed of solid blocking.

<u>All</u> cripple walls shall be supported on continuous foundations.

TABLE R602.10.1.2(2)^{a, b, c} BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY (AS A FUNCTION OF BRACED WALL LINE LENGTH)

SOIL CLASS D ^a WALL HEIGHT = 10 FT 10 PSF FLOOR DEAD LOAD 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING ≤ 25 FT			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE				
SEISMIC DESIGN CATEGORY (SDC)	STORY LOCATION	BRACED WALL LINE LENGTH	METHOD LIB	METHODS DWB, SFB, GB, PBS, PCP, HPS	METHOD WSP	CONT. SHEATHING	
	\wedge	10	NP	4.0	2.5	2.1	
		20	NP	8.0	5.0	4.3	
		30	NP	12.0	7.5	6.4	
		40	NP	16.0	10.0	8.5	
		50	NP	20.0	12.5	10.6	
	^	10	NP	7.5	5.5	4.7	
		20	NP	15.0	11.0	9.4	
SDC D2		30	NP	22.5	16.5	14.0	
		40	NP	30.0	22.0	18.7	
		50	NP	37.5	27.5	23.4	
	•	10	NP	NP	NP	NP	
		20	NP	NP	NP	NP	
		30	NP	NP	NP	NP	
		40	NP	NP	NP	NP	
		50	NP	NP	NP	NP	

MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE

BRACED WALL LINE OF ACING 22311							
SEISMIC DESIGN CATEGORY (SDC)	STORY LOCATION	BRACED WALL LINE LENGTH	METHOD LIB	METHODS DWB, SFB, GB, PBS, PCP, HPS	METHOD WSP	CONT. SHEATHING	
	<u>Cripple wall below</u> one- or two-story dwelling	<u>10</u>	<u>NP</u>	<u>NP</u>	<u>7.5</u>	<u>6.4</u>	
		<u>20</u>	<u>NP</u>	<u>NP</u>	<u>15.0</u>	<u>12.8</u>	
SDC D2		one- or two-story	<u>30</u>	<u>NP</u>	<u>NP</u>	<u>22.5</u>	<u>19.1</u>
		<u>40</u>	<u>NP</u>	<u>NP</u>	<u>30.0</u>	<u>25.5</u>	
		<u>50</u>	<u>NP</u>	<u>NP</u>	<u>37.5</u>	<u>31.9</u>	

(Portions of table not shown remain unchanged)

R602.10.9 Cripple wall bracing. In Seismic Design Categories other than D2, cripple walls shall be braced with a length and type of bracing as required for the wall above in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2) with the following modifications for cripple wall bracing: <u>Cripple walls shall be constructed in accordance with Section R602.9 and braced in accordance with this section. Cripple walls shall be braced with the length and method of bracing used for the wall above in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2), except that the length of cripple wall bracing shall be multiplied by a factor of 1.15.</u>

- 1. The length of bracing as determined from Tables R602.10.1.2(1) and R602.10.1.2(2) shall be multiplied by a factor of 1.15, and
- 2. The wall panel spacing shall be decreased to 18 feet (5486 mm) instead of 25 feet (7620 mm).

2. Delete and substitute as follows:

R602.10.9.1 Cripple wall bracing in Seismic Design Categories D0, D1 and D2. In addition to the requirements of Section R602.10.9, where *braced wall lines* at interior walls occur without a continuous foundation below, the length of parallel exterior cripple wall bracing shall be 11/2 times the length required by Tables R602.10.1.2(1) and R602.10.1.2(2). Where cripple walls braced using Method WSP of Section R602.10.2 cannot provide this additional length, the capacity of the sheathing shall be increased by reducing the spacing of fasteners along the perimeter of each piece of sheathing to 4 inches (102 mm) on center. In Seismic Design Category D2, cripple walls shall be braced in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2).

R602.10.9.1 Cripple wall bracing for Seismic Design Categories D_0 , D_1 and townhouses in Seismic Design **Category C.** In addition to the requirements in Section R602.10.9, braced wall panels for cripple walls shall be located no more than 18 feet (5486 mm) on center along a braced wall line.

Where braced wall lines at interior walls are not supported on a continuous foundation below, the adjacent parallel cripple walls, where provided, shall be braced with Method WSP per Section R602.10.2 or Method CS-WSP per Section R602.10.4. The length of bracing required per Table R602.10.1.2(2) for the cripple walls shall be multiplied by 1.5. Where the cripple walls do not have sufficient length to provide the required bracing, the spacing of panel edge fasteners shall be reduced to 4 inches (102 mm) on center and the required bracing length adjusted by 0.7. If the required length can still not be provided, the cripple wall shall be designed in accordance with accepted engineering practice.

R602.10.9.2 Cripple wall bracing for Seismic Design Category D₂. In Seismic Design Category D₂, cripple walls shall be braced in accordance with Tables R602.10.1.2(1) and R602.10.1.2(2).

3. Revise as follows:

R602.10.9.23 Redesignation of cripple walls. In any Seismic Design Category, Where all cripple wall segments along a braced wall line do not exceed 48 inches in height, the cripple walls shall be permitted to be redesignated as the <u>a</u> first *story* walls for purposes of determining wall bracing requirements. Where any cripple wall segment in a braced wall line exceeds 48 inches in height, the entire cripple wall shall be counted as an additional <u>story</u>. If the cripple walls are redesignated, the stories above the redesignated *story* shall be counted as the second and third stories, respectively.

R602.11.2 Stepped foundations in Seismic Design Categories D_0 , D_1 and D_2 . In all buildings located in Seismic Design Categories D_0 , D_1 or D_2 , where the height of a required *braced wall line* that extends from foundation to floor above varies more than 4 feet (1219 mm), the *braced wall line* shall be constructed in accordance with the following:

- 1. Where the lowest floor framing rests directly on a sill bolted to a foundation not less than 8 feet (2440 mm) in length along a line of bracing, the line shall be considered as braced. The double plate of the cripple stud wall beyond the segment of footing that extends to the lowest framed floor shall be spliced by extending the upper top plate a minimum of 4 feet (1219 mm) along the foundation. Anchor bolts shall be located a maximum of 1 foot and 3 feet (305 and 914 mm) from the step in the foundation. See Figure R602.11.2.
- Where cripple walls occur between the top of the foundation and the lowest floor framing, the bracing requirements of Sections R602.10.9, and R602.10.9.1 and R602.10.9.2 shall apply.
- 3. Where only the bottom of the foundation is stepped and the lowest floor framing rests directly on a sill bolted to the foundations, the requirements of Sections R403.1.6 and R602.11.1 shall apply.

Reason: This proposal clarifies and coordinates the basic cripple wall provisions in Section R602.9 and the cripple wall bracing provisions in Section R602.10.9.

The changes to Section R602.9 are largely editorial. The apparent intent of the provisions for cripple walls shorter than 14" is to require solid blocking or continuous sheathing. However, the current language calls for "a structural panel". Taken literally, that calls for one single sheet of plywood or OSB to be placed on the wall. The language is revised to clarify the apparent intent. Also, the continuous foundation requirement is moved to its own paragraph, as it clearly is intended to apply to all cripple walls, not just 14" and shorter ones.

The 75% minimum WSP bracing requirement for cripple walls in SDC D2 was mistakenly deleted from the reformatted seismic bracing table and is restored to Table R602.10.1.2(2). Consistent with the revisions last cycle, the percentage is converted into a foot length. The 15% reduction for continuous sheathing is also applied.

Section R602.10.9 and R609.10.9.1 are revised to divide the requirements into low-seismic (i.e. governed by wind) and high-seismic sections. The same calculation method and spreadsheet the ICC Ad-Hoc Wall Bracing Committee used to define the wind bracing table, was used to verify that the 1.15x multiplier is accurate for the wind bracing case as well as the seismic bracing case. The 18 foot braced wall panel spacing limit is applied only for high-seismic. There is no documentation of cripple wall failures in wind events, as there is for seismic events. Thus there is no technical justification to apply the additional limit for wind bracing.

The provisions regarding braced wall lines on interior walls not supported on continuous foundations are clarified. The 50% increase in bracing is applied to the adjacent cripple walls. It is noted these walls could potentially be either exterior or interior walls. Also, a complex house plan may have exterior cripple walls that are not adjacent to the unsupported wall (e.g. on an attached garage, den, or other feature) and do not inherit seismic loads from the unsupported wall. It would not then make sense to increase the bracing for those walls. Furthermore, it is clarified that the bracing for the adjacent cripple walls can be either Method WSP or Method CS-WSP. Finally, a specific factor is provided for the increased strength provided by the reduction to 4" edge nailing. Of course, for some plans, the reduction may still result in a required bracing length that exceeds the total length of the cripple wall. Obviously, an engineered solution would be required in that case,

The provision on re-designation of cripple walls is amended to require exterior cripple walls exceeding 48" in height to be considered a story. This is consistent with the calculation performed above to verify the 1.15 multiplier. The increase in bracing for taller cripple walls would begin to approach, and finally equal, the difference in bottom-floor bracing from the addition of a story. Thus, it would make sense to automatically redesignate these taller cripple walls as a story. This will also help clarify the determination of bracing for houses on sloped sites, where figuring out the bracing for the cripple walls occurring on the walls parallel to the slope has been an issue.

Finally, the section references in R602.11.2 are revised to include R602.10.9.2.

Cost Impact: The code change proposal may increase the cost of construction for houses with cripple walls exceeding 48" in height.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEII ENAME: BAJNAI-AHWB-RB-3-R602 9-R602 10-R602 11

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R602.10.1.2, R602.10.1.4.1, Table R602.10.1.2(3), Table R602.10.2, R602.10.2.1, R602.10.3, Table R602.10.3.1, R602.10.3.5 (New), Table R602.10.3.5 (New), Figure R602.10.3.5 (new), R602.12, R703.7

Proponent: Chuck Bajnai, Chesterfield County, VA, Chairman, ICC Ad-Hoc Committee on Wall Bracing

1. Revise as follows:

R602.10.1.2 Length of bracing. The length of bracing along each *braced wall line* shall be the greater of that required by the design wind speed and *braced wall line* spacing in accordance with Table R602.10.1.2(1) as adjusted by the factors in the footnotes or the Seismic Design Category and *braced wall line* length in accordance with Table R602.10.1.2(2) as adjusted by the factors in Table R602.10.1.2(3) or *braced wall panel* location requirements of Section R602.10.1.4. Only walls that are parallel to the *braced wall line* shall be counted toward the bracing requirement of that line, except angled walls shall be counted in accordance with Section R602.10.1.3. In no case shall the minimum total length of bracing in a *braced wall line*, after all adjustments have been taken, be less than 48 inches (1219 mm) total.

Exception: The length of wall bracing for dwellings in Seismic Design Categories D_0 , D_1 and D_2 with stone or masonry veneer installed per Section R703.7 and exceeding the first *story height* shall be in accordance with Section R602.10.3.5.

R602.10.1.4.1 Braced wall panel location in Seismic Design Categories D0, D1 and D2. Braced wall lines at exterior walls shall have a braced wall panel located at each end of the braced wall line.

Exception: For *braced wall panel* construction Method WSP <u>or BV-WSP</u> of Section R602.10.2, the *braced wall panel* shall be permitted to begin no more than 8 feet (2438 mm) from each end of the *braced wall line* provided one of the following is satisfied in accordance with Figure R602.10.1.4.1:

- A minimum 24-inch-wide (610 mm) panel is applied to each side of the building corner and the two 24inch-wide (610 mm) panels at the corner are attached to framing in accordance with Figure R602.10.4.4(1), or
- 2. The end of each *braced wall panel* closest to the corner shall have a hold-down device fastened to the stud at the edge of the *braced wall panel* closest to the corner and to the foundation or framing below. The hold-down

device shall be capable of providing an uplift allowable design value of at least 1,800 pounds (8 kN). The hold-down device shall be installed in accordance with the manufacturer's recommendations, or

3. For Method BV-WSP, hold-down devices shall be provided in accordance with Table R602.10.3.5 at the ends of each braced wall panel.

TABLE R602.10.1.2(3) ADJUSTMENT FACTORS TO THE LENGTH OF REQUIRED SEISMIC WALL BRACING^a

ADJUSTMENT BASED ON:	MULTIPLY LENGTH OF BRACING PER WALL LINE BY:	APPLIES TO:		
Walls with stone or masonry veneer in SDC C-D ₂		See Section R703.7		
Walls with stone or masonry veneer, townhouses in SDC C ^{d,e}		<u>1.5</u>	All intermittent & <u>continuous</u> <u>methods</u>	
		<u>1.5</u>		
Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC D ₀ -D ₂ ^{d,e}	Any story	See Table R602.10.3.5	BV-WSP	
(Dentiene efteble net ekenne neneein un ekenned)				

(Portions of table not shown remain unchanged)

a. through c. (No change)

- d. Applies to stone or masonry veneer exceeding the first story height. See Section R602.10.3.5 for requirements when stone or masonry veneer does not exceed the first story height.
- e. The adjustment factor for stone or masonry veneer shall be applied to all exterior braced wall lines and all braced wall lines on the interior of the building.

TABLE R602.10.2INTERMITTENT BRACING METHODS

METHOD	MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA
<u>BV-WSP^a</u>	<u>Wood Structural Panels</u> with Stone or Masonry <u>Veneer</u> (See Section <u>R602.10.3.5)</u>	<u>7/16"</u>	See Figure R602.10.3.5	Fasteners: 8d common (2½"x0.131) nails Spacing: 4" at panel edges 12" at intermediate supports 4" at braced wall panel end posts

(Portions of table not shown remain unchanged)

a. Method applies to detached one- and two-family dwellings in Seismic Design Categories D0-D2 only.

R602.10.2.1 Intermittent braced wall panel interior finish material. Intermittent *braced wall panels* shall have gypsum wall board installed on the side of the wall opposite the bracing material. Gypsum wall board shall be not less than 1/2 inch (12.7 mm) in thickness and be fastened in accordance with Table R702.3.5 for interior gypsum wall board.

Exceptions:

- 1. Wall panels that are braced in accordance with Methods GB, <u>BV-WSP</u>, ABW, PFG and PFH.
- 2. When an *approved* interior finish material with an in-plane shear resistance equivalent to gypsum board is installed.
- 3. For Methods DWB, WSP, SFB, PBS, PCP and HPS, omitting gypsum wall board is permitted provided the length of bracing in Tables R602.10.1.2(1) and R602.10.1.2(2) is multiplied by a factor of 1.5.

R602.10.3 Minimum length of braced panels. For Methods DWB, WSP, SFB, PBS, PCP, and HPS, and BV-WSP, each *braced wall panel* shall be at least 48 inches (1219 mm) in length, covering a minimum of three stud spaces where studs are spaced 16 inches (406 mm) on center and covering a minimum of two stud spaces where studs are spaced 24 inches (610 mm) on center. For Method GB, each *braced wall panel* and shall be at least 96 inches (2438

mm) in length where applied to one face of a *braced wall panel* and at least 48 inches (1219 mm) where applied to both faces. For Methods DWB, WSP, SFB, PBS, PCP<u>, and HPS</u>, <u>and BV-WSP</u>, for purposes of computing the length of panel bracing required in Tables R602.10.1.2(1) and R602.10.1.2(2), the effective length of the *braced wall* panel shall be equal to the actual length of the panel. When Method GB panels are applied to only one face of a *braced wall* panel, bracing lengths required in Tables R602.10.1.2(1) and R602.10.1.2(2) for Method GB shall be doubled.

Exceptions:

- 1. Lengths of *braced wall panels* for continuous sheathing methods shall be in accordance with Table R602.10.4.2.
- 2. Lengths of Method ABW panels shall be in accordance with Sections R602.10.3.2.
- 3. Length of Methods PFH and PFG panels shall be in accordance with Section R602.10.3.3 and R602.10.3.4 respectively.
- 4. For Methods DWB, WSP, SFB, PBS, PCP and HPS in Seismic Design Categories A, B, and C: Panels between 36 inches (914 mm)and 48 inches (1219 mm) in length shall be permitted to count towards the required length of bracing in Tables R602.10.1.2(1) and R602.10.1.2(2), and the effective contribution shall comply with Table R602.10.3.

TABLE R602.10.3.1 MINIMUM LENGTH REQUIREMENTS FOR BRACED WALL PANELS

SEISMIC DESIGN CATEGORY			HEIGHT OF E	HT OF BRACED WALL PANEL			
AND WIND SPEED	BRACING METHOD	8 ft.	9 ft.	10 ft.	11 ft.	12 ft.	
SDC A, B, C, D_0 , D_1 and D_2 Wind speed < 110 mph	DWB, WSP, SFB, PBS, PCP, HPS, <u>BV-WSP</u> and Method GB when double sided	4'-0"	4'-0"	4'-0"	4'-5"	4'-10"	
	Method GB, single sided	8'-0"	8'-0"	8'-0"	8'-10"	9'-8"	

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm.

2. Delete Sections R602.12, R602.12.1, R602.12.1.1 and relocate to new Section R602.3.5 and revise as follows:

R602.<u>10.3.5</u>¹² Wall bracing for dwellings with and stone and masonry veneer in Seismic Design Categories $D_{0.}$ <u> D_1 and D_2 </u>. Where stone and masonry veneer is installed in accordance with Section R703.7, wall bracing shall comply with this section.

For all buildings in Seismic Design Categories A, B and C, wall bracing at exterior and interior braced wall lines shall be in accordance with Section R602.10 and the additional requirements of Table R602.12(1).

<u>Where dwellings in Seismic Design Categories D_0 , D_1 and D_2 have stone or masonry veneer installed in accordance with Section R703.7, and the veneer does not exceed the first *story* height, wall bracing shall be in provided accordance with Section R602.10.1.2.</u>

For-Where detached one- or two-family dwellings in Seismic Design Categories D₀, D₁ and D₂ have stone or masonry veneer installed in accordance with Section R703.7, and the veneer exceeds the first *story height*, wall bracing and hold downs at exterior *braced wall lines* and interior *braced wall lines* on the interior of the building shall be constructed using Method BV-WSP in accordance with this section and Figure R602.10.3.5. Sections R602.10 and R602.11 and the additional requirements of Section R602.12.1 and Table R602.12(2). In Seismic Design Categories D0, D1 and D2, cCripple walls shall not be permitted, and required interior *braced wall lines* shall be supported on continuous foundations.

<u>Townhouses in Seismic Design Categories D_0 , D_1 and D_2 with stone or masonry veneer exceeding the first story height shall be designed in accordance with accepted engineering practice.</u>

R602.12.1 Seismic Design Categories D₀, **D**₁ and **D**₂. Wall bracing where stone and masonry veneer exceeds the first story height in Seismic Design Categories D₀, D₁ and D₂ shall conform to the requirements of Section R602.10 and R602.11 and the following requirements.

R602.<u>10.3.5.112.1.1</u> Length of bracing. The length of bracing along each *braced wall line* shall be <u>the greater of that</u> required by the design wind speed and *braced wall line* spacing in accordance with Table R602.10.1.2(1) as adjusted by the factors in the footnotes or the Seismic Design Category and *braced wall line* length in accordance with Table R602.10.1.3, and *braced wall panel* location shall be in accordance with Section R602.10.1.4. The seismic adjustment factors in Table R602.10.1.2(3) shall not be applied to the length of bracing determined using Table R602.10.3.5. In no case shall the minimum total length of bracing in a *braced wall line*, after all adjustments have been taken be less than 48 inches total.

3. Add new table as follows:

			BRACED					
SEISMIC DESIGN	STORY	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	SINGLE STORY	CUMULATIVE
CATEGORY		MINIMUM	TOTAL LENG	GTH (FT) OF	BRACED WA	LL PANELS	FORCE (lb) ^a	FORCE (lb) ^b
		REC	QUIRED ALO	NG EACH BR	ACED WALL	<u>. LINE</u>		
		<u>4.0</u>	<u>7.0</u>	<u>10.5</u>	<u>14.0</u>	<u>17.5</u>	<u>N/A</u>	=
<u>D</u> 0		<u>4.0</u>	<u>7.0</u>	<u>10.5</u>	<u>14.0</u>	<u>17.5</u>	<u>1900</u>	=
		<u>4.5</u>	<u>9.0</u>	<u>13.5</u>	<u>18.0</u>	<u>22.5</u>	<u>3500</u>	<u>5400</u>
	à₿₿	<u>6.0</u>	<u>12.0</u>	<u>18.0</u>	<u>24.0</u>	<u>30.0</u>	3500	<u>8900</u>
		<u>4.5</u>	<u>9.0</u>	<u>13.5</u>	<u>18.0</u>	<u>22.5</u>	<u>2100</u>	=
<u>D</u> 1		<u>4.5</u>	<u>9.0</u>	<u>13.5</u>	<u>18.0</u>	<u>22.5</u>	<u>3700</u>	<u>5800</u>
		<u>6.0</u>	<u>12.0</u>	<u>18.0</u>	<u>24.0</u>	<u>30.0</u>	<u>3700</u>	<u>9500</u>
		<u>5.5</u>	<u>11.0</u>	<u>16.5</u>	<u>22.0</u>	<u>27.5</u>	<u>2300</u>	=
<u>D</u> 2		<u>5.5</u>	<u>11.0</u>	<u>16.5</u>	<u>22.0</u>	<u>27.5</u>	<u>3900</u>	<u>6200</u>
	⋳₿₿	<u>NP</u>	<u>NP</u>	<u>NP</u>	<u>NP</u>	NP	<u>N/A</u>	<u>N/A</u>

TABLE R602.10.3.5 METHOD BV-WSP WALL BRACING REQUIREMENTS

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa, 1 pound-force = 4.448 N.

a. Hold down force is minimum allowable stress design load for connector providing uplift tie from wall framing at end of braced wall panel at the noted story to wall framing at end of braced wall panel at the story below, or to foundation or foundation wall. Use single story hold down force where edges of braced wall panels do not align; a continuous load path to the foundation shall be maintained.

b. Where hold down connectors from stories above align with stories below, use cumulative hold down force to size middle and bottom story hold down connectors.

4. Add new figure as follows:



Note: Hold downs should be strap ties, tension ties, or other approved hold down devices and shall be installed in accordance with the manufacturer's instructions.

FIGURE R602.10.3.5 METHOD BV-WSP: WALL BRACING FOR DWELLINGS WITH STONE AND MASONRY VENEER IN SEISMIC DESIGN CATEGORIES D₀, D₁ AND D₂

5. Delete remainder of R602.12 as follows:

R602.12.1.2 Braced wall panel location. Braced wall panels shall begin no more than 8 feet from each end of a braced wall line and shall be spaced a maximum of 25 feet on center.

R602.12.1.3 Braced wall panel construction. Braced wall panels shall be constructed of sheathing with a thickness of not less than 7/16 inch nailed with 8d common nails spaced 4 inches on center at all panel edges and 12 inches on center at intermediate supports. The end of each braced wall panel shall have a hold down device in accordance with Table R602.12(2) installed at each end. Size, height and spacing of wood studs shall be in accordance with Table R602.3(5).

R602.12.1.4 Minimum length of braced panel. Each braced wall panel shall be at least 48 inches in length, covering a minimum of 3 stud spaces where studs are spaced 16 inches on center and covering a minimum of 2 stud spaced where studs are spaced 24 inches on center.

R602.12.1.5 Alternate braced wall panel. Alternate braced wall panels described in Section R602.10.3.2 shall not replace the braced wall panel specification of this section.

R602.12.1.6 Continuously-sheathed wall bracing. Continuously sheathed provisions of Section R602.10.4 shall not be used in conjunction with the wall bracing provisions of this section.

TABLE R602.12(1) STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS, WOOD OR STEEL FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C

TABLE R602.12(2) STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS, ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D0, D1 AND D2

FIGURE R602.12 HOLD DOWNS AT INTERIOR AND EXTERIOR BRACED WALL PANELS

6. Revise as follows:

R703.7 Stone and masonry veneer, general. Stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4 and Figure R703.7. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first *story* above-grade and shall not exceed 5 inches (127 mm) in thickness. See Section R602.12 R602.10 for wall bracing requirements for masonry veneer for wood framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for cold-formed steel construction.

Exceptions:

- 1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
- 2. For detached one- or two-family *dwellings* in Seismic Design Categories D₀, D₁ and D₂, exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.

Reason: Last cycle, the special wall bracing requirements for wood-framed buildings with stone or masonry veneer were moved from Section R703.7 to Section R602.12, so they would follow the rest of the wall bracing provisions. This was a substantial clarification to the code. However, with the changes introduced by the Ad-Hoc Wall Bracing Committee to introduce tables of seismic adjustment factors, bracing methods, and other improvements, an opportunity now exists to further simplify matters, bring the special veneer provisions into the main bracing section, and remove duplicated text. As such, this proposal implements the following changes:

- 1. A new intermittent method, BV-WSP, is defined. The basic sheathing and nailing requirements are relocated from Section R602.12.1.3 to a new row in Table R602.10.2. The hold-down requirement is relocated from Section R602.12.1.3 to Section R602.10.1.4. The reference to Table R602.3(5), the wood stud table, is no longer needed. Once this language was moved to Section R602, that table automatically governs.
- 2. A new exception is added to R602.10.1.2, replacing the original charging language for R602.12. The remaining SDC-specific requirements are incorporated into new Section R602.10.3.5.
- 3. A reference to Method BV-WSP is added to the high-seismic end panel location requirements of Section R602.10.1.4.1. The duplicate language in Section R602.12.1.2 is no longer required and can be deleted.
- 4. The adjustments for SDC A, B, and C are inserted directly into Table R602.10.1.2(3), the seismic adjustment factor. Table R602.12(1) is no longer required and can be deleted.
- 5. A reference to Method BV-WSP is added to the minimum braced wall panel length requirements of Section R602.10.3 and to Table R602.10.3.1. The duplicate language in Section R602.12.1.4 is no longer required and can be deleted.
- 6. A new Section R602.10.3.5 is added for the new Method BV-WSP. The requirements of R602.12, R602.12.1, and R602.12.1.1 are moved into the new section. A subsection, R602.10.3.5.1, is defined for the length of bracing, with language similar to Section R602.10.1.2. Figure R602.12 is moved to the new section.
- 7. Table R602.12(2) is moved to Section R602.10.3.5 and revised to convert the percentages to lengths, similar to Table R602.10.1.2(2).
- 8. Figure R602.12 is replaced by new Figure R602.10.3.5, which provides a number of clarifications regarding the location and type of hold-down devices
- 9. Since BV-WSP is now defined as its own separate intermittent bracing method, Sections R602.10.1.5 and R602.12.1.6 are no longer needed and can be deleted.

This change represents an editorial relocation and reorganization of the special wall bracing provisions for structures with veneer. Section R602.12 is effectively deleted and all of its provisions incorporated under the scope of Section R602.10. While the intent was purely editorial, two minor technical changes were made. First, the previous provisions do not indicate whether a gypsum board finish is required. But, Method BV-WSP is essentially a fully-restrained engineered shear wall segment, and typically the effect of finishes is not incorporated in such designs. Thus, we believe the interior finish is not required, and amend Section R602.10.2.1 accordingly. Second, in the new Table R602.10.3.5, which replaces Table R602.12(2), the hold-down requirements were combined as part of the reformatting to make the table look like Table R602.10.1.2(2). In the process, the 3200 lb and 5100 lb hold-downs for a bottom of two-story are now required to be 3500 lb and 5400 lb respectively. However, this does not change the actual required strap or hold-down size which a user would select from a connector manufacturer's catalog.

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

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

ICCFILENAME: BAJNAI-AHWB-RB-4-R602.10

RB108-09/10 R602.10.5.4

Proponent: Louis Wagner, representing the American Fiberboard Association

Delete without substitution:

R602.10.5.4 Continuously sheathed braced wall lines. Where a continuously-sheathed braced wall line is used in Seismic Design Categories D_0 , D_1 and D_2 or regions where the basic wind speed exceeds 100 miles per hour (45 m/s), the braced wall line shall be designed in accordance with accepted engineering practice and the provisions of the International Building Code. Also, all other exterior braced wall lines in the same story shall be continuously sheathed.

Reason: During deliberations on 5/29/09 by the ICC Ad Hoc Committee on Wall bracing it was pointed out that limitations on the continuously sheathed method were inconsistent with limitations of other bracing methods in the IRC. For example, the same limitations are not applicable where walls are intermittently-sheathed. At the time this inconsistency was found, it was too late to correct the broader proposal being put forward by the ICC Ad Hoc Committee and therefore recommended to be submitted as a separate change proposal.

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

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
					ICCFILENAME: WAGNER-RB-1-R602.10.5.4

RB109–09/10 R602.10.6.2, Figure R602.10.6.2(2), Figure R602.10.6.2(3)

Proponent: Gary Ehrlich, National Association of Home Builders (NAHB)

1. Revise as follows:

R602.10.6.2 Connections to roof framing. Exterior braced wall panels shall be connected to roof framing as follows.

- 1. Parallel rafters or roof trusses shall be attached to the top Top plates of exterior braced wall panels shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of braced wall panels and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the braced wall panels shall be permitted to replace the blocking required by this section. Blocking shall not be required over openings in continuously-sheathed braced wall lines. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with R806.1..
- 2 1. For SDC A, B and C and wind speeds less than 100 miles per hour (45 m/s), where the distance from the top of the <u>braced wall panel to the top of the</u> rafters or roof trusses <u>above</u> and perpendicular top plates is 91/4 inches (235 mm) or less, the rafters or roof trusses shall be connected to the top plates of *braced wall lines* in accordance with Table R602.3(1) and blocking <u>between rafters or roof trusses shall</u> need not be installed required. Where the distance from the top of the <u>braced wall panel</u> to the top of the rafters <u>above</u> and perpendicular top plates is between 91/4 inches (235 mm) and 151/4 inches (387 mm) the rafters shall be connected to the top plates of *braced wall panels* with blocking <u>between rafters shall be provided above the braced wall panel</u> in accordance with Figure R602.10.6.2(1) and attached in accordance with Table R602.3(1). Where the distance from the top of the <u>braced wall panel</u> to the top of the provided above the <u>braced wall panel</u> is between 91/4 inches (235 mm) and 151/4 inches (387 mm) the rafters shall be connected to the top plates of *braced wall panels* with blocking <u>between rafters shall be provided above the braced wall panel</u> in accordance with Figure R602.10.6.2(1) and attached in accordance with Table R602.3(1). Where the distance from the top of the <u>braced wall panel to the top of the</u> roof trusses and perpendicular top plates above is between 91/4 inches (235 mm) and 151/4 inches (387 mm) the roof trusses shall be connected to the top plates of *braced wall panels* with blocking in accordance with Table R602.3(1) and provided trusses and perpendicular top plates above is between 91/4 inches (235 mm) and 151/4 inches (387 mm) the roof trusses shall be connected to the top plates of *braced wall panels* with blocking in accordance with Table R602.3(1) lateral load transfer shall be provided in accordance with Section R802.10.3.
- 3 2. For SDC D₀, D₁ and D₂ or wind speeds of 100 miles per hour (45 m/s) or greater, where the distance between from the top of the braced wall panel to the top of the rafters or roof trusses and perpendicular top plates is 151/4 inches (387 mm) or less, rafters or roof trusses shall be connected to the top plates of braced wall panel in accordance with Figure R602.10.6.2(1) and attached in accordance with Table R602.3(1).
- 4.3. For all seismic design categories and wind speeds, Where the distance between from the top of the braced wall panel to the top of the rafters or roof trusses and perpendicular top plates exceeds 151/4 inches (387 mm), perpendicular rafters or roof trusses shall be connected to the top plates of the braced wall panels shall be connected to perpendicular rafters or roof trusses above in accordance with one or more of the following methods:
- 4-3.1. Soffit blocking panels constructed in accordance with Figure R602.10.6.2(2),
- 4-3.2. Vertical blocking panels constructed in accordance with Figure R602.10.6.2(3),
- 4-3.3. With fFull_height engineered blocking panels designed for values listed in per the AF&PA WFCM American Forest and Paper Association (AF&PA_) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM). Both the roof and floor sheathing shall be attached to the blocking panels in accordance with Table R602.3(1).
- 4-3.4. <u>Blocking, blocking panels, or other methods of lateral load transfer</u> <u>Designed</u> <u>designed</u> in accordance with accepted engineering methods <u>practice</u>.

Lateral support for the rafters and ceiling joists shall be provided in accordance with Section R802.8. Lateral support for trusses shall be provided in accordance with Section R802.10.3. Ventilation shall be provided in accordance with Section R806.1.

Replace Figure R602.10.6.2(2) with the following:



a. Methods of bracing shall be as described in Section <u>R602.10.1.1</u><u>R602.10.2</u> method DWB, WSP, SFB, GB, PBS, PCP OR HPS

For SI: 1 inch = 25.4 mm.

FIGURE R602.10.6.2(2) BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

3. Replace Figure R602.10.6.2(3) with the following:



BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES

Reason: The purpose of this proposal is to amend and simplify the language for blocking between roof rafters and trusses over braced wall panels added during the 2007-2008 Code Development Cycle. The 2009 IRC language is incomprehensible and will create an enforcement nightmare. The change is primarily editorial, although minor technical changes have been introduced.

The terminology in the original code change is often unclear. Terms such as "parallel rafters or roof trusses" and "perpendicular top plates" leave it unclear as to what the framing members or top plates are parallel or perpendicular to. The statement that "blocking need not be installed" is permissive language. The text can even be taken to read that the BLOCKING is what's used to connect the rafter/truss to the top plate. To simplify the requirements, all of the references to "parallel" or "perpendicular" are removed, and the multiple references to Table R602.3(1) replaced with one comprehensive reference in the opening paragraph. Further, since this is the wall section, the blocking requirements and triggers are flipped so the braced wall panel is the point of reference, not the roof framing.

Language allowing a continuous rim board, rim joist, or truss in lieu of the blocking is added. This allows the distinction between "parallel" and "perpendicular" to be removed throughout the proposal, since providing a continuous member over the braced wall panels will be the obvious solution where roof framing direction is parallel to the panels and the framing depth is deep enough to require blocking.

Figures R602.10.6.2(2) and R602.10.6.2(3) are extensively revised. The details are clarified to indicate the blocking panel is only required at the braced wall panels, not along the entire braced wall line. The list of allowable methods is revised to point to Section R602.10.1.1, which includes all the allowable intermittent and continuous bracing methods, including the various alternate narrow wall panels and portal frames. Finally, the reference to "pre-engineered trusses" is replaced with a reference to R802.10, since roof trusses under the IRC are not required to be designed by an engineer.

NAHB asks for your support of this proposal.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: EHRLICH-RB-12-R602.10.6.2

RB110-09/10 R602.10.8

Proponent: Larry Wainright, Qualtim, Inc., representing the Structural Building components Association (SBCA)

Revise as follows:

R602.10.8 Panel joints. All vertical joints of panel sheathing shall occur over, and be fastened to common studs. Horizontal joints in *braced wall panels* shall occur over, and be fastened to common blocking of a minimum 11/2 inch (38 mm) thickness.

Exceptions:

- 1. <u>Vertical joints of panel sheathing occurring over a double stud, fastened in accordance with Table R602.3(1), item 11, shall be permitted to be fastened to the adjoining studs.</u>
- 4 <u>2</u>. Blocking at horizontal joints shall not be required in wall segments that are not counted as *braced wall* panels.
- 2 <u>3</u>. Where the bracing length provided is at least twice the minimum length required by Tables R602.10.1.2(1) and R602.10.1.2(2) blocking at horizontal joints shall not be required in *braced wall panels* constructed using Methods WSP, SFB, GB, PBS or HPS.
- 3 4. When Method GB panels are installed horizontally, blocking of horizontal joints is not required.

Reason: Structures built with pre-manufactured wall panels are becoming more common. Typically, these panels are built with the structural sheathing flush with the edge of the wall section. When two of these sections are installed at the job site, the end stud of each panel is fastened to the abutting panel and the vertical sheathing panel joint is between the two adjoined studs. This common practice should be allowed within the code provided the adjoining studs are properly connected per Table R602.3(1). The result will be wall panels that are easier to manufacture, will result in a higher level of quality since the panels will be easier to keep square, and will incur less damage during transit and installation due to the panel edges being supported by the end studs.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: WAINRIGHT-RB-4-R602.10.8

RB111-09/10 R602.10, R602.12 (New)

Proponent: Chuck Bajnai, Chesterfield County, VA, Chairman, ICC Ad-Hoc Committee on Wall Bracing

1. Revise as follows:

R602.10 Wall bracing. Buildings shall be braced in accordance with this section <u>or, when applicable, Section</u> <u>R602.12</u>. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1.

Exception: Detached one- and two-family *dwellings* located in Seismic Design Category C are exempt from the seismic bracing requirements of this section. Wind speed provisions for bracing shall be applicable to detached one- and two-family *dwellings*.

2. Add new section as follows:

R602.12 Simplified wall bracing. Buildings meeting all of the conditions listed below shall be permitted to be braced in accordance with this section as an alternate to the requirements of Section R602.10.

- 1. <u>A rectangle circumscribing the entire enclosed building, as shown in Figure R602.12.3, shall have no side</u> longer than 60 feet (18 288 mm), and the ratio between the long side and short side shall be a maximum of <u>3:1.</u>
- 2. <u>There shall be no more than two stories above the top of a concrete or masonry foundation or basement wall.</u> <u>Permanent wood foundations shall not be permitted.</u>
- 3. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.
- 4. Wall height shall not be greater than 10 feet (2743 mm).
- 5. Interior walls shall not contribute toward bracing required in this section.
- 6. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.
- 7. All exterior walls shall have gypsum board with a minimum thickness of 1/2 inches (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.
- 8. <u>The structure shall be located where the basic wind speed is less than or equal to 90 mph (40 m/s), and the Exposure Category is A or B.</u>
- 9. <u>The structure shall be located in Seismic Design Category of A, B or C for detached one- and two-family</u> <u>dwellings or Seismic Design Category A or B for townhouses.</u>
- 10. Cripple walls shall not be permitted in two-story buildings.

When the bracing described in this section is used, the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.

R602.12.1 Sheathing materials. The following sheathing materials installed on the exterior side of exterior walls shall be used to construct a bracing unit as defined in Section R602.12.2. Mixing materials is prohibited.

- 1. Wood structural panels with a minimum thickness of 3/8 inch (9.5 mm) fastened in accordance with Table R602.3(3).
- 2. <u>Structural fiberboard sheathing with a minimum thickness of 1/2 inch (12.7 mm) fastened in accordance with</u> <u>Table R602.3(1).</u>

R602.12.2 Bracing unit. A bracing unit shall be a full-height sheathed segment of the exterior wall with no openings and a minimum length as specified below.

- 1. When all framed portions of all exterior walls are continuously sheathed in accordance with Section R602.12.1, Including areas between bracing units, above and below openings and on gable end walls, the minimum length of a bracing unit shall be 3 feet (914 mm).
- 2. When the exterior walls are braced with intermittent sheathing in accordance with Section R602.12.1 and infilled with other materials, the minimum length of a bracing unit shall be 4 feet (1219 mm).

R602.12.2.1 Multiple bracing units. Segments of wall compliant with Section R602.12.2 and longer than the minimum bracing unit length shall be considered as multiple bracing units. The number of bracing units shall be determined by dividing the wall segment length by the minimum bracing unit length. The number of bracing units provided by one or more compliant wall segments shall be added together and rounded down to the nearest whole number. Full-height sheathed segments of wall shorter than the minimum bracing unit length shall not contribute toward a bracing unit except as specified in Section R602.12.6.1.

R602.12.3 Number of bracing units. The number of bracing units required along each side of a building shall be determined by circumscribing a rectangle around the entire enclosed building for each story level as shown in Figure R602.12.3. Each side of the rectangle shall have, at a minimum, the number of bracing units per Table R602.12.3 placed on the parallel exterior walls facing the side of the rectangle. Bracing units shall then be placed using the distribution requirements specified in Section R602.12.4. Mixing intermittent and continuous sheathing shall not be permitted.



FIGURE R602.12.3 RECTANGLE CIRCUMSCRIBING AN ENCLOSED BUILDING

TABLE R602.12.3 MINIMUM NUMBER OF BRACING UNITS ON EACH SIDE OF A CIRCUMSCRIBED RECTANGLE

		EAVE-TO RIDGE	MINIMUM NUMBER OF BRACING UNITS ON EACH LONG SIDE ^{a,b}					CING E ^{a,b}	MINIMUM NUMBER OF BRACING UNITS ON EACH SHORT SIDE ^{a,b}					
<u>STOR</u>	<u>Y LEVEL</u>	HEIGHT		Lengt	<u>h of sh</u>	ort sid	<u>e (ft) ^c</u>			Leng	<u>th of lo</u>	ng side	<u>ə (ft) ^c</u>	
		(FEET)	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>
	One-story house or second floor of a two- story	<u>10</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>3</u>
$\underline{\widehat{\Box}}$	<u>First floor of</u> <u>a two-story</u> <u>house</u>		<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
	<u>One-story</u> <u>house or</u> <u>second floor</u> <u>of a two-</u> <u>story</u>	<u>15</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>
	First floor of a two-story house		2	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>

For SI: 1 ft = 304.8 mm

a. Interpolation shall not be permitted.

b. Cripple walls or wood-framed basement walls in a walk-out condition of a one-story structure shall be designed as the first floor of a two-story house.

c. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.

R602.12.4 Distribution of bracing units. The placement of bracing units on exterior walls shall meet all of the following requirements as shown in Figure R602.12.4.

- 1. A bracing unit shall begin no more than 12 feet (3658 mm) from any wall corner.
- 2. The distance between adjacent edges of two bracing units shall be no greater than 20 feet (6096 mm).
- 3. Segments of wall greater than 8 feet (2438 mm) in length shall have a minimum of one bracing unit.



FIGURE R602.12.4 BRACING UNIT DISTRIBUTION

R602.12.5 Narrow panels. The bracing methods referenced in Section R602.10 and specified in Sections R602.12.5.1 through R602.12.5.3 shall be permitted when using simplified wall bracing.

R602.12.5.1 Method CS-G. Braced wall panels constructed as Method CS-G in accordance with Tables R602.10.4.1. and R602.10.4.2 shall be permitted for single story garages when all framed portions of all exterior walls are sheathed with wood structural panels. Each CS-G panel shall be equivalent to 0.5 of a bracing unit. Segments of wall which include a Method CS-G panel shall meet the requirements of Section R602.10.4.4.

R602.12.5.2 Method CS-PF. Braced wall panels constructed as Method CS-PF in accordance with Section R602.10.4.1.1 shall be permitted when all framed portions of all exterior walls are sheathed with wood structural panels. Each CS-PF panel shall equal 0.5 bracing units. A maximum of four CS-PF panels shall be permitted on all the segments of walls parallel to each side of the circumscribed rectangle. Segments of wall which include a Method CS-PF panel shall meet the requirements of Section R602.10.4.4.

R602.12.5.3 Methods PFH and PFG. Braced wall panels constructed as Method PFH and PFG shall be permitted when bracing units are constructed using wood structural panels. Each PFH and panel shall equal one bracing unit, and each PFG shall be equal to 0.75 bracing units.

R602.12.6 Lateral support. For bracing units located along the eaves, the vertical distance from the outside edge of the top wall plate to the roof sheathing above shall not exceed 9.25 inches (235 mm) at the location of a bracing unit unless lateral support is provided in accordance with Section R602.10.6.2.

R602.12.7 Stem walls. Masonry stem walls with a height and length of 48 inches (1219 mm) or less supporting a bracing unit or a Method CS-G, CS-PF or PFG braced wall panel shall be constructed in accordance with Figure R602.10.7. Concrete stem walls with a length of 48" or less, greater than 12 inches tall and less than 6 inches thick shall be reinforced sized and located in accordance with Figure R602.10.7

Reason: As the wall bracing section evolved, it has become more universal and flexible, but, as a result, it has grown in size and complexity. After the Ad Hoc committee's "engineering" work was complete and integrated into the 2009 IRC, we heard back from end users that this section of the code was extremely challenging. The committee therefore wanted to focus on making the 2012 IRC easier to read, easier to understand and easier to use.

The Ad Hoc committee strove to provide an easy, prescriptive procedure that would serve most users throughout the country. We defined the "majority of the country" as users in the 90 mph and SDC A and B areas.

The Committee developed a quick, prescriptive approach for those homes that fall within certain limitations. This simplified approach:

- 1. Eliminated all of the extra text provisions required for high seismic areas,
- 2. Eliminated the requirement for braced wall lines,
- 3. Quantified the amount of bracing using a simple table, and
- 4. Eliminated from the text the less-often utilized (and frequently the most verbose) bracing methods and concentrated on the most common bracing materials.

Simplified wall bracing incorporates intermittent and continuous sheathing methods (wood structural panels and structural fiberboard), but defines a braced wall panel and its minimum length as a "bracing unit." The minimum number of bracing units is determined by first drawing a rectangle around the building and then using its dimensions to select the total bracing from Table R602.12.3. Bracing units are also required to be placed per the distribution requirements in Section R602.12.4

This simplified method is intended as one easier to use option. Where homes do not qualify because they are located in higher wind or seismic zones, or are more complex in structure, or if the builder simply prefers it, the traditional "long" approach can still be used.

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

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

ICCFILENAME: BAJNAI-AHWB-RB-2-R602.10-R602.12

RB112–09/10 R602.12, R603.12.1, R602.12.1.3, Table R602.12(1), Table R602.12(2), Figure R602.12, R703.7, Table R703.7(1), Table R703.7(2)

Proponent: Charles Clark, Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

R602.12 Wall bracing and stone and masonry veneer. Where stone and masonry veneer is installed in accordance with Section R703.7, wall bracing <u>on exterior braced wall lines</u>, and braced wall lines on the interior of the building, shall comply with this section. In Seismic Design Categories D_0 , D_1 and D_2 , cripple walls shall not be permitted, and required braced wall lines on the interior of the building shall be supported on continuous foundations.

For all buildings in Seismic Design Categories A and, B, and for townhouses in Seismic Design Category C, and for one- or two-family dwellings in Seismic Design Category $D_{0.}$ wall bracing at exterior and interior braced wall lines shall be in accordance with Section R602.10 and the additional requirements of Table R602.12(1).

For townhouses in Seismic Design Category D_0 and detached one- or two-family *dwellings* in Seismic Design Categories D_0 , D_1 and D_2 , wall bracing and hold downs at exterior and interior *braced wall lines* shall be in accordance with Sections R602.10 and R602.11 and the additional requirements of Section R602.12.1, and Table R602.12(2) and Figure R602.12. In Seismic Design Categories D_0 , D_1 and D_2 , cripple walls are not permitted, and required interior *braced wall lines* shall be supported on continuous foundations.

R602.12.1 <u>Townhouses in Seismic Design Category D₀ and one- or two-family dwellings in Seismic Design</u> Categories D_{07} D₁ and D₂. Wall bracing where stone and masonry veneer exceeds the first story height <u>for</u> townhouses in Seismic Design Category D₀ and one- or two-family dwellings in Seismic Design Categories D_{07} D₁ and D₂ shall conform to the requirements of Sections R602.10 and R602.11 and the following requirements <u>Sections</u> R602.12.1.1 to R602.12.1.6.

R602.12.1.3 Braced wall panel construction. *Braced wall panels* shall be constructed of <u>wood structural panel</u> sheathing with a thickness of not less than 7/16 inch (11 mm) nailed with 8d common nails spaced 4 inches (102 mm) on center at all panel edges and 12 inches (305 mm) on center at intermediate supports. The end of each braced wall panel shall have a hold down device in accordance with Table R602.12(2) installed at each end. Size, height and spacing of wood studs shall be in accordance with Table R602.3(5).

TABLE R602.12(1)

STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS USING TABLE R602.10.1.2(2), WOOD OR STEEL FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C

<u>STRUCTURE</u> <u>TYPE AND</u> SEISMIC DESIGN CATEGORY	NUMBER OF WOOD FRAMED STORIES	WOOD FRAMED STORY	MINIMUM SHEATHING AMOUNT <u>BRACED WALL PANEL</u> <u>LENGTH</u> (length of braced wall line length) ^{ab}
All Structures in <u>SDC</u> A or B and <u>Detached one-</u> <u>and two-family</u> <u>dwellings in SDC</u> <u>C</u>	1, 2 or 3	all	Table R602.10.1.2(2)
<u>Townhouses in</u>	1	1 only	Table R602.10.1.2(2)
<u>SDC</u> C	2	top	Table R602.10.1.2(2)
and	2	bottom	1.5 times length required by Table R602.10.1.2(2)
Detached one-		top	Table R602.10.1.2(2)
and two-family		middle	1.5 times length required by Table R602.10.1.2(2)
dwellings in SDC <u>D</u> o ^ª	3	bottom	1.5 times length required by Table R602.10.1.2(2)

a. In Seismic Design Category D₀, cripple walls shall not be permitted and required braced wall lines on the interior of the building shall be supported on a continuous foundation.

b. a. Applies to exterior and interior braced wall lines, and braced wall lines on the interior of the building.

TABLE R602.12(2) STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS USING 7/16 INCH WOOD STRUCTURAL PANEL SHEATHING, ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D., D., AND D.

STRUCTURE TYPE AND SEISMIC DESIGN CATEGORY	NUMBER OF STORIES ^a	STORY	MINIMUM SHEATHING AMOUNT BRACED WALL PANEL (percent length of braced wall line length) ^b	MINIMUM BRACED WALL PANEL SHEATHING THICKNESS AND FASTENING	SINGLE STORY HOLD DOWN FORCE (Ib) ^c	CUMULATIVE HOLD DOWN FORCE (Ib) ^d
	1	1 only	35	7/16-inch wood	N/A	
	2	top	35	structural panel	1900	
Townhouses	2	bottom	45	sheathing with 8d	3200	5100
in SDC D ₀		top	40	common nails	1900	
	3	middle	45	spaced at 4	3500	5400
		bottom	60	inches on center	3500	8900
	1	1 only	45 <u>35</u>	at panel edges,	2100	
One- or two-	2	top	4 5 <u>35</u>	12 inches on	2100	
family	2	bottom	45 <u>40</u>	center at	3700	5800
dwellings in		top	45 <u>35</u>		2100	
SDC D1	3	middle	4 5 <u>40</u>	supports, ou	3700	5800
		bottom	60		3700	9500
One- or two-	1	1 only	55 <u>50</u>	center at braced	2300	
family		top	55 <u>50</u>	wall nanel end	2300	
<u>dwellings in</u> <u>SDC</u> D ₂	2	bottom	55	posts with hold down attached	3900	6200

a. Cripple walls are shall not be permitted in Seismic Design Categories D₀, D₁ or D₂.

b. Applies to exterior and interior braced wall lines, and braced wall lines on the interior of the building. Required braced wall lines on the interior of the building shall be supported on a continuous foundation.

c. <u>Comply with Figure R602.12.</u> Hold down force is minimum allowable stress load for connector providing uplift tie from wall framing at end of braced wall panel at the noted story to wall framing at end of braced wall panel at the story below, or to foundation or foundation wall. Use single story hold down force where edges of braced wall panels do not align; a continuous load path to the foundation shall be maintained. [See Figure R602.12].

d. <u>Comply with Figure R602.12.</u> Where hold down connectors from stories above align with stories below, use cumulative hold down force size middle and bottom story hold down connectors. (See Figure R602.12)

FIGURE R602.12

HOLD DOWNS AT EXTERIOR AND INTERIOR BRACED WALL PANELS STONE OR MASONRY VENEER WALL BRACING HOLD-DOWN REQUIREMENTS FOR SEISMIC DESIGN

(No change to figure)

R703.7 Stone and masonry veneer, general. Stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4 and Figure R703.7. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first *story* above-grade and shall not exceed 5 inches (127 mm) in thickness. See Section R602.12 for wall bracing requirements for masonry veneer for wood framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for cold-formed steel construction.

Exceptions:

- 1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
- 2. For <u>all buildings in Seismic Design Category D_0 and for detached one- or two-family *dwellings* in Seismic Design Categories D_{07} D_1 and D_2 , exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.</u>

TABLE R703.7(1) STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS, WOOD OR STEEL FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C

SEISMIC DESIGN CATEGORY	NUMBER OF WOOD OR STEEL FRAMED STORIES	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION <u>OR</u> FOUNDATION WALL ^a (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf) ^b	WOOD OR STEEL FRAMED STORY
A or B	Steel: 1 or 2 Wood: 1, 2 or 3	30	5	50	All
	1	30	5	50	1 only
	0	30	5	50	top
C	2	30	5		bottom
C				50	top
	Wood only: 3	30	5		middle
					bottom

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa.

a. An additional 8 feet is <u>shall be</u> permitted for gable end walls. See also <u>Comply with</u> story height limitations of Section R301.3.

b. Maximum weight is shall be installed weight and shall includes weight of mortar, grout, lath and other materials used for installation. Where veneer is placed on both faces of a wall, the combined weight shall not exceed that specified in this table.

TABLE R703.7(2)STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS, ONE- AND TWO-FAMILY DETACHED
DWELLINGS, WOOD FRAMING, SEISMIC DESIGN CATEGORIES D0, D1 AND D2

<u>STRUCTURE TYPE AND</u> SEISMIC DESIGN CATEGORY	NUMBER OF WOOD FRAMED STORIES	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION OR FOUNDATION WALL (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf)
	1	20 ^c	4	40
	2	20 ^c	4	40
D_0	3	30 ^d	4	40
One and two family dwallings	1	20 ^c	4	40
<u>One- and two-family dweilings</u> in SDC D ₁	2	20 ^c	4	40
	3	20 ^c	4	40
One- and two-family dwellings	1	20 ^c	3	30
in SDC D ₂	2	20 ^c	3	30

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa, 1 pound-force = 4.448 N. a. Cripple walls are shall not be permitted in Seismic Design Categories D_0 , D_1 and D_2 .

- b. Maximum weight is shall be installed weight and shall includes weight of mortar, grout and lath, and other materials used for installation.
- c. The veneer shall not exceed 20 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls, or 30 feet in height with an additional 8 feet for gable end walls where the lower 10 feet has a backing of concrete or masonry wall. See also Comply with story height limitations of Section R301.3.
- d. The veneer shall not exceed 30 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls. See also Comply with story height limitations of Section R301.3.

Reason: This code change adjusts the overly conservative special wall bracing requirements for houses with masonry veneer in moderate to highseismic regions. This adjustment is based on full-scale whole-building shake-table testing that has demonstrated that the in-plane shear performance of anchored masonry veneer can resist a portion its own seismically-induced load. It showed that the shear capacity of the veneer is significant and can effectively carry a portion of its load directly to the foundation. (Bibliography References 3 & 4 below)

This testing is substantiated by other full-scale tests on whole-houses in the United States, Australia, England, Japan and New Zealand. One study in the United States reported that a two-story split foyer dwelling had a maximum deflection of 0.04 inches (1 mm) at a uniform wind pressure of 25 psf. This deflection was significantly less than that predicted by conventional analysis. Numerous whole-house tests have also been conducted in Australia. These tests demonstrated that conventional residential construction (only slightly different than that in the United States) withstood 2.4 times to 4.75 times its intended design load without failure. In England, researchers have determined that shear loads transferred from veneer to wood-framed shear walls in a full brick-veneered building were reduced by as much as 45% for wind loads. In New Zealand, tests demonstrated that for masonry veneer on conventional wood-stud framing, the veneer can take up to 50% of the lateral in-plane load.

This code change effectively reduces the special wall bracing requirements for wood-stud framing behind masonry veneer in recognition that the veneer carries a significant portion of its own load in-plane.

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- Klingner, Richard E., Shing, P. Benson, McGinley, Mark W., McLean, David I., Okail, Hussein, and Jo, Seongwoo, "NSF NEES Small-Group Project on Performance-based Design of Masonry and Masonry Veneer: Overview and Preliminary Results," *TMS Journal*, The Masonry Society, Boulder, Colorado, December 2008 (date submitted for publication).
- 4. Klingner, Richard E., "Behavior of Anchored Masonry Veneer with Light Wood Stud-Framing or Masonry Backing in Full-Scale Whole-Building Shaking-Table Tests," *TMS Journal*, The Masonry Society, Boulder, Colorado, June 2009 (date submitted for publication).
- 5. Thurston, S.J., Beattie, G. J., "Seismic performance of New Zealand two-storey brick veneer houses," 2009 New Zealand Society for Earthquake Engineering Conference Proceedings, Wellington, New Zealand, April, 2009.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: CLARK-RB-5-R602.12

RB113–09/10 R602.12, Table R602.12(1), Table R602.12(2)

Proponent: Gary Ehrlich, National Association of Home Builders (NAHB)

Revise as follows:

R602.12 Wall bracing and stone and masonry veneer. Where stone and masonry veneer is installed in accordance with Section R703.7, wall bracing <u>on exterior braced wall lines</u>, and braced wall lines on the interior of the building, <u>perpendicular to veneered walls</u> shall comply with this section.

For all buildings in Seismic Design Categories A, B and C, wall bracing at exterior and interior *braced wall lines* shall be in accordance with Section R602.10 and the additional requirements of Table R602.12(1).

For detached one- or two-family *dwellings* in Seismic Design Categories D0, D1 and D2, wall bracing and hold downs at exterior and interior *braced wall lines* shall be in accordance with Sections R602.10 and R602.11 and the additional requirements of Section R602.12.1 and Table R602.12(2). In Seismic Design Categories D0, D1 and D2, cripple walls are not permitted, and required interior *braced wall lines* on the interior of the building shall be supported on continuous foundations.

TABLE R602.12(1) STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS, WOOD OR STEEL FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C

SEISMIC DESIGN CATEGORY	NUMBER OFWOOD FRAMED STORIES	WOOD FRAMED STORY	MINIMUM SHEATHING AMOUNT (length of braced wall line length) ^a
A or B	1, 2 or 3	all	Table R602.10.1.2(2)
<u>C</u> (detached one- and two-family dwellings)	<u>1, 2 or 3</u>	all	Table R602.10.1.2(2)
	1	1 only	Table R602.10.1.2(2)
<u> </u>	2	top	Table R602.10.1.(2)
(townboucoc)	Z	bottom	1.5 times length required by Table R602.10.1.2(2)
(townnouses)		top	Table R602.10.1(1)
	3	middle	1.5 times length required by Table R602.10.1.2(2)
		bottom	1.5 times length required by Table R602.10.1.2(2)

a. Applies to exterior and interior braced wall lines, and braced wall lines on the interior of the building, perpendicular to veneered walls.

TABLE R602.12(2) STONE OR MASONRY VENEER WALL BRACING REQUIREMENTS, ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D_0 , D_1 AND D_2

_	_	_	MINIMUM	MINIMUM		· <u> </u>
SEISMIC	NUMBER		SHEATHING	SHEATHING	SINGLE STORY	CUMULATIVE
DESIGN	OF	STORY	AMOUNT (percent	THICKNESS	HOLD DOWN	HOLD DOWN
CATEGORY	STORIES ^a		length of braced	AND	FORCE (lb) ^{be}	FORCE (Ib) ^{cd}
			wall line length) ^b	FASTENING		

 Applies to exterior and interior braced wall lines, and braced wall lines on the interior of the building, perpendicular to veneered walls.

(Portions of table and footnotes not shown remain unchanged)

FIGURE R602.12 HOLD DOWNS AT EXTERIOR AND INTERIOR BRACED WALL PANELS STONE OR MASONRY VENEER WALL BRACING HOLD-DOWN REQUIREMENTS, ONE- AND TWO-FAMILY DETACHED DWELLINGS, SEISMIC DESIGN CATEGORIES D₀, D₁ AND D₂

(No change to figure)

Reason: The purpose of this proposal is to revise the overly conservative special wall bracing requirements for dwellings with stone or masonry veneer in moderate and high-seismic regions. A common application is for only the front wall of a dwelling to be provided with stone or masonry veneer. However, the provisions as currently stated require the specified bracing length to be increased for every braced wall in the dwelling (both exterior and on the interior), and in high-seismic conditions for hold-downs to be provided on every segment of every braced wall panel in the dwelling.

In recent testing at the University of Texas and UC San Diego, masonry veneer on individual wood-framed wall segments and on a full woodframed building did not fail until subjected to peak ground accelerations well above the ground motions characteristic of Seismic Design Category D2. Thus, failure did not occur until well beyond the seismic limits of the IRC. Additionally, the major failure mode is veneer falling off the segments and building, rather than any damage to the wood framing back-up.

Additionally, testing at BRANZ in New Zealand of conventionally-braced structure with masonry veneer has shown that the masonry itself is capable of taking as much as 50% of the lateral load delivered in-plane to the wall. Further, the veneer showed good performance up to deflections of an inch. The allowable design capacities for bracing in the IRC result in deflections of around ½-inch, well within the range of good performance seen in the BRANZ tests.

There are no documented racking failures of a properly-braced house with stone or masonry veneer due to a seismic event. (Obviously, lack of veneer reinforcing and ties is an entirely different issue). Based on that fact and the UT, UCSD and BRANZ testing, the current requirement is not technically justified and clearly an onerous burden on masonry veneer construction. The proposed revisions will limit the increases in bracing and vertical load-path connections to just those walls that need to resist the seismic loads imparted to the structure by the masonry veneer.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
2				ICCFILENAME: EHRLICH-RB-8-R602.12

RB114–09/10 R606.1, Table R606.1 (New)

Proponent: John England, MCO, England Enterprises, Inc.

1. Revise as follows:

R606.1 General. Masonry construction shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of ACI 530/ASCE 5/TMS 402. <u>Mortar types and uses shall be in accordance with Table R606.1.</u>

2. Add new table as follows:

TABLE R606.1 MORTAR USES^a

<u>USE</u>	Type M	Type S	Type N	Type O
	2,500 PSI	1,800 PSI	750 PSI @	350 PSI @
	@ 28 days	<u>@ 28 days</u>	<u>28 days</u>	<u>28 days</u>
Structural Masonry Units—exterior bearing –underground	<u>X</u>	<u>X</u>		
Structural Masonry Units—exterior bearing –aboveground	X	X	Xp	
Structural Masonry Units—interior bearing	X	X	Xp	
Structural Masonry Units—Interior non-bearing	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
Glass block (interior & exterior)		<u>X</u>	<u>X</u>	
Grout	<u>X</u>	<u>X</u>		
Brick Veneer (non-structural)	<u>X</u>	<u>X</u>	<u>X</u>	
This (all has a second of the stand of the second of the s	C. H	- C		

a. This table is a summary of mortar types and uses specified in the following locations in this code:

- 1. Table R404.1(1) Footnote a;
- 2. Section R607.1;
- 3. Section R609.1.1;
- 4. Section R610.8.
- b. Can only be used in Seismic Design Category A, B, or C. See Section R607.1.2.

Reason: This is a new table which will help inspectors, contractor, and design professionals quickly pick the correct mortar for the job at hand.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: ENGLAND-RB-7-R606.1

RB115-09/10 R606.6

Proponent: John England, MCO, England Enterprises, Inc.

Delete and substitute as follows:

R606.6 Piers. The unsupported height of masonry piers shall not exceed ten times their least dimension. When structural clay tile or hollow concrete masonry units are used for isolated piers to support beams and girders, the cellular spaces shall be filled solidly with concrete or Type M or S mortar, except that unfilled hollow piers may be used if their unsupported height is not more than four times their least dimension. Where hollow masonry units are solidly filled with concrete or Type M or S mortar, except that unfilled hollow piers may be used if their unsupported height is not more than four times their least dimension. Where hollow masonry units are solidly filled with concrete or Type M, S or N mortar, the allowable compressive stress shall be permitted to be increased as provided in Table R606.5.

R606.6 Isolated piers The unsupported height of unfilled hollow masonry piers shall not exceed four times their least dimension.

The unsupported height of solid or hollow masonry unit filled with concrete or Type M or S mortar shall not exceed ten times their least dimension.

Reason: This does not change the meaning. It was reworked to better understand it.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: ENGLAND-RB-8-R606.6

RB116-09/10 R606.6.1

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

Revise as follows:

R606.6.1 Pier cap. Hollow piers shall be capped with 4 inches (102 mm) of *solid masonry* or concrete, <u>a masonry cap</u> <u>block</u>, or shall have cavities of the top course filled with concrete or grout, <u>unless a sill plate of 2-inch (51 mm)</u> <u>minimum nominal thickness and bearing on two face shells is provided</u>. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 square mm). or other *approved* methods.

Reason: The purpose of this proposal is to provide additional options for providing bearing at the top of masonry piers. No guidance is currently provided in the code for the common condition where the top of a masonry pier does not match the bottom of the floor framing. Even if the pier has been properly constructed with solid masonry or grouted cells, the code does not clearly require direct bearing, and this gap is often filled with shims or small blocks that are not adequate to transfer the reaction from the beam or girder to the pier. Language previously included in Section 1804.6.4 of the 1999 SBC requiring a nominal section of sill plate is added to R606.6.1. Also, a reference to a masonry cap block (or "FHA block") is added. These blocks have a solid top surface over hollow cores and are intended to be used at the top courses of masonry piers or walls. However, the "cap" is not 4" thick, hence the need for a separate reference.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: EHRLICH-RB-9-R606.6.1

RB117-09/10 Table R607.1

Proponent: John England, MCO, England Enterprises, Inc.

Delete existing Table R607.1 and replace as follows:

		PROPORTIONS BY VOLUME (cementitious materials)									
		Portland	Mo	rtar cen	nent	Mas	onry ce	ment	- Hudrotod limo ^e or	Aggragata ratio	
MORTAR	TYPE	blended cement	M	s	N	M	s	N	lime putty	(measured in damp, loose conditions)	
Cement-lime	M S N O	1 1 1 1			- - -	- - -	-	- - -	1/4 over 1/4 to 1/2 over 1/2 to 11/4 over 11/4 to 21/2		
Mortar-cement	₩ ₩ \$ \$ ₽ 0	4 	4 	 	+ + - + + + + +	- - - - -	- - - - -		_	Not loss than 21/4 and not more than 3 times the sum of separate volumes of lime, if used, and coment	
Masonry coment	M S S N Q	4 				4 	 	+ + + + + +	_		

TABLE R607.1 MORTAR PROPORTIONS^{a, b}

		PROPORTIONS			
	Type	Portland Cement or Blended Cement	Hydrated	Lime ^c or	Aggregate Ratio
		<u>Diended Cement</u>		<u>r utty</u>	loose)
	<u>M</u>	<u>1</u>	<u>1</u>	/4	Not less than 2 1/4
Cement Lime Mortar	<u>s</u>	1	<u>Over 1/</u>	4 to 1/2	and not more than 3
<u>comon Emo mortar</u>	N	<u>1</u>	<u>Over 1/2</u>	<u>to 1 1/4</u>	times the sum of the
	<u>0</u>	<u>1</u>	<u>Over 1 1/</u>	Over 1 1/4 to 2 1/2	
					cementitious
					materials
	Type	Portland Cement or	Mortar Cement or	Type N	Aggregate Ratio
	<u>- 1460</u>	Blended Cement	Masonry Cement	<u>.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	(sand damp and
					loose)
Mortar Cement	<u>M, S, N, O</u>	N/A	<u>1</u>	N/A	Not less than 2 1/4
<u>or</u>	M	<u>1</u>	N/A	1	and not more than 3
Masonry Cement	<u>s</u>	<u>1/2</u>	<u>N/A</u>	<u>1</u>	times the sum of the
					separate volumes of
					<u>cementitious</u>
					<u>materials</u>

For SI: 1 cubic foot = 0.0283 m3, 1 pound = 0.454 kg.

a. For the purpose of these specifications, the weight of 1 cubic foot of the respective materials shall be considered to be as follows:

Portland Cement	94 pounds	Masonry Cement	Weight printed on bag
Mortar Cement	Weight printed on bag	Hydrated Lime	40 pounds
Lime Putty (Quicklime)	80 pounds	Sand, damp and loose	80 pounds of dry sand

b. Two air-entraining materials shall not be combined in mortar.

c. Hydrated lime conforming to the requirements of ASTM C 207.

Reason: Easier to read and understand.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: ENGLAND-RB-3-T. R607.1

RB118-09/10 R607.3

Proponent: Charles Clark, Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

R607.3 Installation of wall ties. The installation of wall ties shall be as follows:

- The ends of wall ties shall be embedded in mortar joints. <u>Wall ties shall have a minimum of 5/8 inch (15.9 mm) mortar coverage from the exposed face.</u> Wall tie ends shall engage outer face shells of hollow units by at least 1/2 inch (13 mm). Wire wall ties shall be embedded at least 11/2 inches (38 mm) into the mortar bed of *solid masonry* units or solid grouted hollow units.
- 2. Wall ties shall not be bent after being embedded in grout or mortar.
- 3. For solid masonry units, solid grouted hollow units, or hollow units in anchored masonry veneer, wall ties shall be embedded in mortar bed at least 11/2 inches (38 mm).
- 4. For hollow masonry units in other than anchored masonry veneer, wall ties shall engage outer face shells by at least 1/2 inch (13 mm).

Reason: This code change ensures that anchored masonry veneer, as defined by Section R703.7 as not exceeding 5 inches in thickness, is installed correctly when hollow masonry units are used. For Section R607.3 which addresses wall tie installation, hollow masonry units used in an anchored masonry veneer are distinguished from units that are used otherwise to ensure that wall ties and mortar are installed correctly.

In Item #1, the existing text on minimum tie embedment is deleted and items 3 and 4 are added to address embedment. A requirement for minimum mortar cover of 5/8 inch for wall ties is added. This requirement is the same as the requirement in the anchored masonry veneer provisions of the *Building Code Requirements and Specification for Masonry Structures* (TMS 402/ACI 530/ASCE 5). This document is a consensus standard overseen by three organizations and written under an ANSI-accredited, balanced process to ensure their objectivity. The minimum mortar cover requirements established within this document have been corroborated through this consensus body.

Item #3 is added and requires wall ties used with solid masonry units, solid grouted units or hollow units in anchored masonry veneer be embedded in the mortar bed at least 1½ inches. This is necessary to ensure that there is adequate bond of the mortar to the veneer ties. This embedment requirement is the same as the requirement in the anchored masonry veneer provisions of the *Building Code Requirements and Specification for Masonry Structures* (TMS 402/ACI 530/ASCE 5). This document is a consensus standard overseen by three organizations and written under an ANSI-accredited, balanced process to ensure their objectivity. The minimum embedment provision in this document has been corroborated through this consensus body.

Item #4 is added and requires that wall ties for hollow units used in other applications besides anchored masonry veneer embed the face shell by no less than ½ inch. This allows for the cells of the unit to be subsequently filled with grout.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCEILENAME: CLARK-RB-1-R607.3

RB119-09/10

R612.1, R703.8

Proponent: Jeff Lowinski, representing the Window and Door Manufacturers Association (WDMA)

Revise as follows:

R612.1 General. This section prescribes performance and construction requirements for exterior window and door <u>assemblies</u> installed in wall<u>s</u>. Windows and doors shall be installed and flashed in accordance with the fenestration manufacturer's written installation instructions. Window and door openings shall be flashed in accordance with Section R703.8. Written installation instructions shall be provided by the fenestration manufacturer for each window or door.

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations: <u>Penetrations and openings in exterior walls shall be flashed or sealed in such a manner that will inhibit entry of water into the wall cavity or penetration of water to the building structural framing components. Flashing components shall be applied shingle fashion and shall direct water to the surface of the exterior wall finish. Material and components used to flash penetrations and openings shall be water-resistant and corrosion-resistant. Self-adhered membranes used as flashing shall be water-resistant and corrosion-resistant. Self-adhered membranes used as flashing shall be mater-resistant and corrosion-resistant. Self-adhered membranes used as flashing shall be mater-resistant and corrosion-resistant. Self-adhered membranes used as flashing shall comply with AAMA 711. The following locations shall be flashed:</u>

- 1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage.
- 2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
- 3. Under and at the ends of masonry, wood or metal copings and sills.
- 4. Continuously above all projecting wood trim.
- 5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
- 6. At wall and roof intersections.
- 7. At built-in gutters.

Exterior wall plumbing penetrations shall be in accordance with Section P2606.

Reason: The revisions proposed for Chapter 6 clarify that it is window and door assemblies that are installed in walls, and removes the inappropriate flashing text in this chapter since flashing requirements for windows and doors are explicit in Chapter 7.

In Chapter 7, the proposed is intended to be editorial and improves the charging language for flashing. The proposal also directs the reader to the requirements in Section P2606 for exterior wall plumbing penetrations.

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

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

ICCFILENAME: LOWINSKI-RB-4-R612.1-R703.8

RB120-09/10

R313 (New), R313.1 (New), R313.2 (New), R313.3 (New), R313.3.1 (New), R313.3.2 (New), 612.2, 612.3, 612.4, 612.4.1, 612.4.2; IBC 1013.1 (New), 1405.13.2 [IFC [B] 1013.8] (New)

Proponent: Sarah A. Rice, CBO, representing self

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

PART I - IRC BUILDING/ENERGY

Revise as follows:

SECTION R313 WINDOW SILLS

<u>R313.1</u> <u>R612.2</u> Window sills. In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch (102 mm) diameter sphere where such openings are located within 24 inches (610 mm) of the finished floor.

Exceptions:

- 1. Windows whose openings will not allow a 4-inchdiameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
- 2. Openings that are provided with window fall prevention devices that comply with Section R313.2 R612.3.
- 3. Openings that are provided with fall prevention devices that comply with ASTM F 2090.
- 4. Windows that are provided with opening limiting devices that comply with Section R313.3 R612.4.

<u>R313.2</u> R612.3 Window fall prevention devices. Window fall prevention devices and window guards, where provided, shall comply with the requirements of ASTM F 2090.

<u>R313.3</u> R612.4 Window opening limiting devices. When required elsewhere in this code, window opening limiting devices shall comply with the provisions of this section.

<u>R313.3.1</u> R612.4.1 General requirements. Window opening limiting devices shall be self acting and shall be positioned to prohibit the free passage of a 4-in. (102-mm) diameter rigid sphere through the window opening when the window opening limiting device is installed in accordance with the manufacturer's instructions.

<u>R313.3.2</u> R612.4.2 Operation for emergency escape. Window opening limiting devices shall be designed with release mechanisms to allow for emergency escape through the window opening without the need for keys, tools or special knowledge. Window opening limiting devices shall comply with all of the following:

- 1. Release of the window opening-limiting device shall require no more than 15 pounds (66 N) of force.
- 2. The window opening limiting device release mechanism shall operate properly in all types of weather.
- 3. Window opening limiting devices shall have their release mechanisms clearly identified for proper use in an emergency.
- 4. The window opening limiting device shall not reduce the minimum net clear opening area of the window unit below what is required by Section R310.1.1 of the code.

PART II – IBC FIRE SAFETY

1. Add new text as follows:

1013.1 (IFC [B] 1013.1) General. Guards and operable windows shall comply with this section. Guards shall comply with the provisions of Sections 1013.2 through 1013.7. Operable windows with sills located more than 72 inches above finished grade or other surface below shall comply with Section 1013.8.

2. Revise as follows:

1405.13.2 1013.8 (IFC [B] 1013.8) Window Sills. In Occupancy Groups R-2 and R-3, one – and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than 24 inches above the finished floor surface of the room in which the window is located. Glazing between the floor and a height of 24 inches shall be fixed or have openings through which a 4-inch diameter sphere cannot pass.

Exception: Openings that are provided with window guards that comply with ASTM F2006 or F2090.

Reason: PART I - See the reason for the companion change to the IBC. Code users are missing this requirement. It is even more a problem in the IRC as the requirement is 'buried' on the 201st page of the Wall Construction Chapter.

PART II - The proposal simply moves the window opening protection provisions from Chapter 14 to place it among the other guard requirements of Chapter 10. The reason for Section 1405.13.2 is essentially a protection from fall requirement. That is the same reason that 1013 exists. Having this section located in Chapter 14 results in it being frequently overlooked by designers and building officials alike. Placing it in Chapter 10 will result in better compliance.

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

PART I – IRC BUILDING/ENERGY

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
PART II – IBC I	FIRE SAFETY				
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	ICCFILENAME: RICE

RB121-09/10

R313 (New), R313.1 (New), R313.2 (New), R313.3 (New), R313.3.1 (New), R313.3.2 (New), R612.2, R612.3, R612.4, R612.4.1, R612.4.2

Proponent: Daniel E. Nichols, PE, New York State Division of Code Enforcement and Administration

Relocate to new section as follows:

SECTION R313 WINDOW FALL PROTECTION

R612.2 <u>**R313.1**</u> **Window sills.** In *dwelling* units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished *grade* or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch (102 mm) diameter sphere where such openings are located within 24 inches (610 mm) of the finished floor.

Exceptions:

- 1. Windows whose openings will not allow a 4-inchdiameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
- 2. Openings that are provided with window fall prevention devices that comply with Section R612.3.
- 3. Openings that are provided with fall prevention devices that comply with ASTM F 2090.
- 4. Windows that are provided with opening limiting devices that comply with Section R612.4.

R612.3 <u>**R313.2</u></u> Window fall prevention devices.** Window fall prevention devices and window guards, where provided, shall comply with the requirements of ASTM F 2090.</u>

R612.4 R313.3 Window opening limiting devices. When required elsewhere in this code, window opening limiting devices shall comply with the provisions of this section.

E1-1013.1

R612.4.1 <u>R313.3.1</u> General requirements. Window opening limiting devices shall be self acting and shall be positioned to prohibit the free passage of a 4-in. (102-mm) diameter rigid sphere through the window opening when the window opening limiting device is installed in accordance with the manufacturer's instructions.

R612.4.2 <u>R313.3.2</u> Operation for emergency escape. Window opening limiting devices shall be designed with release mechanisms to allow for emergency escape through the window opening without the need for keys, tools or special knowledge. Window opening limiting devices shall comply with all of the following:

- 1. Release of the window opening-limiting device shall require no more than 15 pounds (66 N) of force.
- 2. The window opening limiting device release mechanism shall operate properly in all types of weather.
- 3. Window opening limiting devices shall have their release mechanisms clearly identified for proper use in an emergency.
- 4. The window opening limiting device shall not reduce the minimum net clear opening area of the window unit below what is required by Section R310.1.1 of the code.

Reason: This proposal places the requirements for fall protection under the guard section. Designers and code officials alike are missing this section as it is within the wall construction section. Other requirements regarding window location, such as light and ventilation, fire separation prohibitions, and windborne debris are all in Chapter 3. This will assist the code users as all of the architectural concerns on window locations will be in the planning chapter.

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

Public Hearing: Committee: AS AM D Assembly: ASF AMF DF	NAME: NICHOLS-RB-1-R612
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RB122-09/10 R612.2; IBC 1405.13.2

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

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

PART I – IRC BUILDING/ENERGY

Revise as follows:

R612.2 Window sills. In *dwelling* units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished *grade* or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 <u>36</u> inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch (102 mm) diameter sphere where such openings are located within 24 <u>36</u> inches (610 mm) of the finished floor.

Exceptions:

- 1. Windows whose openings will not allow a 4-inchdiameter(102 mm) sphere to pass through the opening when the opening is in its largest opened position.
- 2. Openings that are provided with window fall prevention devices that comply with Section R612.3.
- 3. Openings that are provided with fall prevention devices that comply with ASTM F 2090.
- 4. Windows that are provided with opening limiting devices that comply with Section R612.4.

PART II – IBC FIRE SAFETY

Revise as follows:

1405.13.2 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than 24 <u>36</u> inches (610 mm) above the finished floor surface of the room in which the window is located. Glazing between the floor and a height of 24 <u>36</u> inches (610 mm) shall be fixed or have openings through which a 4-inch (102 mm) diameter sphere cannot pass.

Exception: Openings that are provided with window guards that comply with ASTM F 2006 or F 2090.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public. This proposed change is a result of the CTC's investigation of the area of study entitled "Child Window Safety". The scope of the activity is noted as:

Study the incidence and mechanisms of falls from open windows by children and to investigate the necessity and suitability of potential safeguards and/or revisions to the current codes.

The intent of IBC Section 1405.13.2 and IRC Section R612.2 is clearly to provide safety mechanisms to reduce the possibility of children falling through a window. The CTC has determined that this can be realized in the code in three ways: window fall prevention devices; window opening control devices; or reducing the possibility of accessing the window by increasing the minimum sill height. The purpose of this code change is to reduce the potential hazard by increasing the sill height from 24 inches to 36 inches.

In response to the CTC studying the Climbability of Guards, the National Ornamental & Miscellaneous Metals Association (NOMMA) commissioned a paper entitled "Review of Fall Safety of Children Between the Ages of 18 months and 4 Years in Relation to Guards and Climbing in the Built Environment", referred to in this code change as "NOMMA paper". This paper is posted on the CTC website as noted below. The paper provides a summary of the building code requirements, a critical review of relevant per-reviewed scientific literature on guard research and injury data and includes a section entitled "Children's Interaction with the Built Environment". Included in this section is an analysis of falls from windows where it is noted that "Falls from windows are among the most common types of unintended injuries to children and they are a major health concern" (NOMMA paper page 30). The study efficiently places within a few pages the data on window fall incidents and the means of reducing the number of incidents.

U.S. Fall Injury Data

NOMMA report page 7: The 1,421,137 injuries reported by NEISS between 2002 and 2005, inclusive, correspond to a national average of 51,217,603 based on weighting data included with the record data. The average over the four years is 12,804,401. The weighted estimate of 1,117,278 incidents on average annually for children between the ages of 18 months and 4 years represents 8.7 percent of these incidents. For all the incidents to children between the ages of 18 months and 4 years, 5.6 percent involved stairs, 1.22 percent involved windows, and 0.87 percent involved porches, balconies, open-sided floors, and floor openings.

NOMMA paper page 30 - 33. The paper further cites reports which have been compiled in the table below:

Study	Location	Falls	% fatalities
Vish et al. (2005)	Chicago	11/yr	
Istre et al. (2003)	Dallas county	17/yr	
Benoit et al. (2002)	L.A. county	12/yr (11%)	4% (4 yrs old or less)
Stone et al. (2000)	Cincinnati	12/yr (6.3%)	4.7%
Benoit et al. (2000)	Northern Virginia	11/yr (11%)	

Center of Gravity

NOMMA paper page 11, Table 2: The standing center of gravity of children aged 2 to 3.5 years is 24.1 inches (50th percentile is 22.2 inches) and of children aged 3.5 to 4.5 is 25.2 (50th percentile is 23.6).

A reasonable expectation for the Code is that, absent any fall protection in the window opening, a minimum sill height will be required to reduce the ability of a child to climb onto the sill enabling the fall through the opening. Using a child target age of up to 4 years of age and the associated center of gravity, the code mandated height of 24" is not adequate. A child need only extend themselves on their toes, stand on modest stack of books or blocks or hoist themselves a matter of a few inches with their arms to be able to flop onto the sill and expose themselves to the window opening and the associated risk of falling.

The hazards associated with child window falls cannot be understated as evidenced by the following CPSC Press release dated May 15, 2008:

NEWS from CPSC U.S. Consumer Product Safety Commission Office of Information and Public Affairs Washington, DC 20207

FOR IMMEDIATE RELEASE May 15, 2008 Release #08-270

CPSC Hotline: (800) 638-2772 CPSC Media Contact: (301) 504-7908

Window Falls Prompts CPSC to Issue Warning

WASHINGTON, D.C. - With the arrival of the warmer spring weather, families across the nation are opening their windows to let the fresh air in. This pleasant feeling can quickly turn tragic in households with small children. In recent weeks, several children have fallen from windows. The U.S. Consumer Product Safety Commission is warning parents and caregivers to take precautions to keep children from falling from windows.

"CPSC staff is aware of at least 18 falls from windows through media reports, including two deaths, involving small children since April," said CPSC Acting Chairman Nancy Nord. "We are issuing this warning so parents will take the necessary steps to prevent these incidents from happening."

These deaths and injuries frequently occur when kids push themselves against window screens or climb onto furniture located next to an open window.

From 2002-2004, CPSC staff received an average of 25 reports a year of fatalities associated with falls from windows. Children younger than five years of age account for approximately one-third of these reported fatalities. For all age categories, more males died from window falls than females.

To help prevent injuries and tragedies, CPSC recommends the following safety tips:

* Safeguard your children by using window guards or window stops.
 * Install window guards to prevent children from falling out of windows. (For windows on the 6th floor and below, install window guards that adults and older children can open easily in case of fire.)

- * Install window stops so that windows open no more than 4 inches.
- * Never depend on screens to keep children from falling out of windows.
- * Whenever possible, open windows from the top -- not the bottom.
- * Keep furniture away from windows, to discourage children from climbing near windows.

To see this release on CPSC's web site, please go to:

http://www.cpsc.gov/cpscpub/prerel/prhtml08/08270.html

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

PART I – IRC BUILDING/ENERGY

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
PART II – IBC F	IRE SAFETY				
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	ICCFILENAME: HEILSTEDT-RB-2-R612-IBC 1405.13.2

RB123-09/10 R612.2, R612.3, R612.4, R612.4.1, R612.4.2; IBC 1405.13.2, 1405.13.2.1 (New)

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

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

PART I - IRC BUILDING/ENERGY

1. Revise as follows:

R612.2 Window sills. In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch diameter sphere where such openings are located within 24 inches of the finished floor.

Exceptions:

- 1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
- 2. Openings that are provided with window fall prevention devices that comply with Section R612.3.
- 3. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
- 4. Windows that are provided with <u>window</u> opening <u>limiting</u> <u>control</u> devices that comply with <u>Section R612.4</u>. <u>R612.3</u>.

2. Delete without substitution:

R612.3 Window fall prevention devices. Window fall prevention devices and window guards, where provided, shall comply with the requirements of ASTM F 2090.

3. Renumber and revise Section R612.4 as follows:

R612.4 <u>R612.3</u> Window opening <u>limiting control</u> devices. When required elsewhere in this code, window opening <u>limiting control</u> devices shall comply with the provisions of this section. <u>ASTM F 2090</u>. <u>The window opening control</u> device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section R 310.1.1. The device or any portion thereof shall not project more than 1 inch into the required net clear opening for a length not exceeding 3 inches when the window is in the fully open position.

4. Delete without substitution:

R612.4.1 General requirements. Window opening limiting devices shall be self acting and shall be positioned so as to prohibit the free passage of a 4.0-in. (102-mm) diameter rigid sphere through the window opening when the window opening limiting device is installed in accordance with the manufacturer's instructions.

R612.4.2 Operation for Emergency Escape. Window opening limiting devices shall be designed with release mechanisms to allow for emergency escape through the window opening without the need for keys, tools or special knowledge. Window opening limiting devices shall comply with all of the following:

- 1. Release of the window opening-limiting device shall require no more than 15 lbf (66 N) of force.
- 2. The window opening limiting device release mechanism shall operate properly in all types of weather.
- 3. Window opening limiting devices shall have their release mechanisms clearly identified for proper use in an emergency.
- 4. The window opening limiting device shall not reduce the minimum net clear opening area of the window unit below what is required by Section R310.1.1 of the code.

PART II – IBC FIRE SAFETY

1. Revise as follows:

1405.13.2 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor surface of the room in which the window is located. Glazing between the floor and a height of 24 inches (610 mm) shall be fixed or have openings such that a 4-inch (102 mm) diameter sphere cannot pass through. Operable sections of windows shall not permit openings that allow passage of a 4 inch diameter sphere where such openings are located within 24 inches of the finished floor.

Exceptions:

Openings that are provided with window guards that comply with ASTM F 2006 or F 2090.

- 1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
- 2. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
- 3. Windows that are provided with window opening control devices that comply with Section 1405.13.2.1..

2. Add new text as follows:

1405.13.2.1 Window opening control devices. When required elsewhere in this code, window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2. The device or any portion thereof shall not project more than 1 inch into the required net clear opening for a length not exceeding 3 inches when the window is in the fully open position.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents;

presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public. This proposed change is a result of the CTC's investigation of the area of study entitled "Child Window Safety". The scope of the activity is noted as:

Study the incidence and mechanisms of falls from open windows by children and to investigate the necessity and suitability of potential safeguards and/or revisions to the current codes.

This code change is a follow-up to code change RB173-07/08 last cycle. At the Final Action Hearings in Minneapolis, the membership approved RB 173-07/08 Part 1 (Public Comment 2) to the IRC to include prescriptive provisions for window opening limiting devices but failed to approve the corresponding and identical provisions to the IBC. The proposal corrects this inconsistent action as well as replaces the prescriptive provisions with a reference to a consensus standard which has been updated to specifically address these devices.

IRC/IBC coordination: The result of this two part code change will be consistency between the IBC and IRC in terms of requirements.

Updated standard ASTM F2090 – 08: Both the IBC and IRC currently reference the 2007 edition of the standard entitled "Specification for Window Fall Prevention Devices with Emergency Escape (Egress Release Mechanisms". This standard was updated in 2008 to address window opening control devices. However, it was not updated in time to be included by reference in the 2009 IBC and IRC. This standard includes the necessary window operational criteria which results in the window not being able to be opened beyond the 4 inch performance threshold which is currently found in IRC Section R612.4.1. This control device can be released to allow the window to be fully opened in order to comply with the emergency escape provisions in both the IBC (1029.2) and IRC (R310.1.1)

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

PART I – IRC BUILDING/ENERGY

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
PART II – IBC I	FIRE SAFETY				
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	ICCFILENAME: HEILSTEDT-RB-1-R612-IBC 1405.13.2

RB124–09/10 R612.2, R612.3, R612.4, R612.4.1, R612.4.2, Chapter 44 (New)

Proponent: Julie Ruth, JRuth Code Consulting, representing AAMA Window Opening Control Device Task Group

1. Revise as follows:

R612.2 Window sills. In *dwelling* units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished *grade* or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch (102 mm) diameter sphere where such openings are located within 24 inches (610 mm) of the finished floor.

Exceptions:

- 1. Windows whose openings will not allow a 4-inchdiameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
- 2. Openings that are provided with window fall prevention devices that comply with Section R612.3.
- 3 2. Openings that are provided with fall prevention devices that comply with ASTM F 2090.
- 4 <u>3</u>. Windows that are provided with opening limiting <u>control</u> devices that comply with Section <u>R612.4</u> <u>R612.3</u>.

2. Delete without substitution:

R612.3 Window fall prevention devices. Window fall prevention devices and window guards, where provided, shall comply with the requirements of ASTM F 2090.

3. Renumber and revise as follows:

R612.4 612.3 Window opening limiting control devices. When required elsewhere in this code, window opening limiting control devices shall comply with the provisions of this section AAMA 909.

4. Delete without substitution:

R612.4.1 General requirements. Window opening limiting devices shall be self acting and shall be positioned to prohibit the free passage of a 4-in. (102-mm) diameter rigid sphere through the window opening when the window opening limiting device is installed in accordance with the manufacturer's instructions.

R612.4.2 Operation for emergency escape. Window opening limiting devices shall be designed with release mechanisms to allow for emergency escape through the window opening without the need for keys, tools or special knowledge. Window opening limiting devices shall comply with all of the following:

- 1. Release of the window opening-limiting device shall require no more than 15 pounds (66 N) of force.
- 2. The window opening limiting device release mechanism shall operate properly in all types of weather.
- 3. Window opening limiting devices shall have their release mechanisms clearly identified for proper use in an emergency.
- 4. The window opening limiting device shall not reduce the minimum net clear opening area of the window unit below what is required by Section R310.1.1 of the code.

5. Add new standard to Chapter 44 as follows:

AAMA 909 Voluntary Specification for Window Opening Control Devices

Reason: The requirements of current Section R612.4 for window opening limiting devices does not provide adequate detail for their design. The 2008 edition of ASTM F2090 attempts to provide greater guidance, but as the members of the AAMA Window Opening Control Device task group, which was created specifically to respond to this new requirement in the International Codes, discovered when they began attempting to design devices to meet this standard, there are inconsistencies and confusion within ASTM F2090-08. Therefore, the members of the AAMA WOCD TG have begun the development of an AAMA standard for these devices, with a goal of completing the standard in time to be referenced in the 2012 International Residential Code.

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

Analysis: A review of the standard proposed for inclusion in the code, AMMA 909, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: RUTH-RB-4-R612.2-CH 44

RB125–09/10 R310.2 (New), 612.3, R612.4, R612.4.1, R612.4.2; IBC 1029.4.1 (New), 1405.13.2

Proponent: Jeff Lowinski, representing the Window and Door Manufacturers Association (WDMA)

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

PART I – IRC BUILDING/ENERGY

1. Add new text as follows:

R310.2 Window fall prevention devices. Window guards and window opening control devices, where provided, shall comply with ASTM F2090.

2. Delete without substitution:

R612.3 Window fall prevention devices. Window fall prevention devices and window guards, where provided, shall comply with the requirements of ASTM F 2090.

R612.4 Window opening limiting devices. When required elsewhere in this code, window opening limiting devices shall comply with the provisions of this section.

R612.4.1 General requirements. Window opening limiting devices shall be self acting and shall be positioned to prohibit the free passage of a 4-in. (102-mm) diameter rigid sphere through the window opening when the window opening limiting device is installed in accordance with the manufacturer's instructions.

R612.4.2 Operation for emergency escape. Window opening limiting devices shall be designed with release mechanisms to allow for emergency escape through the window opening without the need for keys, tools or special knowledge. Window opening limiting devices shall comply with all of the following:

- 1. Release of the window opening-limiting device shall require no more than 15 pounds (66 N) of force.
- 2. The window opening limiting device release mechanism shall operate properly in all types of weather.
- 3. Window opening limiting devices shall have their release mechanisms clearly identified for proper use in an emergency.
- 4. The window opening limiting device shall not reduce the minimum net clear opening area of the window unit below what is required by Section R310.1.1 of the code.

PART II – IBC FIRE SAFETY

1. Add new text as follows:

1029.4.1 Window fall prevention devices. Window guards and window opening control devices, where provided, shall comply with ASTM F2090.

Exception. Window guards installed in windows located more than 75 feet above adjacent grade shall be permitted to comply with ASTM F2006.

2. Delete without substitution:

1405.13.2 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than 24 inches (610 mm) above the finished floor surface of the room in which the window is located. Glazing between the floor and a height of 24 inches (610 mm) shall be fixed or have openings through which a 4-inch (102 mm) diameter sphere cannot pass.

Exception: Openings that are provided with window guards that comply with ASTM F 2006 or F 2090.

Reason: (Parts 1 and 2) The code contains requirements for minimum sill heights that were intended to reduce the likelihood of child window falls. According to the US CPSC, average annual child fall deaths have decreased from 32 to 14 between 1980 and 2000. In 2008, the CSPC reported that annual deaths dropped to less than 9 per year. This significant improvement in child fall safety is the result of the two-pronged approach of window safety education and window guard regulations enacted by local jurisdictions.

Despite this safety improvement, one large metropolitan MSA has bucked the trend. Denver Children's Hospital has shared data suggesting that ER visits resulting from child window falls have been increasing.

Denver is the only major MSA in the US that has required windows to be installed at a minimum sill height, yet the improved safety record reported by the CPSC does not apply in Denver.

WDMA believes that the continued reliance on a minimum sill height could result in more child falls as parents place furniture, including sofas, beds and cribs beneath open windows. Proponents of sill height minimums have continued to ignore the Denver scenario, but WDMA is concerned that this failure to study the issue could result in more injuries and deaths nationwide.

Approval of this proposal will remove the minimum sill height requirement, but mandate that window opening control devices and window guards comply with the appropriate ASTM standards.



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

PART I – IRC BUILDING/ENERGY										
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF						
PART II – IBC I	FIRE SAFETY									
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	ICCFILENAME: LOWINSKI-RB-1-R310.2-IBC-1029.4.1					

RB126–09/10 R601.4 (New), R612.2, R612.3, R612.4, R612.4.1, R612.4.2; IBC 1405.13.2

Proponent: Jeff Lowinski, representing Window and Door Manufacturers Association (WDMA)

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

PART I – IRC BUILDING/ENERGY

1. Add new text as follows:

R601.4 Windows. Where window rough openings are located higher than the first story above grade, the window rough opening sill shall be a minimum of 21 inches (533 mm) above the rough floor deck of the room in which the window is located.

Exceptions:

- 1. Windows above an exterior deck or balcony serving that story.
- 2. Fixed, non-operable windows.
- 3. Window openings that do not permit a 4" diameter sphere to pass through the opening in the lower half of the window.
- 4. Window openings with devices complying with ASTM F 2090.

2. Delete without substitution:

R612.2 Window sills. In *dwelling* units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished *grade* or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch (102 mm) diameter sphere where such openings are located within 24 inches (610 mm) of the finished floor.

Exceptions:

1. Windows whose openings will not allow a 4-inchdiameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.

- 2. Openings that are provided with window fall prevention devices that comply with Section R612.3.
- 3. Openings that are provided with fall prevention devices that comply with ASTM F 2090.
- 4. Windows that are provided with opening limiting devices that comply with Section R612.4.

R612.3 Window fall prevention devices. Window fall prevention devices and window guards, where provided, shall comply with the requirements of ASTM F 2090.

R612.4 Window opening limiting devices. When required elsewhere in this code, window opening limiting devices shall comply with the provisions of this section.

R612.4.1 General requirements. Window opening limiting devices shall be self acting and shall be positioned to prohibit the free passage of a 4-in. (102-mm) diameter rigid sphere through the window opening when the window opening limiting device is installed in accordance with the manufacturer's instructions.

R612.4.2 Operation for emergency escape. Window opening limiting devices shall be designed with release mechanisms to allow for emergency escape through the window opening without the need for keys, tools or special knowledge. Window opening limiting devices shall comply with all of the following:

- 1. Release of the window opening-limiting device shall require no more than 15 pounds (66 N) of force.
- 2. The window opening limiting device release mechanism shall operate properly in all types of weather.
- 3. Window opening limiting devices shall have their release mechanisms clearly identified for proper use in an emergency.
- 4. The window opening limiting device shall not reduce the minimum net clear opening area of the window unit below what is required by Section R310.1.1 of the code.

PART II – IBC FIRE SAFETY

Delete and substitute as follows:

1405.13.2 Window sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than 24 inches (610 mm) above the finished floor surface of the room in which the window is located. Glazing between the floor and a height of 24 inches (610 mm) shall be fixed or have openings through which a 4-inch (102 mm) diameter sphere cannot pass.

Exception: Openings that are provided with window guards that comply with ASTM F 2006 or F 2090.

1405.13.2 Window rough openings. Where window rough openings are located higher than the first story above grade, the window rough opening sill shall be a minimum of 21 inches (533 mm) above the rough floor deck of the room in which the window is located.

Exceptions:

- 1. Windows above an exterior deck or balcony serving that story.
- 2. Fixed, non-operable windows.
- 3. Window openings that do not permit a 4" diameter sphere to pass through the opening in the lower half of the window.
- 4. Window openings with devices complying with ASTM F2090 or F2006.

Reason: (Parts 1 and 2) The current code requirement for minimum sill heights has caused some issues with builders after window installation and the minimum is triggered. By changing the requirement to a rough opening dimension that equates to a 24" sill opening, the construction process will be streamlined. This proposal also simplifies the trigger by removing the 72" dimension from adjacent grade and inserting instead a reference to location above the first story above grade. This change will not result in a material change in the height of window installations. Removing the prescriptive requirements for window opening-limiting devices removes conflicts between the referenced standard and the code.

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

PART I – IRC BUILDING/ENERGY

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
PART II – IBC I	FIRE SAFETY				
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	ICCFILENAME: LOWINSKI-RB-2-R601.4-IBC 1405

RB127–09/10 R612.8, Chapter 44 (New)

Proponent: Jeff Burton, Director of Codes and Standards, representing Association of Millwork Distributors

1. Revise as follows:

R612.8 Other exterior window and door assemblies. Exterior windows and door assemblies not included within the scope of Section R612.6 or Section R612.7 shall be tested in accordance with ASTM E 330 <u>or AMD SHEDS</u>. Glass in assemblies covered by this exception shall comply with Section R308.5.

2. Add new standard to Chapter 44 as follows:

AMD	Association of Millwork Distributors
	10047 Robert Trent Jones Boulevard
	Port Richey, FL 34655

SHEDS Side Hinged Exterior Door Standard

Reason: The code change proposal adds an additional requirement (option) to the code in that it includes a structural component interchangeability methodology that is prevalent in the side hinged exterior door (SHED) industry but is not addressed in the building codes or its current referenced standards. The addition of the AMD SHEDS (Side Hinged Exterior Door Standard), which is designed in accordance with the current industry ASTM E330 static pressure test, adds that needed structural component interchangeability option.

The current minimum code requirements for SHEDs adequately address concerns with public safety and protection of property, in that, to date, no empirical evidence or testimony has been provided to the ICC code development process proving that SHEDs are a significant failure relating to variable pressure from hurricanes force or high winds, in fact, the foremost leading post hurricane/building code experts provide no significant evidence of actual failures relating to SHEDs*. This lack of evidence supports current regulation and commonly used industry practices (component interchange) in place today. The current code is too restrictive in that it references SHED "system only" test standards and should allow for a SHEDs component interchange option similar to its allowances relating to fire rated doors.

*Bibliography

Rainwater Management Performance of Newly Constructed Residential Building Enclosures During August and September 2004 by Dr. Joe Lstiburek of the Building Science Corp., the Home Builders Association of Metro Orlando and the Florida Home Builders Association

The Benefits of Modern Wind Resistant Building Codes on Hurricane Claim Frequency and Severity-A Summary Report by Dr. Timothy Reinhold at the Institute for Business and Home Safety

Post 2004 Hurricane Field Survey-an Evaluation of the Relative Performance of the Standard Building Code and the Florida Building Code by Dr. Kurt Gurley of the University of Florida.

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

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: BURTON-RB-1-R612.8

RB128–09/10 Tables R613.3.2, R613.5(1), R613.5(2)

Proponent: Edward L. Keith, representing APA - The Engineered Wood Association

1. Revise as follows:

TABLE R613.3.2

Thickness (in.)	Product	Flatwise S (lbf-i	Stiffness ^ª n ² /ft)	Flatwise S (lbf-i	Strength [®] n/ft)	Tens (lbf	Density ^{a,c}	
		Along	Across	Along	Across	Along	Across	(pci)
7/16	Sheathing	54,700 <u>55,600</u>	27,100 <u>16,500</u>	950 <u>1,040</u>	870 <u>460</u>	6,800 <u>7,450</u>	6,500 <u>5,800</u>	35 <u>34</u>

(Footnotes remain unchanged)

2. Delete existing tables and replace as follows:

	Building Width (ft)																
Wind 3 (3-sec	Speed . gust)	peed 24			28			32			36			40			
Exp.	Exp.	Load	Wa	Wall Height (ft)		Wall Height (ft)			Wall Height (ft)			Wa	ll Heigh	t (ft)	Wall Height (ft)		
A/B C	C	(psr)	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
85		20	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		30	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		50	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		70	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		20	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
100	95	30	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
100	00	50	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		70	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	N/A
		20	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
110	100	30	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5
110	100	50	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	6.5	4.5	4.5	N/A	4.5	4.5	N/A
		70	4.5	4.5	6.5	4.5	4.5	N/A	4.5	4.5	N/A	4.5	6.5	N/A	4.5	N/A	N/A
		20	4.5	4.5	N/A	4.5	4.5	N/A	4.5	4.5	N/A	4.5	4.5	N/A	4.5	4.5	N/A
120	110	30	4.5	4.5	N/A	4.5	4.5	N/A	4.5	4.5	N/A	4.5	4.5	N/A	4.5	6.5	N/A
120	110	50	4.5	4.5	N/A	4.5	6.5	N/A	4.5	N/A	N/A	4.5	N/A	N/A	4.5	N/A	N/A
		70	4.5	N/A	N/A	4.5	N/A	N/A	4.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE R613.5(1) MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP <u>OR</u> LIGHT-FRAME ROOF ONLY (inches) (underlining omitted for clarity)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kN/m2 Deflection criteria: L/240.

Dellection criteria: L/2

Roof load: 7 psf.

Ceiling load: 5 psf.

Wind loads based on Table R301.2(2).

Strength axis of facing materials applied vertically.

N/A indicates not applicable.

TABLE R613.5(2) MINIMUM THICKNESS FOR SIP WALLS SUPPORTING SIP OR LIGHT-FRAME ONE STORY AND ROOF (inches) (underlining omitted for clarity)

	Building Width (ft)																
Wind S (3-sec.	Wind Speed (3-sec. gust) Snow		24			28		32			36			40			
Exp.	Exp.	Load (psf)	Wa	ll Heigh	t (ft)	Wal	l Heigh	t (ft)	Wa	ll Heigh	t (ft)	Wal	l Heigh	t (ft)	Wa	ll Heigh	t (ft)
A/B C	(00.)	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10	
		20	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
95		30	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
00		50	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	N/A
		70	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	N/A	4.5	N/A	N/A
		20	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.5	4.5	4.5	N/A	4.5	4.5	N/A
100	05	30	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	N/A	4.5	4.5	N/A	4.5	N/A	N/A
100	00	50	4.5	4.5	6.5	4.5	4.5	N/A	4.5	4.5	N/A	4.5	N/A	N/A	N/A	N/A	N/A
		70	4.5	4.5	N/A	4.5	6.5	N/A	4.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		20	4.5	4.5	N/A	4.5	4.5	N/A	4.5	6.5	N/A	4.5	N/A	N/A	N/A	N/A	N/A
110	100	30	4.5	4.5	N/A	4.5	4.5	N/A	4.5	N/A	N/A	4.5	N/A	N/A	N/A	N/A	N/A
110	100	50	4.5	6.5	N/A	4.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		70	4.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		20	4.5	N/A	N/A	4.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
120	110	30	4.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
120		50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Deflection criteria: L/240. Roof load: 7 psf. Ceiling load: 5 psf. Second floor live load: 30 psf. Second floor dead load: 10 psf. Second floor dead load from walls: 10 psf. Wind loads based on Table R301.2(2). Strength axis of facing materials applied vertically. N/A indicates not applicable.

Reason: The original Table R613.3.2 minimum properties for facing materials were established by the SIPs industry with a specific grade of wood structural panels. Since the adoption of these properties in the 2007 Supplement to the IRC, it has become evident that the panel properties for the wood structural panel facing materials do not reflect the facing materials commonly available in the marketplace, which typically have higher properties in the along direction and lower properties in the across direction.

As a result, the Structural Insulated Panel Association (SIPA) worked with APA – The Engineered Wood Association, a standard developer accredited by ANSI and a certification agency accredited under ISO Guide 65, to re-evaluate the performance of SIPs using the readily available facing materials. Results of this re-evaluation are documented in APA Report T2009P-28, which shows no performance difference for SIP applications covered in IRC R613 when using the new facing materials with higher properties in the along direction and lower properties in the across direction, as compared to the existing IRC. Therefore, Table R613.3.2 is suggested to be revised as proposed based on the properties benchmarked during the SIPs testing. While there were no performance issues, the assumptions used in generating Tables R613.5(1) and R613.5(2) were also reviewed by the SIPA Technical Advisory Committee, which suggested more stringent criteria by not allowing any load duration increase, including wind load, for SIPs. As a result, Tables R613.5(1) and R613.5(2) are suggested to be revised as proposed.

Copies of APA Report T2009P-28 have been provided to the committee and additional copies are available for free download at www.apawood.org.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: KEITH-RB-2-TABLES R613.3.2-R613.5(1)-R613.5(2)

RB129-09/10 R613.7

Proponent: Edward L. Keith, representing APA - The Engineered Wood Association

Revise as follows:

R613.7 Drilling and notching. The maximum vertical chase penetration in SIPs shall have a maximum side dimension of 2 inches (51 mm) centered in the panel core. Vertical chases shall have a minimum spacing of 24-inches (610 mm) on center. Maximum of two horizontal chases shall be permitted in each wall panel - one at 14 inches (360 mm) from the bottom of the panel and one at mid-height of the wall panel. The maximum allowable penetration size in a wall panel shall be circular or rectangular with a maximum dimension of 12 inches (300 mm). The minimum wall length for such a penetration shall be 20 feet (6100 mm) and only one such penetration shall be permitted in each full 20 foot (6100 mm) length of wall. Where multiple penetrations are to be located in a single wall line, they shall be placed no closer together than 20 feet (6100 mm) measured between adjacent edges of two penetrations. Overcutting of holes in facing panels shall not be permitted.

Reason: The existing R613.7 provides no limitation on the field-placement of these holes up to 12" x 12" in size. As such, the proposed language is added to clarify the limitation proposed in the original code proposal in 2006. From an engineering perspective, a hole this size will have minimal impact on the capacity of the wall system as long as the wall or the spacing between holes is sufficiently long (20 feet or longer).

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: KEITH-RB-1-R613.7

RB130–09/10 R614 (New), R614.1 (New)

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

Add new text as follows:

R614 General. This section prescribes the construction of patio cover walls.

R614.1 *Patio Cover* wall configuration. *Patio cover* walls shall be permitted to be open, or enclosed with (1) insect screening, (2) approved translucent or transparent plastic not more than 0.125 inch (3.2 mm) in thickness, (3) glass conforming to the provisions of Section R308, or (4) any combination of the foregoing.

Reason: The current Appendix "H", "Patio Covers" defines the allowable configuration of *patio cover* walls, but is not a part of the body of the code. The term *patio cover* is used in a number of places in the code, so further clarification of the requirements for the allowable wall configuration is necessary.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: WALKER-RB-7-R614

RB131–09/10 R702.2 (New), R702.2.1 (New), R702.2.2 (New), R702.2.3 (New), Chapter 44 (New)

Proponent: Michael D. Fischer, The Kellen Company, representing Kellen Technical Services

1. Add new text as follows:

R702.2 Cellulosic Insulation.

R702.2.1 Material. Cellulose insulation shall comply with the requirements of Chapter 11 of this code or the applicable provisions of the IECC. Cellulosic fiber stabilized thermal insulation shall bear a label indicating compliance with ASTM C1497. Cellulosic Fiber loose-fill thermal insulation shall bear a label indicating compliance with ASTM C739.

R702.2.2 Installation. Cellulosic fiber stabilized thermal insulation shall be installed in accordance with manufacturers installation instructions. Cellulosic Fiber loose-fill thermal insulation shall be installed in accordance with ASTM C1015 and manufacturers installation instructions.

R702.2.3 Drying time. Cellulosic fiber stabilized thermal insulation installed in wall cavities shall remain exposed for a minimum of 24 hours after application, and shall not be covered until the moisture level of the insulation material is 25% or less. The insulation installer shall record moisture measurements on the permanent certificate. The measurements shall include the date and time of installation, date and time of moisture content measurement, and recorded moisture content level. Moisture readings shall be taken from exterior walls in a minimum of three rooms.

2. Add new standards to Chapter 44 as follows:

ASTM

C739-08	Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation
C1015-06	Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation
<u>C1497-04</u>	Standard Specification for Cellulosic Fiber Stabilized Thermal Insulation

Reason: The move towards more sustainable building practices has created opportunity for innovative products with environmentally-favorable attributes including recycled content. In the case of cellulose insulation, which has gained market share, many of the questions related to fire performance, defective or "settled" R-Value have been addressed in the IECC requirements.

This proposal sets minimum standards for product and installation in accordance with consensus ASTM standards as well as individual manufacturers' instructions. The proposal requires that cellulose insulation products be labeled to ensure that appropriate third-party oversight and quality control measures help to ensure that these systems will perform as intended.

The proposal also includes a requirement that addresses the issue of moisture content. Recommendations from individual manufacturers insist upon adequate drying time to ensure proper performance as well as to inhibit mold growth and other undesirable effects of excessive moisture in the wall cavity. **Cost Impact:** The code change proposal will not increase the cost of construction.

Analysis: A review of the standards proposed for inclusion in the code, ASTM C 739, C 1015 and C 1497, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: FISCHER-RB-7-R702.2-CH 44

RB132–09/10 R702.2.1, R702.3.1, Chapter 44 (New)

Proponent: Michael Gardner, representing the Gypsum Association

1. Revise as follows:

R702.2.1 Gypsum plaster. Gypsum plaster materials shall conform to ASTM C 5, <u>C 22</u>, C 28, C 35, C 37, C 59, C 61, C 587, C588, C631, C847, C933, C1032 andC1047, and shall be installed or applied in conformance with ASTM C 843 and C844. Plaster shall not be less than three coats when applied over metal lath and not less than two coats when applied over other bases permitted by this section, except that veneer plaster may be applied in one coat not to exceed 3/16 inch (4.76 mm) thickness, provided the total thickness is in accordance with Table R702.1(1).

R702.3.1 Materials. All gypsum board materials and accessories shall conform to ASTM <u>C 22</u>, C 36, C 79, C 475, C 514, C 630, C 931, C 960, C 1002, C 1047, C 1177, C 1178, C 1278, C 1395, C 1396 or C 1658 and shall be installed in accordance with the provisions of this section. Adhesives for the installation of gypsum board shall conform to ASTM C 557.

2. Add new standard to Chapter 44 as follows:

ASTM

<u>C 22/C 22M-00 (2005)e01</u> Specification for Gypsum

Reason: The IBC contains a reference to ASTM C22, Specification for Gypsum; however, the same reference has never been incorporated into the IRC. This proposal is intended to correct that oversight.

ASTM C 22 defines the basic parameters for the gypsum used to manufacture gypsum board and gypsum plaster.

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

Analysis: The proposed new standard, ASTM C 22, is currently referenced in the International Building Code.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: GARDNER-RB-1-R702.2-R702.3-CH 44

RB133-09/10 R702.4.2

Proponent: Barry Reid, Georgia-Pacific, representing Georgia Pacific Gypsum LLC

Revise as follows:

R702.4.2 Fiber-cement, fiber-mat reinforced cement, glass mat gypsum backers and fiber-reinforced gypsum backers. Fiber-cement, fiber-mat reinforced cement, glass mat gypsum backers, glass mat water-resistant gypsum panels, or fiber-reinforced gypsum backers in compliance with ASTM C 1288, C 1325, C 1178, <u>C 1658</u> or C 1278, respectively, and installed in accordance with manufacturers' recommendations shall be used as backers for wall tile in tub and shower areas and wall panels in shower areas.

Reason: The purpose of this proposal is to add an ASTM material standard for current provisions of the IRC. The revision to section R702.4.2 provides another option of materials standards appropriate for use as a backer for wall tile in tub and shower areas and wall panels in shower areas. The current code provisions exclude ASTM C 1396 and ASTM C 630, product standards recognized in the industry as paper-faced gypsum wallboard and paper –faced water resistant gypsum backing board. Within ASTM C 1658 Section 7.1 is material manufactured for use as a glass mat water resistant gypsum panel.

A comparison of ASTM Standard Specifications for C 1658, glass mat water-resistant gypsum panel, and C1278, fiber-reinforced gypsum backers products reveals that C 1658, Section 7, product physical properties, for use as a water resistant gypsum backer board, are the same as C 1278 for all physical properties including water resistance and surface water absorption which is in the IRC. The inclusion of ASTM C 1658 will benefit the consumer by offering more choices without compromising the performance of the tile assembly

Referenced Standards (3.4 & 3.6):

ASTM Standard Specification C 1658

ASTM C 1658

1.1.3 Glass mat water resistant gypsum panel

7. Physical Properties of Glass Mat Water- Resistant Gypsum Panel

ASTM C 1278 6.1 Physical Properties of Water-Resistant Fiber-Reinforced Gypsum Backing Panels

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

Public Hearing: Committee:	AS ASE	AM AME	D DF	
Accentory.	7.01	7 (10)	DI	ICCEII ENAME: REID-RB-1-R702.4.2

RB134–09/10 R202 (New), R703.1, R703.1.1, R703.2, Table R703.4, R703.6.2.1, R703.6.3, R703.8

Proponent: Joseph Lstiburek, Building Science Corporation

1. Add new definition as follows:

WALL ENCLOSURE. A system or assembly of exterior wall components, including the exterior wall finish materials and the water-resistive barrier, that provides environmental separation between the conditioned space and the exterior environment. Exterior wall components, including the exterior wall covering and the water-resistive barrier, provide protection of the building structural members, including framing and sheathing materials, from the detrimental effects of the exterior environment.

2. Revise as follows:

R703.1 General. Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing as described in Section R703.8. The wall enclosure shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a water-resistive barrier behind the exterior veneer as required in section R703.2 and a means for draining water that enters the assembly to the exterior. The wall enclosure shall include flashing as described in Section R703.8. Protection against condensation in the exterior wall assembly shall be provided in accordance with Section R601.3.

R703.1.1 Water resistance. The exterior wall envelope shall be designed and constructed in a manner that prevents the accumulation of water within the wall assembly by providing a water-resistant barrier behind the exterior veneer as required by Section R703.2 and a means of draining to the exterior water that enters the assembly. Protection against condensation in the exterior wall assembly shall be provided in accordance with Section R601.3 of this code.

Exceptions:

- 1. A weather-resistant exterior wall envelope shall not be required over Concrete or and masonry walls designed in accordance with Chapter 6 and flashed according to Section R703.7 or R703.8.
- 2. Compliance with the requirements for a means of drainage, and the requirements of Section R703.2 and Section R703.8, shall not be required for <u>a wall enclosure</u> an exterior wall envelope that has been demonstrated <u>through testing</u> to resist wind-driven rain through testing of the exterior wall envelope, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTME 331 under the following conditions:
 - 2.1. Exterior wall envelope <u>Wall enclosure</u> test assemblies shall include at least one opening, one control joint, one wall/eave interface and one wall sill. All tested openings and penetrations shall be representative of the intended end-use configuration.
 - 2.2. Exterior wall envelope Wall enclosure test assemblies shall be at least 4 feet (1219 mm) by 8 feet (2438 mm) in size.

- 2.3. Exterior wall assemblies <u>Wall enclosure test assemblies</u> shall be tested at a minimum differential pressure of 6.24 pounds per square foot (299 Pa).
- 2.4. Exterior wall envelope Wall enclosure test assemblies shall be subjected to the minimum test exposure for a minimum of 2 hours.

The exterior wall envelope wall enclosure design shall be considered to resist wind-driven rain where the results of testing indicate that water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings penetration or intersections of terminations with dissimilar materials.

<u>R703.1.1</u> R703.2 Water-resistive barrier. One layer of No. 15 asphalt felt, free from holes and breaks, complying with ASTM D 226 for Type 1 felt or other approved water-resistive barrier shall be applied over studs or sheathing of all exterior walls. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm). The felt or other approved material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope enclosure as described in Section R703.1.

Exception: Omission of the water-resistive barrier is permitted in the following situations:

- 1. In detached accessory buildings.
- 2. Under exterior wall finish materials as permitted in Table R703.4.
- 3. Under paperbacked stucco lath when the paper backing is an approved water-resistive barrier.

TABLE R703.4 WEATHER-RESISTANT SIDING WALL COVERING ATTACHMENT AND MINIMUM THICKNESS

(No change to table or footnotes)

R703.6.2.1 Weep screeds. A minimum 0.019-inch (0.5 mm) (No. 26 galvanized sheet gage), corrosion-resistant weep screed or plastic weep screed, with a minimum vertical attachment flange of 31/2 inches (89 mm) shall be provided at or below the foundation plate line on exterior stud walls in accordance with ASTM C 926. The weep screed shall be placed a minimum of 4 inches (102 mm) above the earth or 2 inches (51 mm) above paved areas and shall be of a type that will allow trapped water to drain to the exterior of the building. The weather water-resistant barrier shall lap the attachment flange. The exterior lath shall cover and terminate on the attachment flange of the weep screed.

R703.6.3 Water-<u>resistant</u> resistive barriers. Water- <u>resistant</u> resistive barriers shall be installed as required in Section R703.2 and, where applied over wood-based sheathing, shall include a water-<u>resistant</u> resistive vapor-permeable barrier with a performance at least equivalent to two layers of Grade D paper.

Exception: Where the water-<u>resistant</u> resistive barrier that is applied over wood-based sheathing has a water resistance equal to or greater than that of 60 minute Grade D paper and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or designed drainage space.

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

- 1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistant resistive barrier for subsequent drainage.
- 2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
- 3. Under and at the ends of masonry, wood or metal copings and sills.
- 4. Continuously above all projecting wood trim.
- 5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
- 6. At wall and roof intersections.
- 7. At built-in gutters.

Reason: The current language of the building code is inconsistent with terms in the engineering, scientific, technical, educational, building science and "common use" communities. In fact terms and language within the code itself are inconsistently used. "Codespeak" makes it difficult to communicate appropriate requirements and concepts. The I-Codes are likely the most effective educational documents used in the construction industry. It behooves us to use the language in them correctly. If you don't call "things" by their proper names how can you expect users of the

documents to execute the actions correctly. The changes proposed in this code change do not change the intent of any of the sections nor do they change any specific requirement they only fix bad terms and language and bad physics. Note that the current IRC does not define exterior wall envelope. The order of two sections are flipped by renumbering. Furthermore, these changes provide consistency to the terms used in this Chapter. Throughout the chapter "water-resistant barrier" is used. In these sections "water-resistive" is used. This change provides consistence. Additionally, vapor permeable is not defined anywhere in the IRC. Vapor permeable membrane is defined but not used. In any event, vapor-permeable is not necessary in the language of R703.6.3 due to the equivalency requirement to Grade D paper.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: LSTIBUREK-RB-4-R202-R703.1

RB135-09/10 Table R703.4

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

Revise table as follows:

				TYPE OF	SUPPORTS FOR	THE SIDING	MATERIAL A	AND FASTEN	ERS ^{b,c,d}
SIDING MATERIAL	Nominal Thickness ^a (inches)	Joint Treatment	Water- Resistive Barrier Required	Wood or wood Structural Panel Sheathing <u>INTO STUD</u>	FIBERBOARD SHEATHING INTO STUD	GYPSUM SHEATHING INTO STUD	FOAM PLASTIC SHEATHING INTO STUD	DIRECT TO STUDS	NUMBER OR SPACING OF FASTENERS

TABLE R703.4 WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

(Portions of table not shown remain unchanged)

a. through c. (No change)

- d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs where for fiberboard, or gypsum, or foam plastic sheathing backing is used. Where wood or wood structural panel sheathing is used, nails shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with the siding manufacturer's installation instructions.
- e. through z. (No change)

Reason: For many cases with siding attached over wood or wood structural panel sheathing, insufficient fastener penetration is provided if siding nails required by Table R703.4 are driven only into the sheathing. Only in cases where specific fastening instructions are provided for use of sheathing as a nail base should such a practice be permitted. In general, this will require a closer fastener spacing than currently required in Table R703.4 to account for the reduced withdrawal resistance of the siding nails installed in sheathing only (which may be no thicker than 3/8"). The change to the column heading for 'wood or wood structural panel sheathing' and footnote 'd' in Table R703.4 is needed to address this issue and avoid a common source of confusion resulting in potentially inadequate siding installations.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: CRANDELL-RB-4-T. R703.4

RB136-09/10 R703.5.1

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

Revise as follows:

R703.5.1 Application. Wood shakes or shingles shall be applied either single-course or double-course over nominal 1/2-inch (13 mm) wood-based sheathing or to furring strips over nominal 1/2-inch (13 mm) nonwood sheathing. A permeable water-resistive barrier shall be provided in accordance with Section R703.2 over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51mm) and vertical overlaps of not less than 6 inches (152 mm). Where furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25

mm by 102 mm), <u>shall be preservative treated or naturally durable wood in accordance with Section R317</u>, and shall be fastened horizontally to the studs with 7d or 8d box nails <u>with corrosion resistance in accordance with Section R317</u>. and <u>Furring strips</u> shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.5.2. The spacing between adjacent shingles to allow for expansion shall not exceed 1/4 inch (6 mm), and between adjacent shakes, it shall not exceed 1/2 inch (13 mm). The offset spacing between joints in adjacent courses shall be a minimum of 11/2 inches (38 mm).

Reason: This proposal references the water resistive barrier requirements in Section R703.2 and thus allows redundant WRB requirements to be deleted from this section which addresses wood shakes and shingles. In addition, language is added to require furring strips to be preservative treated or naturally decay resistant, including complimentary requirements for corrosion-resistant fasteners in treated furring strips. When placed in a horizontal direction as required for wood shakes and shingles, wood furring strips create a water stop behind the siding and it would be especially important to require greater moisture durability of the furring strips and their attachments. This change proposal is intended to compliment and be consistent with separate proposals addressing installation of various sidings over foam sheathing, including the use of furring strips with wood shakes and shingles.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: CRANDELL-RB-5-R703.5.1

RB137-09/10

R703.7

Proponent: Kimdolyn Boone, representing DuPont Building Innovations

Revise as follows:

R703.7 Stone and masonry veneer, general. Stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4, and Figure R703.7, Section R703.6.3 and Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS-402. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first *story* above-grade and shall not exceed 5 inches (127 mm) in thickness. See Section R602.12 for wall bracing requirements for masonry veneer for wood framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for cold-formed steel construction.

Exceptions:

- 1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
- 2. For detached one- or two-family *dwellings* in Seismic Design Categories D0, D1 and D2, exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.

Reason: Clarification of current requirement of the code. The requirements are currently listed in the Table 703.4 and footnotes. Adding the reference to the text makes both the table & text agree.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: BOONE-RB-1-R703.7

RB138-09/10 Figure R703.7, R703.7.4.3

Proponent: Charles Clark, Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:



For SI: 1 inch = 25.4 mm.

FIGURE R703.7 MASONRY VENEER WALL DETAILS (continued)


a. See Sections R703.7.5, R703.7.6 and R703.8.b. See Sections R703.2 and R703.7.4.

MASONRY VENEER -

┢

c. See Sections R703.7.4.2 and R703.7.4.3.

d. See Section R703.7.3.

For SI: 1 inch = 25.4 mm.

FIGURE R703.7 – continued MASONRY VENEER WALL DETAILS

R703.7.4. 3 Mortar or Grout fill. As an alternate to the air space required by Section R703.7.4.2, mortar or grout shall be permitted to fill the air space. When the air space is filled with mortar grout, a water-resistive barrier is required over studs or sheathing. When filling the air space, replacing the sheathing and water-resistive barrier with a wire mesh and *approved* water-resistive barrier or an *approved* water-resistive barrier-backed reinforcement attached directly to the studs is permitted.

Reason: This code change is a follow-up to RB189-07/08 which was approved during the previous code cycle to remove from TABLE R703.4 WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS the footnote allowing an air space to be filled with mortar or grout.

An anchored masonry veneer wall is designed and intended to incorporate an air space behind the wall to allow water that penetrates the masonry veneer to drain down the air space and then through flashing and weep holes at the bottom to get the water out of the wall. The Brick Industry Association has never recommended the practice of slushing the air space behind a single wythe of brick veneer with mortar. This is because doing so results in the following:

- Restricts water flow Allowing mortar to intentionally be "slushed" or flung into the air space from the mason's trowel as the veneer is constructed constricts the flow of water down the back of the veneer. A single layer or wythe of masonry veneer is not designed or intended to act as a water-resistive barrier. It needs to have a functioning air space which serves to drain the water from wind-driven rain to the outside of the wall.
- Creates pockets that hold water Invariably, pockets of air within the slushed mortared space, as shown in the attached photograph, allow a place for water to linger within the wall and significantly increase the possibility that it will make its way into the typically wood or cold-formed steel backing substrate wall behind it.
- 3. **Prohibits air flow** This mortar inhibits air flow through the air space and increases the amount of time necessary for moisture to evaporate from the masonry and other components of the wall.



Continuing to allow mortar to be slushed into the air space behind anchored masonry veneer only invites water to linger in a wall and potentially cause problems. While a low slump grout can provide a uniform barrier to water, mortar slushed in an air space cannot provide equivalent protection and should not be allowed. It is time we removed this provision from the code.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCEII ENAME: CLARK-RB-6-F_R703 7-R703 7 4 3

RB139–09/10 R703.7.3.2, Table R703.7.3.2 (New)

Proponent: Charles Clark, Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS)

1. Revise as follows:

R703.7.3.2 The allowable span shall not exceed 18 feet 3 inches (5562 mm) and shall be constructed to comply with Figure R703.7.3.2 and the following:

- 1. Provide a minimum length of 18 inches (457 mm) of masonry veneer on each side of opening as shown in Figure R703.7.3.2.
- 2. Provide a minimum 5 inch by 31/2 inch by 5/16 inch (127 mm by 89 mm by 7.9 mm) steel angle above the opening and shore for a minimum of 7 days after installation.
- 3. Provide double-wire joint reinforcement extending 12 inches (305 mm) beyond each side of the opening. Lap splices of joint reinforcement a minimum of 12 inches (305 mm). Comply with one of the following:
 - 3.1. Double-wire joint reinforcement shall be 3/16 inch (4.8 mm) diameter and shall be placed in the first two bed joints above the opening.
 - 3.2. Double-wire joint reinforcement shall be 9 gauge (0.144 inch or 3.66 mm diameter) and shall be placed in the first three bed joints above the opening.
- 4. Provide the height of masonry veneer above opening per Table R703.7.3.2.

TABLE R703.7.3.2 HEIGHT OF MASONRY VENEER ABOVE OPENING

MINIMUM HEIGHT OF MASONRY VENEER ABOVE OPENING (IN)	MAXIMUM HEIGHT OF MASONRY VENEER ABOVE OPENING (FT)
13	< 5
24	5 TO < 12
60	12 TO HEIGHT ABOVE SUPPORT ALLOWED BY SECTION R703.7
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm	

Reason: This code change is a follow-up to RB196-07/08 which was approved during the previous code cycle. This table refers to Figure R703.7.3.2 and indicates the minimum and maximum height of masonry veneer allowed over the opening. These are shown on Figure R703.7.3.2 at the edge of the opening and at the center of the opening respectively.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCEILENAME CLARK-RB-2-R703 7 3 2-T R703 7 3 2

RB140–09/10 R703.7.4, R703.7.4.2, R703.7.4.3, Table R703.7.4 (New)

Proponent: Charles Clark, Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS)

1. Revise as follows:

R703.7.4 Anchorage. Masonry veneer shall be anchored to the supporting wall with corrosion-resistant metal ties embedded in mortar or grout and extending into the veneer a minimum of 11/2 inches (38 mm), with not less than 5/8 inch (15.9 mm) mortar or grout cover to outside face. <u>Masonry veneer shall conform to Table R703.7.4.</u> Where veneer is anchored to wood backings by corrugated sheet metal ties, the distance separating the veneer from the sheathing material shall be a maximum of a nominal 1 inch (25 mm). Where the veneer is anchored to wood backings using metal strand wire ties, the distance separating the veneer from the sheathing material shall be a maximum of 41/2 inches (114 mm). Where the veneer is anchored to cold-formed steel backings, adjustable metal strand wire ties shall be used. Where veneer is anchored to cold-formed steel backings, the distance separating the veneer from the sheathing material shall be a maximum of 41/2 inches (114 mm).

2. Delete without substitution:

R703.7.4.2 Air space. The veneer shall be separated from the sheathing by an air space of a minimum of a nominal 1 inch (25 mm) but not more than 41/2 inches (114 mm).

3. Revise as follows:

R703.7.4. 3 Mortar or grout fill. As an alternate to the air space required by Section R703.7.4.2 Table R703.7.4, mortar or grout shall be permitted to fill the air space .When the air space is filled with mortar, a water-resistive barrier is required over studs or sheathing. When filling the air space, replacing the sheathing and water-resistive barrier with a wire mesh and *approved* water-resistive barrier or an *approved* water-resistive barrier-backed reinforcement attached directly to the studs is permitted.

TABLE R703.7.4 TIE ATTACHMENT AND AIR SPACE REQUIREMENTS

BACKING AND TIE	MINIMUM TIE	MINIMUM TIE FASTENER ^A	MINIMUM AIR SPACE	MAXIMUM AIR SPACE
<u>Wood Backing with</u> <u>Corrugated Sheet</u> <u>Metal</u>	<u>22 U.S. gage (0.0299 in.)</u> <u>x 7/8 in. wide</u>	8d common nail ^b	Nominal 1 in. between sheathing and veneer	<u>Nominal 1 in.</u> <u>between</u> <u>sheathing and</u> <u>veneer</u>
Wood Backing with Metal Strand Wire	<u>W1.7 (No. 9 U.S. gage;</u> <u>0.148 in.) with hook</u> embedded in mortar joint	8d common nail ^b	Nominal 1 in. between sheathing and veneer	<u>4½ in. between</u> <u>backing and</u> <u>veneer</u>
Cold-Formed Steel Backing with Adjustable Metal Strand Wire	W1.7 (No. 9 U.S. gage; 0.148 in.) with hook embedded in mortar joint	No. 10 screw	Nominal 1 in. between sheathing and veneer	4½ in. between backing and veneer

For SI: 1 inch = 25.4 mm.

- a. In Seismic Design Category D₀, D₁ or D₂, the minimum tie fastener shall be an 8d ring-shank nail or a No. 10 screw, 2 ½ inches long.
- b. All fasteners shall have rust inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion.

Reason: This code change adds a table to the anchored masonry veneer provisions that accomplishes the following:

- 1) Makes the code easier to use by having minimum requirements for tie and tie fastener in a tabular form. The table also includes minimum and maximum air space requirements.
- 2) Footnote a) adds a requirement that a ring-shank nail is to be used when the veneer is constructed in a Seismic Design Category D₀, D₁ or D₂. Recent full-scale building shaking-table testing conducted at the University of California San Diego found that "fasteners on one side of the specimen failed by extraction of nails under dynamic tensile loads, at levels of shaking less than the Design Basis Earthquake (DBE). This behavior is not consistent with performance objectives for veneer. Current IRC requirements for the attachment of connectors to wood-stud backing need improvement in Seismic Design Category D₀ and above. (See references in Bibliography below)
- 3) Footnote b) requires that the fasteners be able to resist corrosion. This text is very similar to existing text in Section R603.2.4 on fastening requirements.

Bibliography:

- Klingner, Richard E., Shing, P. Benson, McGinley, Mark W., McLean, David I., Okail, Hussein, and Jo, Seongwoo, "NSF NEES Small-Group Project on Performance-based Design of Masonry and Masonry Veneer: Overview and Preliminary Results," *TMS Journal*, The Masonry Society, Boulder, Colorado, December 2008 (date submitted for publication).
- 2. Klingner, Richard E., "Behavior of Anchored Masonry Veneer with Light Wood Stud-Framing or Masonry Backing in Full-Scale Whole-Building Shaking-Table Tests," *TMS Journal*, The Masonry Society, Boulder, Colorado, June 2009 (date submitted for publication).

Cost Impact: The code change proposal may slightly increase the cost of anchored masonry veneer construction in Seismic Design Categories D_0 , D_1 and D_2 .

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: CLARK-RB-4-R703.7.4

RB141-09/10 R703.7.4.1

Proponent: Charles Clark, Brick Industry Association, representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

R703.7.4.1 Size and spacing. Veneer ties, if strand wire, shall not be less in thickness than No. 9 U.S. gage [(0.148 in.) (4 mm)] wire and shall have a hook embedded in the mortar joint, or if sheet metal, shall be not less than No. 22 U.S. gage by [(0.0299 in.)(0.76 mm)] 7/8 inch (22 mm) corrugated. Each tie shall support not more than 2.67 square feet (0.25 m²) of wall area and shall be spaced not more than 24 inches (610 mm) 32 inches (813 mm) on center horizontally and 24 inches (635 mm) on center vertically and shall support not more than 2.67 square feet (0.25 m²) of wall area.

Exception: In Seismic Design Category D_0 , D_1 or D_2 or townhouses in Seismic Design Category C or in wind areas of more than 30 pounds per square foot pressure (1.44 kPa), each tie shall support not more than 2 square feet (0.2 m2) of wall area.

Reason: This code change accomplishes the following:

- Moves the unmodified text indicating the maximum wall area that can be supported by a tie ahead of the tie spacing requirements. This provides
 more clarity since the tie spacing used on a specific project may be established by dividing the maximum wall area by either the maximum
 horizontal or vertical spacing requirement which follows next.
- 2) Changes the tie spacing requirements to match those found in the anchored masonry veneer provisions of the Building Code Requirements and Specification for Masonry Structures (TMS 402/ACI 530/ASCE 5). This document is a consensus standard overseen by three organizations and written under an ANSI-accredited, balanced process to ensure their objectivity. The maximum spacing requirements for ties established within this document have been corroborated through this consensus body.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: CLARK-RB-3-R703.7.4.1

RB142-09/10

R703.7.4.1

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

Revise as follows:

R703.7.4.1 Size and spacing. Veneer ties, if strand wire, shall not be less in thickness than No. 9 U.S. gage [(0.148 in.) (4 mm)] wire and shall have a hook embedded in the mortar joint, or if sheet metal, shall be not less than No. 22 U.S. gage by [(0.0299 in.)(0.76 mm)] 7/8 inch (22 mm) corrugated. Each tie shall be spaced not more than 24 inches (610 mm) on center horizontally and vertically and shall support not more than 2.67 square feet (0.25 m2) of wall area. The tie shall be fastened to wall framing using a minimum 10d common nail in each tie or an approved fastener in accordance with the tie manufacturer's installation instructions.

Exception: In Seismic Design Category D_0 , D_1 or D_2 or townhouses in Seismic Design Category C or in wind areas of more than 30 pounds per square foot pressure (1.44 kPa), each tie shall support not more than 2 square feet (0.2 m²) of wall area.

Reason: The code is currently silent in regard to the required fastener size for installation of veneer ties to wood wall framing. The proposed 10d common nail should provide a minimum 2-1/2" penetration into framing when applied over a typical ½" thick sheathing. This attachment will provide adequate withdrawal resistance to address the IRC scope of wind speeds (up to 110 mph, Exposure D). While past industry practice has permitted an 8d common nail, the proposed 10d common nail better addresses the scope of the IRC, including the exception statement regarding tie spacing in higher wind and seismic conditions. This proposal is a needed improvement to address an omission in the current code and to be consistent with separate proposals addressing appropriate siding connections over foam sheathing, including masonry and stone veneer.

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

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

ICCFILENAME: CRANDELL-RB-2-R703.7.4.1

RB143-09/10 R703.7.7 (New)

Proponent: Tim A. Fleming, Code Solutions, Inc.

Add new text as follows:

R703.7.7 Corner movement flashing. Corner movement flashing shall be located beneath the first course of masonry and the concrete foundation at each outside corner to prevent adhesion of the masonry veneer to the foundation. Corner movement flashing shall be of rigid noncorrosive material 1/16" or 16 gauge in thickness and extend a minimum of 16" along each wall surface from the outside corner. Corner movement flashing shall be installed in addition to the flashing required in sections R703.5 and R703.8.

Reason: The purpose of this code change is to prevent foundation failures due to reduced coverage or exposed concrete reinforcement or exposed post tensioning cable ends. The proposed additional language is necessary because the current wording of the code is intended to only prevent water infiltration and does not specifically address differential movement of the masonry veneer and the foundation. Masonry walls expand and contract at a different rate than concrete foundations buried into the ground. The thin plastic flashing required by section R703.7.5 used for water protection is normally omitted at the outside corners. This thin flashing cannot prohibit adhesion when the foundation has an irregular surface. Without a rigid piece of flashing the first mortar bed joint adheres to the exposed or irregular surface of the foundation. When the masonry expands it does so at a greater rate than the concrete foundation. The masonry that is adhered to the corner of the foundation then breaks the corner of the foundation off, many times exposing reinforcement or post tension cable ends to the environment.

Below are some photographs of this condition commonly referred to as "corner pops"





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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: FLEMING-RB-1-R703.7.7

RB144-09/10 R202 (New), R703.8, Chapter 44 (New)

Proponent: Jeff Lowinski, representing the Window and Door Manufacturers Association (WDMA)

1. Add new definition as follows:

PAN FLASHING. Corrosion-resistant flashing at the base of an opening that is integrated into the building exterior wall to direct water to the exterior and is pre-manufactured, fabricated, formed or applied at the job site.

2. Revise as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

- 1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. <u>Flashing at exterior window</u> and door openings shall be installed in accordance with one or more of the following:
 - 1.1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at

the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall also incorporate flashing or protection at the head and sides.

- 1.2. In accordance with the flashing design or method of a registered design professional.
- 1.3. In accordance with other approved methods.
- <u>1.4.</u> In accordance with ASTM E 2112.
- 2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
- 3. Under and at the ends of masonry, wood or metal copings and sills.
- 4. Continuously above all projecting wood trim.
- 5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
- 6. At wall and roof intersections.
- 7. At built-in gutters.

3. Add new standard to Chapter 44 as follows:

ASTM

<u>E 2112-07</u> Standard Practice for Installation of Exterior Windows, Doors, and Skylights

Reason: The purpose of this proposal is to leverage the proposed revisions to the window and door flashing requirements of a separate WDMA proposal and add the mandatory option of flashing windows and doors to ASTM E2112. This proposal introduces a new reference standard to the IRC, ASTM E2112. As with the previous proposal, this proposal identifies alternate flashing methods for windows and doors that complement the requirements of Section R703.8 and includes mandatory options for window and door flashing depending on the conditions of the project.

WDMA supports installing and flashing windows and doors to ASTM E2112 as one mandatory option for window and door installation and flashing, as presented in this code proposal.

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

Analysis: A review of the standard proposed for inclusion in the code, ASTM E 2112, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

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

ICCFILENAME: LOWINSKI-RB-6-R202-R703.8

RB145-09/10 R202 (New), R703.8

Proponent: Jeff Lowinski, representing the Window and Door Manufacturers Association (WDMA)

1. Add new definition as follows:

PAN FLASHING. Corrosion-resistant flashing at the base of an opening that is integrated into the building exterior wall to direct water to the exterior and is pre-manufactured, fabricated, formed or applied at the job site.

2. Revise as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

- 1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. <u>Flashing at exterior window</u> and door openings shall be installed in accordance with one or more of the following:
 - 1.1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage. Openings using pan flashing shall also incorporate flashing or protection at the head and sides.

- 1.2. In accordance with the flashing design or method of a registered design professional.
- 1.3. In accordance with other approved methods.
- 2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
- 3. Under and at the ends of masonry, wood or metal copings and sills.
- 4. Continuously above all projecting wood trim.
- 5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
- 6. At wall and roof intersections.
- 7. At built-in gutters.

Reason: This proposal identifies alternate flashing methods for windows and doors that complement the requirements of Section R703.8 and includes mandatory options for window and door flashing depending on the conditions of the project.

Window and door manufactures are required, by Section R613.1, to provide installation instructions for each window and door. Most window and door manufacturers require installation per their instructions and many window and door manufacturers are incorporate a pan flashing in their window and door installation instructions. Window and door manufacturers create installation and flashing instructions for a wide variety of wall conditions but are unable to create installation instructions for every conceivable wall condition. The 2nd and 3rd flashing methods identified in this proposal allows necessary flexibility while retaining the performance requirements of Section R703.8.

This proposal also introduces a definition of pan flashing into the code.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCFILENAME: LOWINSKI-RB-5-R703.8

RB146-09/10 R703.8

Proponent: Mike Rice, Maplewood, MN, representing the Association of Minnesota Building Officials

Revise as follows:

R703.8 Flashing. *Approved* corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. *Approved* corrosion-resistant flashings shall be installed at all of the following locations:

- 1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage.
- 2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
- 3. Under and at the ends of masonry, wood or metal copings and sills.
- 4. Continuously above all projecting wood trim.
- 5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
- At wall and roof intersections. <u>Kick out flashing shall be installed where the lower portion of a sloped roof stops</u> within the plane of an intersecting wall cladding in such a manner as to divert or kick out water away from the assembly.
- 7. At built-in gutters.

Reason: This change would complement the current code addressing wall and roof intersections and further prevent water from entering the wall cavity or penetrating to the structural building components. Step flashing at wall and roof intersections is incomplete without the kick out flashing, where the lower portion of a sloped roof stops within the plane of an intersecting wall. The water must be diverted away or it will find a way behind the water-resistive barrier and the siding or, in some cases, it will go through the siding. The benefit of adding the kick out flashing would far exceed the cost, as the cost would be little.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: RICE-RB-2-R703.8

RB147–09/10 Table R703.4, R703.11.2, R703.11.2.1, R703.11.2.2, R703.11.2.3, Table R703.11 (New)

Proponent: Dennis Pitts, American Forest & Paper Association

1. Revise as follows:

				TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS b,c,d							
SIDING MATERIAL	Nominal Thickness ^a (inches)	Joint Treatment	WATER- RESISTIVE BARRIER REQUIRED	WOOD OR WOOD STRUCTURAL PANEL SHEATHING	FIBERBOARD SHEATHING INTO STUD	GYPSUM SHEATHING INTO STUD	FOAM PLASTIC SHEATHIN G INTO STUD	DIRECT TO STUDS	NUMBER OR SPACING OF FASTENERS		
VINYL SIDING ¹	0.035	Lap	Yes	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN ^{Y,Z}	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN ^Y	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN ⁹	0.120 NAIL (SHANK) WITHA 0.313 HEAD PER SEE SECTION R703.11. 2	NOT ALLOWED	16 INCHES ON CENTER OR AS SPECIFIED BY THE MANUFACTU RER INSTRUCTIO NS OR TEST REPORT		

TABLE R703.4 WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

(Portions of table and footnotes not shown remain unchanged)

2. Delete and substitute as follows:

R703.11.2 Foam plastic sheathing. Vinyl siding used with foam plastic sheathing shall be installed in accordance with Section R703.11.2.1, R703.11.2.2, or R703.11.2.3.

Exception: Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other *approved* backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Section R703.11.1.

R703.11.2 Backing material. Vinyl siding certified per D 3679 is rated for use where the vinyl siding is directly applied over wood structural panels, structural fiberboard, exterior gypsum sheathing, or other approved backing material capable of independently resisting the design suction wind loads in Table R703.11, Case 1. For vinyl siding over foam plastic sheathing or other backing material not approved to independently resist the design wind loads, the vinyl siding must be rated for the design suction wind loads in Table R703.11, Case 2 or 3.

3. Delete without substitution:

R703.11.2.1 Basic wind speed not exceeding 90 miles per hour and Exposure Category B. Where the basic wind speed does not exceed 90 miles per hour (40 m/s), the Exposure Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 11/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C578, 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C1289, or 1-inch-thick (25 mm)(nominal) expanded polystyrene perASTMC578.

R703.11.2.2 Basic wind speed exceeding 90 miles per hour or Exposure Categories C and D. Where the basic wind speed exceeds 90 miles per hour (40 m/s) or the Exposure Category is C or D, or all conditions of Section R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in

Tables R301.2(2) adjusted for height and exposure using Table R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

- 1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.
- For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.

R703.11.2.3 Manufacturer specification. Where the vinyl siding manufacturer's product specifications provide an *approved* design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.

4. Add new table as follows:

<u>TABLE R703.11</u> <u>REQUIRED NEGATIVE (SUCTION) WIND LOAD RATINGS (psf) FOR</u> <u>VINYL SIDING CERTIFIED PER ASTM D 3679^{a,b}</u>

		Wind	<u>3 second g</u>	<u>ust)</u>			
<u>Case</u>	Backing Material	Exposure	<u>85</u>	<u>90</u>	<u>100</u>	<u>105</u>	<u>110</u>
	Exterior Side: Wood structural panels, structural		<u>17.4 °</u>	<u>19.5 °</u>	<u>24.1 ^c</u>	<u>26.6 ^c</u>	<u>29.1 °</u>
<u>1</u>	1 approved backing capable of independently resisting the design wind load. Infill materials are permitted between the vinyl siding and the backing material if the minimum fastener penetration is maintained.	<u>C</u>	<u>24.4</u> ^c	<u>27.3 °</u>	<u>33.7</u>	<u>37.2</u>	<u>40.7</u>
		<u>D</u>	<u>28.9 °</u>	<u>32.4</u>	<u>40.0</u>	<u>44.2</u>	<u>48.3</u>
	Exterior Side: Foam plastic sheathing or other	B	<u>45.1</u>	<u>50.6</u>	<u>62.5</u>	<u>69.0</u>	<u>75.4</u>
2 <u>backing material not approved to independent</u> resist the design wind loads. Interior Side: Gypsum wallboard or equivalent interior side of wall.	backing material not approved to independently resist the design wind loads. Interior Side: Gypsum wallboard or equivalent on	<u>C</u>	<u>63.2</u>	<u>70.8</u>	<u>87.5</u>	<u>96.5</u>	<u>105.6</u>
	interior side of wall.	D	<u>74.9</u>	<u>83.9</u>	<u>103.7</u>	<u>114.5</u>	<u>125.2</u>
	3 Exterior Side: Foam plastic sheathing or other backing material not approved to independently resist the design wind loads. Interior Side: None	<u>B</u>	<u>64.4</u>	<u>72.2</u>	<u>89.3</u>	<u>98.5</u>	<u>107.8</u>
<u>3</u>		<u>C</u>	<u>90.2</u>	<u>101.1</u>	<u>125.0</u>	<u>137.9</u>	<u>150.9</u>
		<u>D</u>	<u>107.0</u>	<u>119.9</u>	<u>148.2</u>	<u>163.5</u>	<u>178.9</u>

NOTES:

a. The tabulated wind load ratings are based on a 30' mean roof height. For other mean roof heights, multiply the tabulated wind load ratings for Exposure B by the Adjustment Coefficients in Table R301.2(2).

b. The vinyl siding shall be attached directly to the studs. If the manufacturer requires the vinyl siding to be attached to the backing material to achieve higher wind load ratings, the backing material shall be the same material as tested.

c. Vinyl siding certified to ASTM D 3679 has been rated for at least 29.1 psf negative (suction) wind load. For higher wind load ratings, contact the manufacturer.

Reason: Vinyl siding is required to be certified per ASTM D3679 which includes negative (suction) wind testing to set a design wind rating. This wind rating is based on tests conducted with OSB or plywood used as backing material and assumes that the vinyl siding will be applied over similar backing material that can independently resist the negative wind loads. During the last cycle, provisions were added to IRC 703.11 to address the common condition where vinyl siding is installed over foam sheathing. Under this condition, the vinyl siding must resist the full wind load since the foam sheathing does not resist the negative wind loads.

At the final hearings, a new provision was added that provided a prescriptive solution for the case where the basic wind speed does not exceed 90 mph, the Exposure Category is B, and gypsum wallboard or equivalent is installed on the side of the wall opposite the foam plastic sheathing. In support, the following data was provided:

WIND PRESSURE TESTING OF WALL ASSEMBLIES WITH FOAM SHEATHING AND VINYL SIDING PRODUCTS

	Backing Material	Ult. Test Capacity (psf)	Wind Load resisted by Vinyl Siding	Safety Factor on Vinyl Siding	Wind Rating (psf)	Reference				
		CONTROL:	Vinyl Siding test (OS	B backing material p	erforated per D 3679)				
	(none)	22.7	36%	1.50	42.1	D 3679				
Low	Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)									
Vinyl Siding	3/8" EPS	29.1	100%	2.00	14.6	2009 IRC				
	1/2" ISO	1/2" ISO 41.1 100%		2.00	20.6	2009 IRC				
	1/2" XPS	41.6	100%	2.00	20.8	2009 IRC				
		CONTROL:	Vinyl Siding test (OS	B backing material p	erforated per D 3679)				
	(none)	81.9	36%	1.50	151.6	D 3679				
High Capacity		Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)								
Vinyl Siding	3/8" EPS	77.0	100%	2.00	38.5	2009 IRC				
	1/2" ISO	86.1	100%	2.00	43.1	2009 IRC				
	1/2" XPS	89.5	100%	2.00	44.7	2009 IRC				

(NAHB Research Center Report #4107003013108)

For the CONTROL case, the vinyl siding was wind rated at 42.1 psf using the procedures in D 3679. This rating was determined from the ultimate test capacity of the vinyl siding acting alone, divided by 0.36 in recognition that the backing material is resisting most of the wind load and by a safety factor of 1.5 since the vinyl siding is serving primarily as an exterior covering. The ultimate test capacity of the vinyl siding backed by solid foam sheathing was divided by 1.0 in recognition that the vinyl siding attachment must resist the wind load and by a safety factor of 2.0 since the vinyl siding is now acting as a structural sheathing to protect the building envelop. For the low capacity vinyl siding, the vinyl siding backed by 3/8" EPS was not capable of resisting the minimum wind loads in the IRC; however, ½" ISO and ½" XPS were capable of resisting the 19.5 psf negative wind loads associated with 90 mph, Exposure B. This case was selected as the basis of the current prescriptive provisions in R703.11.2.1. Upon further study of the CONTROL case in the previous table, it can be seen that the low-capacity vinyl siding used in the tests would have a wind rating of 42.1 psf, not the minimum of 29.1 psf permitted by D 3679. A re-analysis was conducted to see what the result would be if minimum vinyl siding was used over foam sheathing:

	Backing Material	D 3679 min. Capacity (psf)	Wind Load resisted by Vinyl Siding	Safety Factor on Vinyl Siding	Wind Rating (psf)	Reference
	OSB	15.7	36%	1.50	29.1	D 3679
D 3679 min.	3/8" EPS	15.7	100%	2.00	7.9	2009 IRC
Vinyl Siding	1/2" ISO	15.7	100%	2.00	7.9	2009 IRC
	1/2" XPS	15.7	100%	2.00	7.9	2009 IRC

In order for the vinyl siding to resist the full wind load, this re-analysis suggests that it would take a medium grade of vinyl siding to meet the minimum negative wind loads and a high grade of vinyl siding and attachment to meet the moderate negative wind loads. For this reason, it is recommended that Section R703.11.2 and R703.11.2.1 be deleted and replaced with wind Table R703.11. Also, the prescriptive fastening in Table R703.4 should be replaced by a reference to the general section since the fastening schedule is linked to the wind rating.

Section R703.11.2.2 was previously added to provide an adjustment to the D 3679 wind ratings for cases where foam sheathing is used as the backing material. It requires the user to multiply the D 3679 wind ratings provided by the vinyl siding manufacturer in literature or an Evaluation Report, with a factor associated with the construction. In this proposed change, Section R703.11.2.2 was deleted and the adjustment factors were incorporated as increases in the required wind ratings in a new Table R703.11. Until D 3679 is modified to provide a means of determining wind ratings using the actual backing materials, this method should be used to prevent confusion and aid the user in selecting the proper vinyl siding.

Section R703.11.3 was added to provide guidance on the use of data for combined vinyl siding and foam sheathing tests. However, no standardized test procedure exists and any information developed by the vinyl siding manufacturer should be evaluated carefully prior to approval. This section is redundant with Section R104.11 and is, therefore, recommended for deletion.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: PITTS-RB-5-T. R703.4-R703.11

RB148 –09/10 R202 (New), R703.13 (New), Chapter 44 (New)

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

1. Add new definition as follows:

POLYPROPYLENE SIDING. A shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings.

2. Add new text as follows:

R703.13 Polypropylene siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of R703.13.1, of R703.13.2 or of R703.3 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the manufacturer's installation instructions.

R703.13.1 Flame spread index. The polypropylene siding material shall comply with the requirements of ASTM D 7254. The certification shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E 84 or UL 723.

R703.13.2 Heat release. The polypropylene siding material shall comply with the requirements of ASTM D 7254 and a 4 foot by 8 foot (1.22 x 2.44 m) section of the polypropylene siding material shall exhibit a peak rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source at the thickness intended for use.

R703.13.3 Fire separation distance. The polypropylene siding shall comply with all the requirements of ASTM D 7254 and the fire separation distance between a building with polypropylene siding and the adjacent building shall be no less than 10 feet (3.05 m).

3. Add new standards to Chapter 44 as follows:

NFPA

289 Standard Method of Fire Test for Individual Fuel Packages (2009)

ASTM

<u>D 7254</u> Standard specification for polypropylene (PP) siding

Reason: Polypropylene siding is being used in construction now although the IBC does not permit it. Therefore, it is important to regulate the use of polypropylene siding in a way that it can be used safely. The new sections are similar to the existing sections on vinyl siding, except for the fire testing. Vinyl siding is known to have adequate fire performance since the siding needs to be made of rigid (unplasticized) PVC in accordance with ASTM D 3679. Polypropylene is known not to have adequate fire performance unless properly fire retarded.

A new standard specification has been issued for polypropylene siding, ASTM D 7254. The specification addresses many of the key requirements for the material. Unfortunately the fire test requirement in ASTM D 7254 is not explicit enough. ASTM D 7254 does not require that, when fire testing is conducted in the ASTM E 84 (Steiner tunnel), the test specimen must remain in place during the test and flaming drips and falling test specimens are not allowed to happen. This requirement is critical for materials that are used exposed so that the flame spread index assesses actual surface flame spread on the material surface. The standards committee responsible for the ASTM E 84 fire test (ASTM E05) decided that this issue should be addressed in the code rather than in the standard itself. Polypropylene that has not been appropriately fire retarded will release abundant amount of heat, much more than other combustible sidings permitted by the code, such as wood siding or vinyl (PVC) siding, and spread fire through flaming drips. Such flaming drips will contribute to ignite mulch and debris found near the building and spread the fire. Table 1 shows such results.

Recent fire tests were also conducted in the Steiner tunnel, ASTM E 84, on a rigid PVC material 0.06 in. thick; it exhibited a flame spread index of 10. Under the same test conditions, a fire retarded polypropylene material 0.15 in. thick exhibited a flame spread index of 50. These are both very adequate values, in view of the fact that both the polypropylene material and the PVC material remained in place during the ASTM E 84 test and did not generate flaming drips.

Table 1: Results of Steiner Tunnel Tests (ASTM E 84)									
Material	Flame Spread Index	Maximum Flame Front Advance (ft)	Time to Max. Flame Front Advance (min:s)	Flaming on Floor (Duration) (min:s)					
PVC	10	4.6	7:48	None					
FR Polypropylene	50	19.5	6:24	4:18					

This shows that it is possible to use fire retarded polypropylene materials that give very adequate flame spread values and also very adequate heat release values, without flaming drips. Consequently, polypropylene siding should only be used when it is shown to exhibit the appropriate fire performance.

When polypropylene siding material (which does not have the appropriate fire performance) is tested in ASTM E 84 (Steiner tunnel) the test specimen will often fall ahead of the arrival of the flame giving incorrect results.

Table 2 shows new results of cone calorimeter heat release tests with polypropylene and PVC:

Table 2: Results of Cone Calorimeter (ASTM E 1354) Tests									
Material	Peak Heat Total Heat Time to Effective Heat of Fire Per								
	Release Rate	Released	Ignition	Combustion	Index				
	kW/m ²	MJ/m ²	S	MJ/kg	s m² /kW				
PVC	186.8	16.7	36	9.2	0.19				
Non FR Polypropylene	768.3	47.2	23	40.3	0.03				

Table 3 shows some earlier results with polypropylene, PVC and wood materials in the cone calorimeter:

Table 3 - Cone Calorimeter Data on Plastics and Douglas Fir							
	Flux 20 kW/m ²						
Material	Pk HRR	THR	ТТІ	EHC	FPI		
	(kW/m²)	(MJ/m²)	(s)	(MJ/kg)	(s m²/kW)		
PVC Rigid, Custom Inj. Mold.	40	3.0	5159	1.4	1343		
PVC Rigid, Extrusion	102	2.9	3591	7.3	31.4		
PP Non FR	1170	231.3	218	72.0	0.19		
PP FR	236		382	23.6	1.62		
PE Non FR	913	161.9	403	41.1	0.44		
XLPE FR	88	87.6	750	22.4	8.08		
Douglas Fir	237	46.5	254	13.1	1.10		
		Flux 40	kW/m²				
PVC Rigid, Custom Inj. Mold.	175	24.3	73	5.1	0.42		
PVC Rigid, Extrusion	183	90.8	85	13.3	0.46		
PP Non FR	1509	206.9	86	42.1	0.06		
PP FR	243		80	23.9	0.33		
PE Non FR	1408	221.0	159	46.6	0.06		
XLPE FR	192	126.2	105	24.2	0.55		
Douglas Fir	221	64.1	34	17.6	0.15		
		Flux 70	kW/m²				
PVC Rigid, Custom Inj. Mold.	191	93.0	45	12.7	0.24		
PVC Rigid, Extrusion	190	96.5	48	10.8	0.25		
PP Non FR	2421	231.1	41	43.1	0.02		
PE Non FR	2735	227.5	47	42.6	0.02		
XLPE FR	268	129.2	35	24.7	0.13		
Douglas Fir	196	50.0	12	13.5	0.06		

Table 3 shows that, when tested in the cone calorimeter, ASTM E 1354, under the same conditions, it was found that non fire retarded polypropylene exhibits a peak heat release rate of 1509 kW/m², while a non fire retarded PVC material exhibits a peak heat release rate of 183 kW/m², and a Douglas fir material exhibits a peak heat release rate of 221 kW/m². Such a very high heat release rate is unacceptable for a siding material. Testing in the cone calorimeter, including the testing above, is normally conducted in the horizontal orientation with radiant heat exposing the test specimen from above, thus capturing any flaming drips and assessing their effects.

Table 4 shows that wood materials, when not fire retarded, will usually exhibit flame spread index values that are less than 200 and will correspond to Class B or Class C categories. At the same time rigid PVC (vinyl) materials will generally exhibit flame spread index values less than 25. Neither wood nor PVC materials will cause flaming drips or molten material burning on the ground.

Table 4. Steiner tunnel (ASTM E 84) Data for Wood and Vinyl Materials							
Material/Product	Flame Spre	ead Index	Material/Product	Flame Spread Index			
	Low	High		Low	High		
Cellulose fiberboard ceiling tile	70	80	Ponderosa pine B	105	170		
Cottonwood	115		Poplar	170	185		
Cypress	145	150	Red Gum	140	155		
Douglas fir	70	100	Red oak flakeboard	70	190		
Douglas fir overlay	110	140	Red Oak Flooring	100	100		
Douglas fir/cedar plywood	190	230	Red Pine	140			
Eastern White Pine	85		Redwood	65	70		
Hemlock/cedar plywood	190		Southern yellow pine	130	195		
Lauan hardwood	150	170	Vinyl faced plywood	110	130		
Lodgepole Pine	95		Vinyl profile	15	20		
Maple flooring	105		Vinyl Siding	10	15		
Northern white pine A	190	215	Vinyl vapor barrier	10	15		
Northern white pine B	120	180	Walnut	130	140		
Pacific silver fir	70		West Coast Hemlock	60	70		
Pacific Yellow Cedar	80		Western Red Cedar	70			
Particleboard	135	180	Western spruce	100			
Plywood paneling over gypsum	130	150	Western white pine	75			
Ponderosa pine A	170	230	Yellow birch	105	110		

Figure 1 shows char from a PVC siding fire (no foam backing): the material softened, charred and burned but is still substantially intact. Figure 2 shows a vertical PP sheet melting and resulting in flaming drips on the floor.

The reason that heat release rate and floor flaming are important issues is because it has been shown that the heat radiated by siding is a major contributor to the ignition of neighboring houses, as is the spread of fire along the ground, particularly when there are loose combustibles present.

That is the reason that the third option allows polypropylene siding to be used, but with a larger separation distance, when the results of the ASTM E 84/UL 723 (Steiner tunnel) test are based on a test specimen that is not self supporting and falls to the floor of the tunnel during the test. The standard ASTM E 84 states: "1.4 Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place." Therefore valid test results require the test specimen to stay in place ahead of the exposing flame.

Figure 1 – Remains of vinyl siding fire



Figure 2 Polypropylene siding melting and flaming on the floor.



NFPA 289 was developed to test individual fuel packages and is similar in concept to UL 1975, already widely used in the ICC codes.

Cost Impact: The code does not at present allow the use of polypropylene siding. In order to safely use polypropylene siding construction costs would have to increase either by using materials that would meet test requirements for adequate fire safety or by increasing fire separation distances.

Analysis: A review of the standards proposed for inclusion in the code, NFPA 289 and ASTM D 7254, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEILENAME: HIRSCHLER-RR-5-R202-R703-13

RB149-09/10 R801.3

Proponent: Jim Olk, City of Farmers Branch, TX, representing Building Officials Association of Texas

Revise as follows:

R801.3 Roof drainage. In areas where expansive or collapsible soils are known to exist, all *dwellings* shall have a controlled method of water disposal <u>drainage</u> from roofs in <u>conformance with Chapter 4 or provide a system</u> that will collect and discharge roof drainage to the ground surface at least 5 feet (1524 mm) from <u>the building</u> foundation walls or to an *approved* drainage system.

Reason: Over saturation of the soil adjacent to all types of foundations can cause differential soil movement which can lead to foundation failure on all types of foundations.

This proposal will allow proper grading as well as drainage system to comply with the intent of the code.

Bibliography:

Letter dated March 13, 2009 from MLAW Consultants and Engineers, Kirby T. Meyer, P.E. to the Building Officials Association of Texas President, Scott McDonald, in support of this proposal.

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

Public Hearing: Committee:	AS	AM	D	ICCEII ENAME: OI K-RR-1-R801 3
Assembly:	ASF	AMF	DF	
				ICCFILEINAIVIE. ULK-KB-1-K601.3

RB150-09/10 R802.3.2

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

R802.3.2 Ceiling joists lapped. Ends of ceiling joists shall be lapped a minimum of 3 inches (76 mm) or butted over bearing partitions or beams and toenailed to the bearing member. When ceiling joists are used to provide resistance to rafter thrust, lapped joists shall be nailed together in accordance with Table R602.3(1) R802.5.1(9) and butted joists shall be tied together in a manner to resist such thrust. When the joists are not resisting thrust they shall be permitted to be nailed in accordance with Table R602.3(1).

Reason: This corrects a conflict between R802.3.2 and R802.3.1. Table R805.1(9), mentioned in R802.3.1, addresses nailing of ceiling joist lap splices in situations where the ceiling joists resist the outward thrust of rafters. Table R602.3(1) addresses the situation in which lapped ceiling joists are not resisting rafter thrust, typically joists not attached to rafters.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCEILENAME: PITTS-RB-1-R802.3.2

RB151–09/10 Figure R802.5.1

Proponent: Robert Rice, Grants Pass, OR, representing Josephine County Building Safety and Southern Oregon Chapter of ICC

Delete existing Figure R802.5.1 and replace as follows:



For SI: 1 Inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.018 rad. Note: Where celling joints run perpendicular to the rafter, rafter ties shall be installed per RB02.3.1 HC = Height of celling joiste or rafter ties measured vertically above the top of rafter support walls HR = Height of roof ridge measured vertically above the top of the rafter support walls.

FIGURE R802.5.1 BRACED RAFTER CONNECTION

Reason: The existing figure is lacking in some information and references to pertinent sections of code. This proposal updates the figure.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: RICE-RB-4-F. R802.5.1

RB152–09/10 R802.7, R802.7.1, R802.7.1.1 (New), Figure R802.7.1.1 (New), R802.7.1.2 (New), Figure R802.7.1.2

Proponent: Dennis Pitts, American Forest and Paper Association

1. Revise as follows:

R802.7 Cutting, drilling and notching. Structural roof members shall not be cut, bored or notched in excess of the limitations specified in this section.

R802.7.1 Sawn lumber. <u>Cuts, notches, and holes, Notches</u> in solid lumber joists, rafters, blocking and beams shall not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the member. The tension side of members. The diameter of the holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is also notched, the hole shall not be closer than 2 inches (51 mm) to the notch comply with the provisions of R502.8.1 except that cantilevered portions of rafters shall be permitted in accordance with Section R802.7.1.1.

<u>R802.7.1.1 Cantilevered portions of rafters.</u> <u>Exception:</u> Notches on cantilevered portions of rafters are permitted provided the dimension of the remaining portion of the rafter is not less than -4- <u>3-1/2</u>-inch nominal (102 <u>89</u> mm) and the length of the cantilever does not exceed 24 inches (610 mm) in accordance with Figure R802.7.1.1.

2. Add new figure as follows:



3. Add new text as follows:

R802.7.1.2 Ceiling joist taper cut. Taper cuts at the ends of the ceiling joist shall not exceed one-fourth the depth of the member in accordance with Figure R802.7.1.2.

4. Add new figure as follows:



FIGURE R802.7.1.2 CEILING JOIST TAPER CUT

Reason: The revision simplifies text by referencing material elsewhere in the code. The exception is re-written as a section on cantilever portions of rafters and includes a figure to clarify the intent. The actual dimension "3-1/2 inch" replaces "4-inch nominal" to clarify the minimum dimension remaining after the notching. "Nominal" is typically used to describe standard sizes. The section on ceiling joist taper cut is added to clarify application of the D/4 provision to a ceiling joist taper cut.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: PITTS-RB-6-R802.7

RB153-09/10 R802.10.2.1

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

Revise as follows:

R802.10.2.1 Applicability limits. The provisions of this section shall control the design of truss roof framing when snow controls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist, rafter or truss span, not greater than 36 feet (10 973 mm) in width parallel to the joist, rafter or truss span, <u>not more than three stories</u> <u>above grade plane in height</u>, not greater than two stories in height with each *story* not greater than 10 feet (3048 mm) high, and roof slopes not smaller than 3:12 (25-percent slope) or greater than 12:12 (100-percent slope). Truss roof framing constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 110 miles per hour (49 m/s), Exposure A, B or C, and a maximum ground snow load of 70 psf (3352 Pa). For consistent loading of all truss types, roof snow load is to be computed as: 0.7 *p*g.

Reason: The purpose of this code change is to harmonize the language used within the IRC. This change harmonizes this section with the scope of the IRC, Section R101.2:

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

and also with the scope of the steel roof Section R804.1.1

R804.1.1 Applicability limits. The provisions of this section shall control the construction of cold-formed steel roof framing for buildings not greater than 60 feet (18 288 mm) perpendicular to the joist, rafter or truss span, not greater than 40 feet (12 192 mm)in width parallel to the joist span or truss, less than or equal to three stories above *grade* plane and with roof slopes not less than 3:12 (25-percent slope) or greater than 12:12 (100 percent slope). Cold-formed steel roof framing constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 110 miles per hour (49 m/s), Exposure B or C, and a maximum ground snow load of 70 pounds per square foot (3350 Pa).

This change removes a competitive disadvantage wood trusses currently have with steel trusses. As much as is possible, materials should be subject to the same requirements within the code.

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

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

RB154–09/10 R301.2.1, Table R602.3(1), R802.10.5, R802.11.1, R802.11.1.2 (New), R802.11.1.3 (New), Table R802.11

Proponent: T. Eric Stafford, PE, representing the Institute for Business and Home Safety

1. Revise as follows:

R301.2.1 Wind limitations. Buildings and portions thereof shall be limited by wind speed, as defined in Table R301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be determined from Figure R301.2(4). Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where loads for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.6. <u>A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.</u>

TABLE R602.3(1) FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER ^{a,b,c}	SPACING OF FASTENERS
5	Rafter <u>or roof truss</u> to plate, toe nail	23-16d box nails (3½"x0.135") or 3- 10d common nails (3"x0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss ¹

(Portions of table not shown remain unchanged)

a. through i. (No change)

j. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toenails on one side of the rafter and toe-nails from the ceiling joist to top plate in accordance with this schedule. The toe-nail on the opposite side of the rafter shall not be required.

2. Delete without substitution:

R802.10.5 Truss to wall connection. Trusses shall be connected to wall plates by the use of *approved* connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in TableR301.2(2), adjusted for height and exposure per Table R301.2(3), see section R802.11.

3. Revise as follows:

R802.11.1 Uplift resistance. Roof assemblies <u>shall have uplift resistance in accordance with Sections R802.11.1.2</u> <u>and R802.11.1.3</u> which are subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater shall have roof rafters or trusses attached to their supporting wall assemblies by connections capable of providing the resistance required in Table R802.11. Wind uplift pressures shall be determined using an effective wind area of 100 square feet (9.3 m2) and Zone 1 in Table R301.2(2), as adjusted for height and exposure per Table R301.2(3).

Where the uplift force does not exceed 200 pounds, rafters and trusses spaced not more than 24 inches on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Where the basic wind speed does not exceed 90 mph, the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet or less, rafters and trusses spaced not more than 24 inches on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

A continuous load path shall be designed to transmit the uplift forces from the rafters or trusses to the foundation.

4. Add new text as follows:

R802.11.1.2 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings. Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice.

R802.11.1.3 Rafter uplift resistance. Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by Table R802.11 or as determined by accepted engineering practice, Connections for beams used in a roof system shall be designed in accordance with accepted engineering practice.

5. Delete existing Table R802.11 and replace as follows:

					EXPOS	URE B						
	Roof	Basic Wind Speed (MPH)										
Rafter or Truss	Span	8	5	9	0	10	00	110				
opacing	(feet)	Roof	Pitch	Roof	Pitch	Roof	Pitch	Roof	Pitch			
		<u><5:12</u>	<u>≥5:12</u>	<u><5:12</u>	<u>≥5:12</u>	<u><5:12</u>	<u>≥5:12</u>	<u><5:12</u>	<u>≥5:12</u>			
	<u>12</u>	<u>47</u>	<u>41</u>	<u>62</u>	54	<u>93</u>	<u>81</u>	<u>127</u>	<u>110</u>			
	<u>18</u>	<u>59</u>	<u>51</u>	<u>78</u>	<u>68</u>	<u>119</u>	<u>104</u>	<u>165</u>	<u>144</u>			
	<u>24</u>	<u>70</u>	<u>61</u>	<u>93</u>	<u>81</u>	<u>145</u>	<u>126</u>	<u>202</u>	<u>176</u>			
12" 0.0	<u>28</u>	<u>77</u>	<u>67</u>	<u>104</u>	<u>90</u>	<u>163</u>	<u>142</u>	<u>227</u>	<u>197</u>			
12 0.0.	<u>32</u>	<u>85</u>	<u>74</u>	<u>115</u>	<u>100</u>	<u>180</u>	<u>157</u>	<u>252</u>	<u>219</u>			
	<u>36</u>	<u>93</u>	<u>81</u>	<u>126</u>	<u>110</u>	<u>198</u>	<u>172</u>	<u>277</u>	<u>241</u>			
	<u>42</u>	<u>105</u>	<u>91</u>	<u>143</u>	<u>124</u>	<u>225</u>	<u>196</u>	<u>315</u>	<u>274</u>			
	<u>48</u>	<u>116</u>	<u>101</u>	<u>159</u>	<u>138</u>	<u>251</u>	<u>218</u>	<u>353</u>	<u>307</u>			
	<u>12</u>	<u>63</u>	<u>55</u>	<u>83</u>	<u>72</u>	<u>124</u>	<u>108</u>	<u>169</u>	<u>147</u>			
	<u>18</u>	<u>78</u>	<u>68</u>	<u>103</u>	<u>90</u>	<u>159</u>	<u>138</u>	<u>219</u>	<u>191</u>			
	<u>24</u>	<u>93</u>	<u>81</u>	<u>124</u>	<u>108</u>	<u>193</u>	<u>168</u>	<u>269</u>	<u>234</u>			
16" o c	<u>28</u>	<u>102</u>	<u>89</u>	<u>138</u>	<u>120</u>	<u>217</u>	<u>189</u>	<u>302</u>	<u>263</u>			
10 0.0.	<u>32</u>	113	<u>98</u>	153	133	239	208	335	291			
	<u>36</u>	<u>124</u>	<u>108</u>	<u>168</u>	<u>146</u>	<u>264</u>	<u>230</u>	<u>369</u>	<u>321</u>			
	<u>42</u>	<u>139</u>	<u>121</u>	<u>190</u>	<u>165</u>	<u>299</u>	<u>260</u>	<u>420</u>	<u>365</u>			
	48	155	135	<u>212</u>	184	335	<u>291</u>	471	410			

TABLE R802.11 RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)

					EXPOS	SURE B					
Poffor or Truco	<u>Roof</u>	Basic Wind Speed (MPH)									
Spacing	<u>Span</u>	8	<u>5</u>	9	0	<u>10</u>	00	<u>1</u> '	10		
opacing	(feet)	<u>Roof</u>	Pitch	<u>Roof</u>	Pitch	<u>Roof</u>	<u>Pitch</u>	<u>Roof</u>	Pitch		
		<u><5:12</u>	<u>≥5:12</u>	<u><5:12</u>	<u>≥5:12</u>	<u><5:12</u>	<u>≥5:12</u>	<u><5:12</u>	<u>≥5:12</u>		
	<u>12</u>	<u>94</u>	<u>82</u>	<u>124</u>	<u>108</u>	<u>186</u>	<u>162</u>	<u>254</u>	<u>221</u>		
	<u>18</u>	<u>117</u>	<u>102</u>	<u>155</u>	<u>135</u>	238	<u>207</u>	<u>329</u>	<u>286</u>		
	<u>24</u>	<u>140</u>	<u>122</u>	<u>186</u>	<u>162</u>	<u>290</u>	<u>252</u>	404	<u>351</u>		
24" о с	<u>28</u>	<u>154</u>	<u>134</u>	<u>208</u>	<u>181</u>	<u>326</u>	<u>284</u>	<u>454</u>	<u>395</u>		
<u>24 0.0.</u>	<u>32</u>	<u>170</u>	<u>148</u>	<u>230</u>	<u>200</u>	<u>360</u>	<u>313</u>	<u>504</u>	<u>438</u>		
	<u>36</u>	<u>186</u>	<u>162</u>	<u>252</u>	<u>219</u>	<u>396</u>	<u>345</u>	<u>554</u>	<u>482</u>		
	<u>42</u>	<u>209</u>	<u>182</u>	<u>285</u>	<u>248</u>	<u>449</u>	<u>391</u>	<u>630</u>	<u>548</u>		
	<u>48</u>	<u>232</u>	<u>202</u>	<u>318</u>	<u>277</u>	<u>502</u>	<u>437</u>	<u>706</u>	<u>614</u>		
	<u>12</u>	<u>94</u>	<u>82</u>	<u>114</u>	<u>99</u>	<u>157</u>	<u>137</u>	<u>206</u>	<u>179</u>		
	<u>18</u>	<u>120</u>	<u>104</u>	<u>146</u>	<u>127</u>	204	<u>177</u>	<u>268</u>	<u>233</u>		
	<u>24</u>	<u>146</u>	<u>127</u>	<u>179</u>	<u>156</u>	<u>251</u>	<u>218</u>	<u>330</u>	<u>287</u>		
12" o c	<u>28</u>	<u>164</u>	<u>143</u>	<u>201</u>	<u>175</u>	<u>283</u>	<u>246</u>	<u>372</u>	<u>324</u>		
12 0.0.	<u>32</u>	<u>182</u>	<u>158</u>	<u>224</u>	<u>195</u>	<u>314</u>	<u>273</u>	<u>414</u>	<u>360</u>		
	<u>36</u>	<u>200</u>	<u>174</u>	<u>246</u>	<u>214</u>	<u>346</u>	<u>301</u>	<u>456</u>	<u>397</u>		
	<u>42</u>	<u>227</u>	<u>197</u>	<u>279</u>	<u>243</u>	<u>394</u>	<u>343</u>	<u>520</u>	<u>452</u>		
	<u>48</u>	<u>254</u>	<u>221</u>	<u>313</u>	<u>272</u>	<u>441</u>	<u>384</u>	<u>583</u>	<u>507</u>		
	<u>12</u>	<u>125</u>	<u>109</u>	<u>152</u>	<u>132</u>	<u>209</u>	<u>182</u>	<u>274</u>	<u>238</u>		
	<u>18</u>	<u>160</u>	<u>139</u>	<u>194</u>	<u>169</u>	<u>271</u>	<u>236</u>	<u>356</u>	<u>310</u>		
	<u>24</u>	<u>194</u>	<u>169</u>	<u>238</u>	207	<u>334</u>	<u>291</u>	<u>439</u>	<u>382</u>		
16" o c	<u>28</u>	<u>218</u>	<u>190</u>	<u>267</u>	<u>232</u>	<u>376</u>	<u>327</u>	<u>495</u>	<u>431</u>		
<u>10 0.0.</u>	<u>32</u>	<u>242</u>	<u>211</u>	<u>298</u>	<u>259</u>	<u>418</u>	<u>364</u>	<u>551</u>	<u>479</u>		
	<u>36</u>	<u>266</u>	<u>231</u>	<u>327</u>	<u>284</u>	<u>460</u>	<u>400</u>	<u>606</u>	<u>527</u>		
	<u>42</u>	<u>302</u>	<u>263</u>	<u>372</u>	<u>324</u>	<u>524</u>	<u>456</u>	<u>691</u>	<u>601</u>		
	<u>48</u>	<u>338</u>	<u>294</u>	<u>416</u>	<u>362</u>	<u>587</u>	<u>511</u>	<u>775</u>	<u>674</u>		
	<u>12</u>	<u>188</u>	<u>164</u>	<u>228</u>	<u>198</u>	<u>314</u>	<u>273</u>	<u>412</u>	<u>358</u>		
	<u>18</u>	<u>240</u>	<u>209</u>	<u>292</u>	<u>254</u>	<u>408</u>	<u>355</u>	<u>536</u>	<u>466</u>		
	<u>24</u>	<u>292</u>	<u>254</u>	<u>358</u>	<u>311</u>	<u>502</u>	<u>437</u>	<u>660</u>	<u>574</u>		
24" o c	<u>28</u>	<u>328</u>	<u>285</u>	<u>402</u>	<u>350</u>	<u>566</u>	<u>492</u>	<u>744</u>	<u>647</u>		
21 0.0.	<u>32</u>	<u>364</u>	<u>317</u>	<u>448</u>	<u>390</u>	<u>628</u>	<u>546</u>	<u>828</u>	<u>720</u>		
	<u>36</u>	<u>400</u>	<u>348</u>	<u>492</u>	<u>428</u>	<u>692</u>	<u>602</u>	<u>912</u>	<u>793</u>		
	<u>42</u>	<u>454</u>	<u>395</u>	<u>558</u>	<u>485</u>	<u>786</u>	<u>684</u>	<u>1040</u>	<u>905</u>		
	<u>48</u>	<u>508</u>	<u>442</u>	<u>626</u>	545	882	<u>767</u>	<u>1166</u>	<u>1014</u>		

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.

- a. The uplift connection forces are based on a maximum 33 foot mean roof height and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated basic wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights.
- b. The uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.
- c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.
- d. The tabulated uplift connection forces shall be permitted to be multiplied by 0.75 for connections not located within 8 feet of building corners.
- e. For buildings with hip roofs with 5:12 and greater pitch, the tabulated uplift connection forces shall be permitted to be multiplied by 0.70. This reduction shall not be combined with any other reduction in tabulated forces.
- <u>f.</u> For wall-to-wall and wall-to-foundation connections, the uplift connection force shall be permitted to be reduced by 60 plf for each full wall above.
- g. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.
- h. The tabulated forces for a 12" on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

Reason: The issue of roof uplift connections, the limits of conventional nailed connections, and the point at which pre-engineered metal clips or straps are required has been a topic of much debate over the last several code cycles. A 200 pound maximum capacity for conventional rafter-to-wall or truss-to-wall connections has been suggested, based largely on capacities calculated directly from AF&PA's NDS. At the same time, the existing Table R802.11 has not been updated in some time and is overly conservative for many typical houses. The uplift loads are based on low-slope (4:12 pitch or less) roofs. The table does not account for the reduction in uplift loads that occur on higher-slope (5:12 pitch or greater) roofs or on hig roofs per ASCE 7. Thus the code does not encourage the use of high-slope roofs, which have been shown to experience significantly less damage in high-wind events. The triggers proposed by the insurance industry, coupled with the current table, would subject many houses in low-wind areas to a requirement for roof-to-wall ties (not to mention continuous straps to the foundation) that is not justified by the actual performance of roof systems in low-wind areas. This requirement is particularly unjustified on higher-slope roofs where the uplift loads can be substantially reduced through a detailed analysis using ASCE 7.

This proposal rolls together elements of several proposals concerning roof uplift connections (RB132-07/08, RB206-07/08, and RB207-07/08) from the last cycle. First, three options are provided for selection of the roof uplift: Table R802.11, the truss designer, or an engineered approach. In many jurisdictions (particularly rural ones), an engineered truss design is not required and the local truss fabricator will run the software from the plate company. These jurisdictions may also have limited or no plan review. Thus, there is less opportunity to insure the proper wind speed, building dimensions, mean roof height, etc. are used, and a possibility that overly conservative roof uplift loads will be generated on the truss design drawing. Hence, the ability to determine an uplift load from Table R802.11 even when there are truss drawings must be preserved. However, to address issues previously raised by code officials in relation to this section, we have introduced language to limit the use of Table R802.11 to roof rafters and and/or use of the truss design drawing values.

Second, this proposal replaces the current Table R802.11 with a new table based on Table 2.2A of the WFCM, which is based on the latest ASCE 7 wind load provisions. The new table expands upon both the existing IRC table and the WFCM table by incorporating values for high-slope roofs. These factors were derived using the ASCE 7 wind provisions and the calculation method used to develop Table 2.2A of the WFCM. A factor for hip roofs is also added, as hip roofs have seen similar improved performance in high-wind events. This table was proposed as part of the public comment to RB207-07/08. The failure of the public comment was due to concerns over the triggering language. The technical content of the proposed table was unchallenged; in fact a number of industry groups including IBHS, SBCA, AF&PA, and the Foam Sheathing Coalition who are not often in agreement with each other spoke in favor of the proposed revisions.

By introducing clarity to the trigger language for uplift connectors and providing this revised table, the IRC provisions for roof uplift connections will be substantially improved. Builders and building officials will have improved direction for when pre-engineered metal connectors are actually required. Additionally, the use of hip roofs and high-slope roofs will be encouraged, as designers, engineers and builders will be able to appropriately reduce uplift loads and avoid triggering uplift connector requirements for building locations and for roof configurations where the requirements are not justified.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: STAFFORD-RB-1-R301.2.1-T. R602.3(1)-R802

RB155–09/10 R802.10.5, R802.11.1, R802.11.1.2 (New), R802.11.1.3 (New)

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

1. Delete without substitution:

R802.10.5 Truss to wall connection. Trusses shall be connected to wall plates by the use of *approved* connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in TableR301.2(2), adjusted for height and exposure per Table R301.2(3), see section R802.11.

2. Delete and substitute as follows:

R802.11.1 Uplift resistance. Roof assemblies which are subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater shall have roof rafters or trusses attached to their supporting wall assemblies by connections capable of providing the resistance required in Table R802.11.Wind uplift pressures shall be determined using an effective wind area of 100 square feet (9.3m2) and Zone 1 inTableR301.2(2), as adjusted for height and exposure per Table R301.2(3).

A continuous load path shall be designed to transmit the uplift forces from the rafter or truss ties to the foundation.

Connections to resist uplift forces on trusses and rafters shall be designed in accordance with sections R802.11.1.2 and R802.11.1.3. Where the uplift force does not exceed 200 pounds, rafters and trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1). Where the basic wind speed does not exceed 90 mph (40 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, rafters and trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

3. Add new text as follows:

R802.11.1.2 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings. Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice.

R802.11.1.3 Rafter uplift resistance. Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by Table R802.11 or as specified by accepted engineering practice, Connections for beams used in a roof system shall be designed in accordance with the uplift forces as determined by accepted engineering practice

For wall framing connections to resist uplift load, refer to Section R602.10.2.1, Table R602.3(1), AF&PA/WFCM, or as determined by accepted engineering practice .

Reason: The general requirement of Section R801.2 states:

"...Roof and ceiling construction shall be capable of accommodating all loads imposed according to Section R301 and of transmitting the resulting loads to the supporting structural elements."

Chapter 6, wall construction, provides the requirements for connecting wall top plates to roof framing in Table 602.3(1) and with the addition of Section 602.10.1.2.1, braced wall panel uplift load path, during the last code cycle, the continuous load path language in Section R802.11 is redundant. Further, Section R602.10.1.2.1 establishes the connection in Table R602.3(1) as good for 100 plf.

R602.10.1.2.1 Braced wall panel uplift load path. Braced wall panels located at exterior walls that support roof rafters or trusses (including stories below top story) shall have the framing members connected in accordance with one of the following:

1. Fastening in accordance with Table R602.3(1) where:

1.1. The basic wind speed does not exceed 90 mph (40 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, or

1.2. The net uplift value at the top of a wall does not exceed 100 plf. The net uplift value shall be determined in accordance with Section R802.11 and shall be permitted to be reduced by 60 plf (86 N/mm) for each full wall above.

2. Where the net uplift value at the top of a wall exceeds 100 plf (146 N/mm), installing *approved* uplift framing connectors to provide a continuous load path from the top of the wall to the foundation. The net uplift value shall be as determined in Item 1.2 above.

3. Bracing and fasteners designed in accordance with accepted engineering practice to resist combined uplift and shear forces.

This is in conflict with R802.10.5 which states:

R802.10.5 Truss to wall connection. Trusses shall be connected to wall plates by the use of *approved* connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in TableR301.2(2), adjusted for height and exposure per Table R301.2(3), see section R802.11.

This proposal accomplishes to things.

- 1. It replaces the continuous load path requirement in R802.11.1 with a pointer back to the more detailed requirements of R602.10.2.1
- 2. It deletes Section R802.10.5, which has truss to wall connection requirements that are in conflict with R602.10.2.1
- 3. Coordinates the 100 plf trigger found in R602.10.1.2.1 with the rafter and truss connections in R802.11.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: WAINRIGHT-RB-2-R802.10.5-R802.11

RB156–09/10 Table R602.3(1), Section R602.10.1.2.1, R802.10.5, R802.11.1, Table R802.11

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

1. Revise as follows:

TABLE R602.3(1)

FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER ^{a,b,c}	SPACING OF FASTENERS
5	Rafter <u>or roof truss</u> to plate, toe nail	23-16d box nails (3½"x0.135") <u>or 3-</u> 10d common nails (3"x0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss ¹

(Portions of table not shown remain unchanged)

a. through i. (No change)

j. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toenails on one side of the rafter and toe-nails from the ceiling joist to top plate in accordance with this schedule. The toe-nail on the opposite side of the rafter shall not be required.

R602.10.1.2.1 Braced wall panel uplift load path. *Braced wall panels* located at exterior walls that support roof rafters or trusses (including stories below top *story*) shall have the framing members connected in accordance with one of the following:

- 1. Fastening in accordance with Table R602.3(1) where:
 - 1.1. The basic wind speed does not exceed 90 mph (40 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, or
 - 1.2. The net uplift value at the top of a wall does not exceed 100 115 plf. The net uplift value shall be determined in accordance with Section R802.11 and shall be permitted to be reduced by 60 plf (86 N/mm) for each full wall above.
- 2. Where the net uplift value at the top of a wall exceeds 100 115 plf (146 N/mm), installing approved uplift framing connectors to provide a continuous load path from the top of the wall to the foundation. The net uplift value shall be as determined in Item 1.2 above.
- 3. Bracing and fasteners designed in accordance with accepted engineering practice to resist combined uplift and shear forces.

2. Delete without substitution:

R802.10.5 Truss to wall connection. Trusses shall be connected to wall plates by the use of *approved* connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in TableR301.2(2), adjusted for height and exposure per Table R301.2(3), see section R802.11.

3. Delete and substitute as follows:

R802.11.1 Uplift resistance. Roof assemblies which are subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater shall have roof rafters or trusses attached to their supporting wall assemblies by connections capable of providing the resistance required in Table R802.11.Wind uplift pressures shall be determined using an effective wind area of 100 square feet (9.3m2) and Zone 1 inTableR301.2(2), as adjusted for height and exposure per Table R301.2(3). A continuous load path shall be designed to transmit the uplift forces from the rafter or truss ties to the foundation.

R802.11.1 Uplift resistance. Individual rafters and trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by one of the following methods:

- 1. as specified in Table R802.11; or
- 2. as specified on the Truss Design Drawings; or
- 3. as specified by a registered design professional.

Where the uplift force does not exceed 230 pounds, rafters and trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Connections for girder trusses and roof beams shall be designed in accordance with the uplift forces specified on the Truss Design Drawings or as determined by a registered design professional.

TABLE R802.11 REQUIRED STRENGTH OF TRUSS OR RAFTER CONNECTIONS TO RESIST WIND UPLIFT FORCESa^{, b, c, e, f} (Pounds per connection)

TABLE R802.11 RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)

Rafter or	Roof Snan		Expos	ure B		Exposure C			
Truss Spacing	(feet)		Basic Wind S	Speed (mph)	440	05	Basic Wind	Speed (mph)	440
opacing		85	<u>90</u>	<u>100</u>	<u>110</u>	<u>85</u>	<u>90</u>	<u>100</u>	<u>110</u>
	<u>12</u>	<u>47</u>	<u>62</u>	<u>93</u>	<u>127</u>	<u>94</u>	<u>114</u>	<u>157</u>	<u>206</u>
	<u>18</u>	<u>59</u>	<u>78</u>	<u>119</u>	<u>165</u>	<u>120</u>	<u>146</u>	<u>204</u>	<u>268</u>
	<u>24</u>	<u>70</u>	<u>93</u>	<u>145</u>	<u>202</u>	<u>146</u>	<u>179</u>	<u>251</u>	<u>330</u>
12" 0 0	<u>28</u>	<u>77</u>	<u>104</u>	<u>163</u>	<u>227</u>	<u>164</u>	<u>201</u>	<u>283</u>	<u>372</u>
12 0.0.	<u>32</u>	<u>85</u>	<u>115</u>	<u>180</u>	<u>252</u>	<u>182</u>	<u>224</u>	<u>314</u>	<u>414</u>
	<u>36</u>	<u>93</u>	<u>126</u>	<u>198</u>	<u>277</u>	<u>200</u>	<u>246</u>	<u>346</u>	<u>456</u>
	<u>42</u>	<u>105</u>	<u>143</u>	<u>225</u>	<u>315</u>	<u>227</u>	<u>279</u>	<u>394</u>	<u>520</u>
	<u>48</u>	<u>116</u>	<u>159</u>	<u>251</u>	<u>353</u>	<u>254</u>	<u>313</u>	<u>441</u>	<u>583</u>
	<u>12</u>	<u>63</u>	<u>83</u>	<u>124</u>	<u>169</u>	<u>125</u>	<u>152</u>	<u>209</u>	<u>274</u>
	<u>18</u>	<u>78</u>	<u>103</u>	<u>159</u>	<u>219</u>	<u>160</u>	<u>194</u>	<u>271</u>	<u>356</u>
	<u>24</u>	<u>93</u>	<u>124</u>	<u>193</u>	<u>269</u>	<u>194</u>	<u>238</u>	<u>334</u>	<u>439</u>
16" 0.0	<u>28</u>	<u>102</u>	<u>138</u>	<u>217</u>	<u>302</u>	<u>218</u>	<u>267</u>	<u>376</u>	<u>495</u>
<u>16 U.C.</u>	<u>32</u>	<u>113</u>	<u>153</u>	<u>239</u>	<u>335</u>	<u>242</u>	<u>298</u>	<u>418</u>	<u>551</u>
	<u>36</u>	<u>124</u>	<u>168</u>	<u>264</u>	<u>369</u>	<u>266</u>	<u>327</u>	<u>460</u>	<u>606</u>
	<u>42</u>	<u>139</u>	<u>190</u>	<u>299</u>	<u>420</u>	<u>302</u>	<u>372</u>	<u>524</u>	<u>691</u>
	<u>48</u>	<u>155</u>	<u>212</u>	<u>335</u>	<u>471</u>	<u>338</u>	<u>416</u>	<u>587</u>	<u>775</u>
	<u>12</u>	<u>94</u>	<u>124</u>	<u>186</u>	<u>254</u>	<u>188</u>	<u>228</u>	<u>314</u>	<u>412</u>
	<u>18</u>	<u>117</u>	<u>155</u>	<u>238</u>	<u>329</u>	<u>240</u>	<u>292</u>	<u>408</u>	<u>536</u>
	<u>24</u>	<u>140</u>	<u>186</u>	<u>290</u>	<u>404</u>	<u>292</u>	<u>358</u>	<u>502</u>	<u>660</u>
241 0.0	<u>28</u>	<u>154</u>	<u>208</u>	<u>326</u>	<u>454</u>	<u>328</u>	<u>402</u>	<u>566</u>	<u>744</u>
<u>24 0.c.</u>	<u>32</u>	<u>170</u>	<u>230</u>	<u>360</u>	<u>504</u>	<u>364</u>	448	<u>628</u>	<u>828</u>
	<u>36</u>	<u>186</u>	<u>252</u>	<u>396</u>	<u>554</u>	<u>400</u>	<u>492</u>	<u>692</u>	<u>912</u>
	<u>42</u>	<u>209</u>	<u>285</u>	449	<u>630</u>	<u>454</u>	<u>558</u>	<u>786</u>	<u>1040</u>
	<u>48</u>	<u>232</u>	<u>318</u>	<u>502</u>	<u>706</u>	<u>508</u>	<u>626</u>	<u>882</u>	<u>1166</u>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.

a. The tabulated uplift connection forces are based on a maximum 33 foot mean roof height, and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated basic wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.

b. The tabulated uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.

c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.

d. <u>The tabulated uplift connection forces shall be permitted to be multiplied by one of the reduction factors listed in the table below.</u> Tabulated reduction factors shall not be combined.

Roof Type	Roof Pitch	Connection Location	Adjustment Factor
A. 201	Any	Within 8 feet of building corners	1.00
Any	Any	8 feet or more from building corners	0.75
Managlana ar gabla roof	5:12 or grootor	Within 8 feet of building corners	0.87
Monosiope of gable roof	5.12 or greater	8 feet or more from building corners	0.75
Hip roof	5:12 or grootor	Within 8 feet of building corners	0.70
	5.12 of greater	8 feet or more from building corners	0.75

e. The tabulated forces for a 12" on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

Reason: The purpose of this proposal is to provide sensible and simplified requirements for roof uplift connections. The issue of roof uplift connections, the limits of conventional nailed connections, and the point at which pre-engineered metal clips or straps are required has been a topic of much debate over the last several code cycles. The insurance industry and others have been trying to mandate a 200 pound maximum capacity for conventional rafter-to-wall or truss-to-wall connections, based largely on capacities calculated directly from AF&PA's NDS. At the same time, the existing Table R802.11 has not been updated in some time and is overly conservative for many typical houses. The uplift loads are based on low-slope (4:12 pitch or less) roofs. The table does not account for the reduction in uplift loads that occur on higher-slope (5:12 pitch or greater) roofs or on hip roofs per ASCE 7. Thus the code does not encourage the use of high-slope roofs, which have been shown to experience significantly less damage in high-wind events. The triggers proposed by the insurance industry, coupled with the current table, would subject many houses in low-wind areas to a requirement for roof-to-wall ties (not to mention continuous straps to the foundation) that is not justified by the actual performance of roof systems in low-wind areas. This requirement is particularly unjustified on higher-slope roofs where the uplift loads can be substantially reduced through a detailed analysis using ASCE 7.

This proposal is similar to a companion proposal which rolls together elements of several proposals concerning roof uplift connections (RB132-07/08, RB206-07/08, and RB207-07/08) from the last cycle. The key difference is the proposed trigger of 230 pounds in this proposal. This value is consistent with the capacities seen in uplift testing of both individual components and roof assemblies conducted by the NAHB Research Center, Clemson University, State Farm, and others. It is a modest increase from the 200 pound capacity previously proposed by IBHS. The benefit in this small yet technically-justified increase is an ability to simplify the proposed code language by including a house with a 32' span low-slope roof in 90mph Exposure B in the scope of conventional connections. This will allow the prescriptive kick-out for the 32' high-slope condition to be removed and the overall table to be simplified.

By introducing clarity to the trigger language for uplift connectors and providing this revised table, the IRC provisions for roof uplift connections will be substantially improved. Builders and building officials will have improved direction for when pre-engineered metal connectors are actually required. Additionally, the use of hip roofs and high-slope roofs will be encouraged, as designers, engineers and builders will be able to appropriately reduce uplift loads and avoid triggering uplift connector requirements for building locations and for roof configurations where the requirements are not justified.

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

Public Hearing: Committee:	AS	AM	D
Assembly:	ASF	AMF	DF
•			ICCFILENAME: EHRLICH-RB-10-T. R602.3(1)-R602.10.1.2.1-R802.10.5-R802.11.1

RB157–09/10 R806.1, R806.2, R806.3 (New)

Proponent: Michael Fischer, The Kellen Company, representing the Roof Attic Ventilation Coalition

1. Revise as follows:

R806.1 Ventilation required. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than 1/4 inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth, or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Openings in roof framing members shall conform to the requirements of SectionR802.7. Required ventilation openings shall open directly to the outside air.

R806.2 Minimum area. The total net free ventilating area shall not be less than 1/150 of the area of the <u>attic or rafter</u> space ventilated except that reduction of the total area to 1/300 is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. As an alternative, the net free cross-ventilation area may be reduced to 1/300 when a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.

2. Add new text as follows:

R806.3 Cross-ventilation. At least 40 percent and not more than 50 percent of the required ventilating area shall be provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located no more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents.

Exception. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet below the ridge or highest point of the space shall be permitted.

Reason: The code sets minimum requirements for ventilated attics. This proposal establishes an appropriate requirement for cross-ventilation as the default condition instead of allowing a reduction in ventilation for what is the most commonly recommended practice for ventilated attics. An exception for conditions where framing might preclude cross-ventilation to the specific location required allows some design flexibility for non-typical roof/wall assemblies. The proposal further clarifies that ventilators open to outside air, as opposed to adjacent attic or rafter spaces or some other interior space.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: FISCHER-RB-5-R806.1

RB158-09/10 R806.2

Proponent: Joseph Lstiburek, Building Science Corporation

Revise as follows:

R806.2 Minimum area. The total net free ventilating area shall not be less than <u>1/150</u> <u>1/300</u> of the area of the space ventilated where except that reduction of the total area to <u>1/300</u> is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. As an alternative, the net free cross-ventilation area may be reduced to <u>1/300 when In climate zones 5, 6, 7 and 8</u> a Class I or II vapor retarder is shall be installed on the warm-in-winter side of the ceiling.

Reason: This language is now more consistent with the IBC, which only allows one ventilation ratio. It also is consistent with the appropriate building science/physics.

The previous wording encouraged installing vapor retarders in ceilings in hot humid climates in order to reduce ventilation areas. That is very bad in terms of the governing physics. This wording fixes that.

Vapor retarders are required in cold climates regardless of ventilation area. This wording makes that clear as well.

Bottom line: if you choose to vent a roof this language says vent it according to the 1:300 ratio everywhere. In cold climates you need to add a vapor retarder. The language relating to vapor retarders is now consistent with the vapor retarder changes made to wall assemblies in the two previous code cycles.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCEILENAME L STIBUREK-RB-3-R806 2

RB159-09/10 R806.2

Proponent: Michael D. Fischer, The Kellen Company, representing the Roof-Attic Ventilation Coalition

Revise as follows:

R806.2 Minimum area. The total net free ventilating area shall not be less than 1/150 of the area of the space ventilated except that reduction of the total area to 1/300 is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. As an alternative, the net free cross-ventilation area may be reduced to 1/300 when a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.

Reason: The code sets minimum requirement for ventilated attics. This proposal removes an allowable reduction in ventilation if vapor retarders are installed on the warm-in-winter side of the ceiling assembly. While this practice may function in some climate zones, it does not justify a reduction in ventilation area across all climate regions.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: FISCHER-RB-6-R806.2

RB160-09/10 R806.4 (New)

Proponent: Michael D. Fischer, The Kellen Company, representing the Roof-Attic Ventilation Coalition

Add new text as follows:

R806.4 Installation and weather protection. Ventilators shall be installed in accordance with manufacturer's installation instructions. Installation of ventilators in roof systems shall be in accordance with the requirements of R903. Installation of ventilators in wall systems shall be in accordance with the requirements of Section R703.1.

(Renumber subsequent sections)

Reason: The code sets minimum requirements for ventilated attics. This proposal requires that ventilators be installed in accordance with the manufacturers' installation instructions. This requirement is essential if ventilation systems are to provide proper cross-ventilation and perform as intended. The proposal further clarifies that the weather protection requirements applicable for roof and wall penetrations, including flashing requirements, are considered.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: FISCHER-RB-4-R806.4

RB161-09/10 R806.4

Proponent: Joseph Lstiburek, Building Science Corporation

Revise as follows:

R806.4 Unvented attic assemblies. Unvented *attic* and unvented enclosed rafter assemblies (spaces between the ceiling joists of the top *story* and the roof rafters) and unvented enclosed rafter assemblies (spaces between ceilings that are applied directly to the underside of roof framing members/rafters and the structural roof sheathing at the top of the roof framing members/rafters) shall be permitted if all the following conditions are met:

- 1. The unvented attic space is completely contained within the building thermal envelope.
- 2. No interior <u>class I</u> vapor retarders are installed on the ceiling side (*attic* floor) of the unvented *attic* assembly <u>or</u> <u>on the ceiling side of the unvented enclosed rafter assembly</u>.
- 3. Where wood shingles or shakes are used, a minimum1/4 inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.
- 4. In climate zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a <u>class II</u> vapor retarder, or shall have a <u>class II</u> vapor retarder coating or covering in direct contact with the underside of the insulation.
- 5. Either Items 5.1, 5.2 or 5.3 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
 - 5.1. *Air-impermeable insulation* only. Insulation shall be applied in direct contact with the underside of the structural roof sheathing.
 - 5.2. Air-permeable insulation only. In addition to the air-permeable installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing as specified in Table R806.4 for condensation control.
 - 5.3. Air-impermeable and air-permeable insulation. The *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing as specified in Table R806.4 for condensation control. The air-permeable insulation shall be installed directly under the *air-impermeable insulation*.

5.4 Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Reason: The main reason for this-change is to allow unvented roof construction for both attics and cathedral ceilings. The current language does not explicitly allow unvented roof construction for cathedral ceilings. Attics and ceilings are similar – the governing physics are identical - so the requirements will work for both. The language defining cathedral ceilings comes directly from similar language in the IBC Section 1203.2.

When the changes to vapor retarder definitions were made in the previous two code change cycles this section was inadvertently not changed. This proposed change inserts the new terminology and the appropriate specific class of vapor retarder.

The new note 5.4 acknowledges that rigid insulation sheets do meet the material properties of air-impermeable insulation directly. However, they are an air-impermeable insulation if their edges are not sealed to provide a continuous plane of airtightness. This new note clarifies the use of rigid insulation sheets.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: LSTIBUREK-RB-2-R806.4

RB162-09/10

R903.2.1

Proponent: Mike Rice, Maplewood, MN, representing the Association of Minnesota Building Officials

Revise as follows:

R903.2.1 Locations. Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. <u>Kick out flashing shall be installed where the lower portion of a sloped roof stops within the plane of an intersecting wall cladding in such a manner as to divert or kick out water away from the assembly.</u> Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet).

Reason: This would be consistent with the code change proposal of R703.8 This change would also complement the current code addressing wall and roof intersections and prevent water from entering the wall cavity or penetrating to the structural building components. Step flashing at wall and roof intersections is incomplete without the kick out flashing, where the lower portion of a sloped roof stops within the plane of an intersecting wall. The water must be diverted away or it will find a way behind the water-resistive barrier and the siding or in some cases, it will go through the siding. The benefit of adding the kick out flashing would far exceed the cost, as the cost would be little.

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

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

ICCFILENAME: RICE-RB-1-R903.2.1

RB163–09/10 R903.5, R903.5.1, R903.5.2, Figure R903.5, R907.3

Proponent: Michael D. Fischer, The Kellen Company, representing the Asphalt Roofing Manufacturers Association

1. Delete without substitution:

R903.5 Hail exposure. Hail exposure, as specified in Sections R903.5.1 and R903.5.2, shall be determined using Figure R903.5.

R903.5.1 Moderate hail exposure. One or more hail days with hail diameters larger than 1.5 inches (38 mm) in a 20 year period.

R903.5.2 Severe hail exposure. One or more hail days with hail diameters larger than or equal to 2.0 inches (51 mm) in a 20-year period.

FIGURE R903.5 HAIL EXPOSURE MAP

2. Revise as follows:

R907.3 Recovering versus replacement. New roof coverings shall not be installed without first removing all existing layers of roof coverings where any of the following conditions exist:

- 1. Where the existing roof or roof covering is water-soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
- 2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.
- 3. Where the existing roof has two or more applications of any type of roof covering.
- 4. For asphalt shingles, when the building is located in an area subject to moderate or severe hail exposure according to Figure R903.5.

Exceptions:

- 1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
- 2. Installation of metal panel, metal shingle and concrete and clay tile roof coverings over existing wood shake roofs shall be permitted when the application is in accordance with Section R907.4.
- 3. The application of new protective coating over existing spray polyurethane foam roofing systems shall be permitted without tear-off of existing roof coverings.

Reason: This proposal removes the hail hazard map (Fig. R903.5), the definitions of hail exposure, and the current re-roofing limitation for asphalt shingles in some regions. The IRC requirement for reroofing is posed as a solution to minimize damage to asphalt shingles from hail events, but there is no data that concludes that limiting the application of asphalt shingles to a single layer provides appropriate cost savings to the homeowner. While this requirement may provide some benefit to insurers, that does not justify its inclusion in the IRC.

The revolting section provides for limitations where the roof system is damaged and will not support an additional layer of shingles. This performance requirement should outweigh an arbitrary and universal ban on reroofing over an existing layer of asphalt shingles. The limitation is also vague in that it does not specify if the ban applies to the existing layer or to the reroof material. For example, would installation of metal roofing over an existing layer of asphalt shingles be allowed under this requirement in hail exposure areas? If so, the requirement unfairly provides preferential treatment of one type of roof covering without technical justification. The additional and often unnecessary expense of tear-off and disposal can result in delays of reroofing as homeowners struggle to decide what home maintenance they can afford. As the reroofing is delayed, additional water intrusion may cause other problems for occupants.

The current requirements are based upon a 20-year return period as contained in the definition of moderate and severe exposure conditions. Design requirements for other products, including resistance from windborne debris, are based upon a 50-year mean recurrence and annual probability of 2%. Using a 20-year standard suggests that this requirement is not intended to protect the structure or its occupants, but mitigate property loss by asking the consumer to pay more for re-roofing.

Requiring removal of an existing layer of asphalt shingles creates a significant impact on environmental issues. While many states and local jurisdictions have appropriate recycling programs in place, in many areas the tear-off materials end up in landfills. According to the US EPA, 11 million tons of asphalt shingles are manufactured and disposed of each year, and make up about 8% of the total building waste stream. The impact on landfills is an important consideration. Building materials take up significant space, and asphalt roofing products can encapsulate other landfill materials and delay the process of decay and degradation. Removing this requirement will allow local governments to buy time and implement programs that will provide for the re-use of asphalt shingles in roadways and other applications.

Figure R903.5 was introduced into the IRC during final action in Detroit on a Sunday afternoon with only a handful of governmental voting members present. These requirements were approved despite the fact that the map does not represent the work of any consensus body, the concept provided no technical or economic justification, and the proposal was disapproved by the IRC code development committee. Attempts to expand the use of this concept to new installations have been disapproved by the ICC in subsequent code cycles. Approval of this proposal will allow all stakeholders to properly address concerns in hail-prone regions through the development of consensus-based codes and standards, will have a positive impact on the environment and our landfills, and will provide a significant cost benefit for homeowners seeking to properly maintain their property.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: FISCHER-RB-3-R903.5

RB164-09/10 R905.1

Proponent: W. Harvey Cappel, PE, Racelectric Engineering

Revise as follows:

R905.1 Roof covering application. Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, specifically waived by a listed exception in the appropriate code section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

Reason: The term "otherwise specified" without a definition basically means "anything specified" which makes this Section R905.1 meaningless and basically void. The original intent here is to require roof coverings to be installed to resist specific wind loads. With this undefined "otherwise specified" loophole the intent of R905.1 is cancelled. We want roof coverings to be installed to resist the wind loads so let's be clear about what we want.

Cost Impact: There will be no cost impact (as compared to the original intent of the Code) related to this proposed code change.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: CAPPEL-RB-3-R905.1

RB165-09/10

R905.2.4.1

Proponent: W. Harvey Cappel, PE, Racelectric Engineering

Revise as follows:

R905.2.4.1 Wind resistance of asphalt shingles <u>adhesive strips</u>. Asphalt shingles shall be tested <u>for wind</u> <u>resistance of the adhesive strips (required to secure the shingle tabs)</u> in accordance with ASTM D 7158. Asphalt shingles shall meet the classification requirements of Table R905.2.4.1 (1) for the appropriate maximum basic wind speed. Asphalt shingle packaging shall bear a label to indicate compliance with ASTM D 7158 and the required classification in Table R905.2.4.1 (1).

Exception: Asphalt shingles not included in the scope of ASTM D 7158 shall be tested and labeled to indicate compliance with ASTM D 3161 and the required classification in Table R905.2.4.1 (2).

Reason: The referenced test standards test the adhesive and its resistance to failure due to wind loads (test simulated) on the upwind side of the roof. These tests do not test fasteners or the resistance of fasteners to withdrawal from the wood deck. The tests aren't even (test simulated) on the correct side of the roof (downwind) required for testing the fasteners. Mr. Mike Noone, Chairman of ASTM Subcommittee D08-02 (the authors of ASTM D 3161 and similar test codes) will confirm this. The problem with the current wording is that it is misleading causing some to believe that use of the manufactures' nail standard during this test is a test of the nails and therefore the standard nailing required, for these shingles, on any roof for winds up to the test standard wind speeds. This is not true. For high wind areas (110 mph or greater) the fasteners must be designed for the wind speed, mean roof height and exposure. Fasteners are not tested nor do they need to be. Sufficient data is already available to Engineers for the design of fastener systems.

Cost Impact: The only impact this code change proposal will have on cost is to those that have been wrongly interpreting the intent of the Code. In this case the cost of only a few more nails per shingle will be insignificant especially as compared to the cost of a failed shingle system cause by inadequate nailing.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: CAPPEL-RB-1-R905.2.4.1

RB166-09/10 R905.2.5

Proponent: W. Harvey Cappel, PE, Racelectric Engineering

Revise as follows:

R905.2.5 Fasteners. Fasteners for asphalt shingles shall be galvanized steel, stainless steel, aluminum or copper roofing nails, minimum <u>11 gage (0.1205 (3mm)</u> 12 gage (0.105 inch (3mm)) shank with a minimum 3/8-inch (10 mm) diameter head, ASTM F 1667, of a length to penetrate through the roofing materials and <u>penetrate through the minimum required roof sheathing or penetrate to an equivalent embedment into the thicker than minimum required roof sheathing. a minimum of <u>34</u> inch (19 mm) into the roof sheathing. Where the roof sheathing is less than <u>34</u> inch (19 mm) thick, the fasteners shall penetrate through the sheathing. Fasteners shall comply with ASTM F 1667.</u>

Reason: 1) The 12 gage nails are rarely if ever used anymore and in many cases inadequate. The outdated standard is copied from the typical manufacturer's installation instructions (also outdated). The minimum standard needs to be updated.

2) The current Section wording is outdated (copied from the typical shingle manufacturer's installation instructions, also outdated) and ambiguous. It implies an either or standard with the in between not in compliance with the Code. This is ridiculous. If a 3/8 inch penetration is in compliance with the Code then all greater penetrations and embedment's up to and including the other Code required ³/₄ inch penetration are also in compliance with the Code. The problem with this incorrect wording is that it is being used as evidence of non compliance, which is senseless.

Cost Impact: 1) Probably no cost impact at all to go to the new 11 gage nail since the 12 gage nail isn't normally being used anyway, but even where it is, the cost impact will be minimal.

2) There will be no cost impact related to this proposed Code change; only less confusion and potentially a cost savings.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: CAPPEL-RB-2-R905.2.5

RB167-09/10

R905.2.6

Proponent: W. Harvey Cappel, PE, Racelectric Engineering

Revise as follows:

R905.2.6 Attachment. Asphalt shingles shall have the minimum number of fasteners required by the manufacturer, but not less than four fasteners per strip shingle or two fasteners per individual shingle. Where the roof slope exceeds 21 units vertical in 12 units horizontal (21:12, 175 percent slope), or where the basic wind speed is equal to or exceeds100 mph shingles shall be installed as required by the manufacturer, but with not less than six nails per shingle and as required to comply with Section R905.1.

Reason: The current code is being misinterpreted (mainly because of a misunderstanding of the ASTM D 3161 test [it only tests adhesives] requirement for high wind areas) regarding the fastening requirements to resist wind loads. This proposed change will help reinforce the known requirement that additional fasteners are required in high wind areas. The shingle manufacturers cannot be relied on for this requirement since they cannot and do not take responsibility for fastening design or fastening installation in high wind areas. Their wind related limit of warranty and responsibility typically stops with assurance against manufacturer's defects and compliance with one of the ASTM adhesive tests standards. Knowing that four nails per shingle are typically inadequate in high wind areas, here is an opportunity to set a minimum standard for high wind areas. The extreme number of shingle failures as a result of recent hurricanes Rita and Ike with wind speeds well below the typical coastal design standards, should be sufficient motivation to make a change in our shingle installation codes. What we have in force now, (basically four nails per shingle everywhere) is not working.

Cost Impact: There will be no cost impact (as compared to the original intent of the Code) related to this proposed Code change. Even if this change causes some construction projects to use six nails per shingle instead of the incorrect four nails per shingle, the additional cost will be minimal, especially as compared to the cost of an inadequate and failed shingle installation.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: CAPPEL-RB-4-R905.2.6

RB168-09/10

R905.2.8.3

Proponent: Gary Ehrlich, PE, National Association of Home Builders (NAHB)

Revise as follows:

R905.2.8.3 Sidewall flashing. Flashing against a vertical sidewall shall be by the step-flashing method. The flashing shall be a minimum of 4 inches (102 mm) high and 4 inches (102 mm) wide. At the end of the vertical sidewall the step flashing shall be turned out in a manner that and shall directs water away from the vertical sidewall and onto the roof and/or into the gutter. Where siding is provided on the vertical sidewall, the vertical leg of the flashing shall be continuous under the siding.

Reason: The purpose of this proposal is to clarify the requirements for the use of flashing at a vertical wall-to-roof intersection. The use of "step flashing" is fine for masonry wall construction; but to use it where siding is provided is incorrect. Walls with siding should be provided with continuous "J"-shaped sections of flashing, with the vertical leg continuous under the siding. A "J" turn back lip on the horizontal leg of the siding controls the water and directs it down the roof to the gutter. Step flashing does not have the return lip. "J"-shaped flashing sections are continuous, requiring fewer joints, look much better, and also reduce the opportunity for water to have multiple points of possible entry.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCEILENAME: EHRLICH-RB-11-R905.2.8.3

RB169–09/10 R905.2.8.3.1 (New); IBC 1405.2.1 (New)

Proponent: Edward L. Paxton, Salt Lake County, UT, representing the Utah Chapter of ICC

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

PART I – IRC BUILDING/ENERGY

Add new text as follows:

R905.2.8.3.1. Counter-flashing. A 6" tall counter-flashing with drip edge shall be installed on the sidewall, overlapping the step flashing a minimum of 2 inches. Required weather barrier/building paper or house wrap and exterior coverings shall overlap the counter-flashing. Vertical sidewall exterior coverings with any required weep screed or drip edge shall terminate a minimum of 4" above the finished roof surface.

PART II – IBC FIRE SAFETY

Add new text as follows:

1405.2.1 Termination above roof surfaces. All exterior wall coverings installed on vertical surfaces shall terminate a minimum of 4" above any intersecting roof surface, or as required by roofing manufacturer. Flashing and water resistive barriers shall be installed as to allow replacement of the roof covering with required flashings without removal of the exterior wall covering.

Reason: Building finishes on vertical surfaces are regularly installed tight to roofing surface. This does not allow for proper drainage of installed building exterior coverings. The result is improper drainage which leads to mold growth, covering failures and leaks. When roof replacement is necessary, the ability to properly install new step flashing is not possible without removing and repairing building exterior coverings. Alternatively, the new step flashing is often improperly installed over top of the exterior wall covering, trapping moisture that drains out of the bottom of the exterior covering weep or drip edge.

The minimal increase in cost to add an extra counter-flashing is minimal when compared to the cost to repair damage wall covering or to properly replace the roof when necessary.

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

PART I - IRC BUILDING/ENERGY

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
PART I – IBC F	IRE SAFETY				
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	ICCFILENAME: PAXTON-RB-1-R905.2.8.3.1- FS1-1405.2.1

RB170-09/10 R905.2.8.5 (New)

Proponent: Logan G. Sauter, Salt Lake City Corporation, representing the Utah Chapter of ICC

Add new text as follows:

R905.2.8.5 Drip Edge. Provide drip edge at eaves and gables of shingle roofs. Overlap to be a minimum of 2 inches (51 mm). Eave drip edges shall extend 0.25 inch (6.4 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edges shall be mechanically fastened a maximum of 12 inches (305 mm) o.c.

Reason: Unlike the IBC, the IRC does not include drip edge requirements for shingle roofs. This new text brings the IRC into uniformity with the IBC, reflects manufacturers' requirements for shingle roof installations, and uses identical wording and placement as found in IBC 1507.2.9.3.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
-				ICCFILENAME: SAUTER-RB-1-R905.2.8.5

RB171-09/10 R907.3

Proponent: Robert McCluer, RMc Code Consulting, representing the Metal Construction Association (MCA)

Revise as follows:

R907.3 Re-covering versus replacement. New roof coverings shall not be installed without first removing all existing layers of roof coverings where any of the following conditions occur:

- 1. Where the existing roof or roof covering is water-soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
- 2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.
- 3. Where the existing roof has two or more applications of any type of roof covering.
- 4. For <u>asphalt shingles over existing</u> asphalt shingles, when the building is located in an area subject to moderate or severe hail exposure according to Figure R903.5.

Exceptions:

- 1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
- 2. Installation of metal panel, metal shingle, and concrete and clay tile roof coverings over existing wood shake roofs shall be permitted when the application is in accordance with Section R907.4.
- 3. The application of new protective coating over existing spray polyurethane foam roofing systems shall be permitted without tear-off of existing roof coverings.

Reason: The purpose of this code change is only to clarify the application of the current text of item 4 of Section R907.3. This change is needed since the current text is not clear and could be misapplied.

The purpose of item 4 is to address the behavior of more than one layer of asphalt shingles on a roof located in a moderate or severe hail exposure. This condition results in a "sponge" effect in the top layer of the shingles that reduces the impact resistance of the roof. Thus the top layer is more susceptible to penetration by hailstones that increases the potential for water penetration under the roof covering.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: MCCLUER-RB-1-R907.3

RB172-09/10 R907.5

Proponent: Rick Davidson, City of Maple Grove, MN

Revise as follows:

R907.5 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counter flashings Any existing flashings, edgings, outlets, collars, vents or similar devices that are a part of the roof assembly shall not be reinstalled where <u>be replaced when</u> rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled.

Reason: The current language states that only specific items cannot be reused if damaged. This implies that those items not listed may be reused even if damaged. The proposal also makes it clear that damaged components must be replaced even if they are not "reinstalled" but simply reused in-place.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCEILENAME: DAVIDSON-RB-1-R907.5
RB173-09/10 R1004.3

Proponent: Jim Buckley, Buckley Rumford Co., representing the Masonry Alliance for Codes and Standards (MACS) and Clay Flue Lining Institute (CFLI)

Revise as follows:

R1004.3 Decorative shrouds. Decorative shrouds shall not be installed at the termination of <u>air-cooled</u> chimneys for factory-built fireplaces <u>listed to UL 127</u> except where the shrouds are listed and *labeled* for use with the specific factory-built fireplace system and installed in accordance with the manufacturer's installation instructions.

Reason: Add the words "air-cooled" and "listed to UL127" as non listed decorative shrouds can interfere with the air flow of air-cooled metal chimneys listed to UL 127 for factory-built fireplaces. There is no problem, however, adding decorative shrouds to insulated factory-built chimneys listed to UL 103 that are used for masonry fireplaces, stoves, furnaces and many other appliances. The language here should be specific to aircooled UL 127 chimneys and distinguished from insulated Class A chimneys specified in Section R1005.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: BUCKLEY-RB-2-R1004.3

RB174-09/10 1005.2

Proponent: Jim Buckley, Buckley Rumford Co., representing the Masonry Alliance for Codes and Standards (MACS) and Clay Flue Lining Institute (CFLI)

Revise as follows:

R1005.2 Decorative shrouds. Decorative shrouds shall not be installed at the termination of factory-built chimneys except where the shrouds are *listed* and *labeled* for use with the specific factory-built chimney system and installed in accordance with the manufacturer's installation instructions. Decorative shrouds shall comply with the provisions of R1003.9.

Reason: There is no problem adding decorative shrouds to insulated factory-built chimneys listed to UL 103 that are used for masonry fireplaces, stoves, furnaces and many other appliances provided they comply with the general provisions for chimney terminations in Section R1003.9.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: BUCKLEY-RB-3-R1005.2

RB175-09/10 AG101.2

Proponent: Lorraine Ross, Intech Consulting, Inc., representing the Association of Pool and Spa Professionals

Revise as follows:

AG101.2 Pools in flood hazard areas. Pools that are located in flood hazard areas established by Table R301.2(1), including above-ground pools, on-ground pools and in-ground pools that involve placement of fill, shall comply with Sections AG101.2.1 or AG101.2.2.

Exception: Pools located in riverine flood hazard areas which are outside of designated floodways <u>and pools in</u> flood hazard areas not directly connected to a watercourse.

Reason: The 2009 IRC adopted new provisions regarding pools located in flood hazard areas. This proposed revision is intended to clarify that the exception applies to pools in flood hazard areas not directly connected to a flowing body of water, which is called a watercourse in other parts of the National Flood Insurance Program (NFIP) regulations.

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

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

RB176-09/10

AG106.1, AG106.2 (New), AG106.3 (New), AG106.4 (New), AG106.5 (New), AG108 (New); IBC 3109.5.1 (New), 3109.5.2 (New), 3109.5.3 (New), 3109.5.4 (New), Chapter 35 (New)

Proponent: Gary S. Duren, Code Compliance, Inc., representing Pool Safety Council

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

PART I – IRC BUILDING/ENERGY

1. Delete and substitute as follows:

AG106.1 General. Suction outlets shall be designed and installed in accordance with ANSI/APSP-7.

AG106.1 General. Suction outlets shall be designed to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or multiple suction outlets, whether isolated by valves or otherwise, shall be protected against user entrapment.

2. Add new text as follows:

AG106.2 Suction fittings. Pool and spa suction outlets shall have a cover that conforms to ANSI/ASME A112.19.8.

Exception: Surface skimmers

AG106.3 Vacuum relief system required. Pool and spa single- or multiple-outlet circulation systems shall be equipped with a vacuum relief system should grate covers located therein become missing or broken. All pool and spa single- or multiple-outlet circulation systems shall be equipped with an approved or engineered vacuum relief system of the type specified herein, as follows:

- 1. Safety vacuum release system conforming to ASME A112.19.17 or ASTM F 2387; or
- 2. An approved gravity drainage system.

AG106.4 Dual drain separation. Single or multiple pump circulation systems shall be provided with a minimum of two suction outlets of the approved type. A minimum horizontal or vertical distance of 3 feet (914 mm) shall separate the outlets. These suction outlets shall be piped so that water is drawn through them simultaneously through a vacuum relief-protected line to the pump or pumps.

AG106.5 Pool cleaner fittings. Where provided, vacuum or pressure cleaner fitting(s) shall be located in an accessible position(s) at least 6 inches (152 mm) and not more than 12 inches (305 mm) below the minimum operational water level or as an attachment to the skimmer(s).

3. Add new standards to AG108 as follows:

ANSI/ASME

A112.19.8a-08
A112.19.17-09Suction Fittings for use in Swimming Pools, Wading Pools, Spas and Hot Tubs
Manufactured Safety Vacuum Release Systems (SVRS) For Residential and Commercial
Swimming Pool, Spa, Hot Tub and Wading Pool Suction Systems

<u>F 2387-04</u> Standard specification for manufactured safety vacuum release systems, swimming pools, spas and hot tubs

PART II – IBC GENERAL

1. Delete and substitute as follows:

3109.5 Entrapment avoidance. Suction outlets shall be designed and installed in accordance with ANSI/APSP-7.

3109.5 Entrapment avoidance. Suction outlets shall be designed to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or multiple suction outlets, whether isolated by valves or otherwise, shall be protected against user entrapment.

2. Add new text as follows:

3109.5.1 Suction fittings. Pool and spa suction outlets shall have a cover that conforms to ANSI/ASME A112.19.8.

Exception: Surface skimmers

3109.5.2 Vacuum relief system required. Pool and spa single- or multiple-outlet circulation systems shall be equipped with a vacuum relief system should grate covers located therein become missing or broken. All pool and spa single- or multiple-outlet circulation systems shall be equipped with an approved or engineered vacuum relief system of the type specified herein, as follows:

- 1. Safety vacuum release system conforming to ASME A112.19.17 or ASTM F 2387; or
- 2. An approved gravity drainage system.

3109.5.3 Dual drain separation. Single or multiple pump circulation systems shall be provided with a minimum of two suction outlets of the approved type. A minimum horizontal or vertical distance of 3 feet (914 mm) shall separate the outlets. These suction outlets shall be piped so that water is drawn through them simultaneously through a vacuum relief-protected line to the pump or pumps.

3109.5.4 Pool cleaner fittings. Where provided, vacuum or pressure cleaner fitting(s) shall be located in an accessible position(s) at least 6 inches (152 mm) and not more than 12 inches (305 mm) below the minimum operational water level or as an attachment to the skimmer(s).

3. Add new standards to Chapter 35 as follows:

ANSI/ASME

A112.19.8a-08	Suction Fittings for use in Swimming Pools, Wading Pools, Spas and Hot Tubs
A112.19.17-09	Manufactured Safety Vacuum Release Systems (SVRS) For Residential and Commercial
	Swimming Pool, Spa, Hot Tub and Wading Pool Suction Systems
ASTM	
<u>F 2387-04</u>	Standard specification for manufactured safety vacuum release systems, swimming pools, spas
	and hot tubs

Reason: During the last code change cycle the proponents of APSP-7 made representations that the APSP standard would bring the IRC into consistency with the Virginia Gramme Baker Pool and Spa Safety Act. This is a false statement as to I-Code models were utilized as the model for the safety prescription contained in the Act.

The incorporation of the APSP-7 standard removed the prescription for body and limb entrapment safety. The adverse affect of incorporation of the APSP-7 standard is that the liability for safe pool and spa construction was shifted away from the APSP constituent-manufacturers and placed squarely on the back of the installer, designer and/or the authority having jurisdiction.

By incorporating the safety prescription above installers, designers and the authority having jurisdiction can readily determine code compliance and more important if the pool or spas is as safe as possible.

Cost Impact: There may be an increase in costs associated with installing the proper safety equipment in pools and spas in the neighborhood of \$500.00 - \$2,000.00 dependant on the system used to achieve compliance with the safety prescription.

Analysis: A review of the standards proposed for inclusion in the code, ANSI/ASME A112.19.8a, A112.19.17 and ASTM F 2387, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

PART I – IRC BUILDING/ENERGY

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
PART II IBC GENERAL				
Public Hearing: Committee:	AS	AM	D	ICCEII ENAME: DUREN-RB-1-AG106-G-1-3109.5
Assembly:	ASF	AMF	DF	

RB177-09/10

AG106.2 (New), AG108 (New), Chapter 44 (New); IBC 3109.51 (New), Chapter 35 (New)

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing the Pool Safety Council

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

PART I – IRC BUILDING/ENERGY

1. Add new text as follows:

AG106.2 Vacuum relief system required. All pool and spa single- or multiple-outlet circulation systems that incorporate submerged suction outlet fittings shall be equipped with an approved or engineered vacuum relief system as follows:

- 1. Safety vacuum release systems conforming to ASME A112.19.17 or ASTM F 2387; or
- 2. An approved gravity drainage system.

2. Add new standards to Chapter 44 and AG108 as follows:

ANSI/ASME

<u>A112.19.17-09</u> <u>Manufactured Safety Vacuum Release Systems (SVRS) For Residential and Commercial</u> <u>Swimming Pool, Spa, Hot Tub and Wading Pool Suction Systems</u>

ASTM

<u>F 2387-04</u> Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) For Swimming Pools, Spas, Hot Tubs

PART II – IBC GENERAL

1. Add new text as follows:

<u>3109.5.1 Vacuum relief system required.</u> All pool and spa single- or multiple-outlet circulation systems that incorporate submerged suction outlet fittings shall be equipped with an approved or engineered vacuum relief system as follows:

- 1. Safety vacuum release systems conforming to ASME A112.19.17 or ASTM F 2387; or
- 2. An approved gravity drainage system.

2. Add new standards to Chapter 35 as follows:

ANSI/ASME

A112.19.17-09	Manufactured Safety Vacuum Release Systems (SVRS) For Residential and Commercial	
	Swimming Pool, Spa, Hot Tub and Wading Pool Suction Systems	

ASTM

<u>F 2387-04</u> Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) For Swimming Pools, Spas, Hot Tubs **Reason:** This code change provides a final layer of protection against potential entrapments. While the APSP-7 provides partial protection against entrapment, it does not protect swimmers or waders in the event that problems occur with improperly designed pools, some types of blocked drains, etc. These events can and do occur and when they occur, this proposal provides a mechanism to help prevent entrapment.

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

Analysis: A review of the standards proposed for inclusion in the code, ANSI/ASME A112.19.17 and ASTM F 2387, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

PART I – IRC BUILDING/ENERGY

Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	
PART II – IBC	GENERAL				
Public Hearing:	Committee: Assembly:	AS ASF	AM AMF	D DF	ICCFILENAME: BEITEL-RB-2-APDX G-IBC-G-1- 3109.5.1

RB178–09/10 R202 (New), Appendix G, R324 (New), R325 (New), R326 (New), Chapter 44

Proponent: Tom Neltner, National Center for Healthy Housing, representing National Center for Healthy Housing and Alliance for Healthy Homes

1. Add new definitions as follows:

ABOVE-GROUND/ON-GROUND POOL. See "Swimming pool."

BARRIER. A fence, wall, building wall or combination thereof which completely surrounds the swimming pool and obstructs access to the swimming pool.

HOT TUB. See "Swimming pool."

IN-GROUND POOL. See "Swimming pool."

RESIDENTIAL. That which is situated on the premises of a detached one- or two-family dwelling or a one-family townhouse not more than three stories in height.

SPA. A structure intended for recreational bathing, in which all controls, water-heating and water-circulating equipment are an integral part of the product. A spa may be either a nonportable spa or a portable spa.

SPA, NONPORTABLE. See "Swimming pool."

SPA, PORTABLE. A nonpermanent structure intended for recreational bathing, in which all controls, water-heating and water-circulating equipment are an integral part of the product.

SWIMMING POOL. Any structure intended for swimming or recreational bathing that contains water over 24 inches (610 mm) deep. This includes in-ground, above-ground and on-ground swimming pools, hot tubs and spas.

SWIMMING POOL, INDOOR. A swimming pool which is totally contained with a structure and surrounded on all four sides by the walls of the enclosing structure.

SWIMMING POOL, OUTDOOR. Any swimming pool that is not an indoor swimming pool.

2. Delete Appendix G in its entirety without substitution:

APPENDIX G SWIMMING POOLS, SPAS AND HOT TUBS

3. Add new text as follows:

SECTION R324 SWIMMING POOLS, SPAS AND HOT TUBS

R324.1 General. The provisions of this section shall control the design and construction of swimming pools, nonportable spas and hot tubs installed in or on the lot of a one- or two-family dwelling.

R324.2 Pools in flood hazard areas. Pools that are located in flood hazard areas established by Table R301.2(1), including above-ground pools, on-ground pools and in-ground pools that involve placement of fill, shall comply with Sections R324.2.1 or R324.2.2.

Exception: Pools located in riverine flood hazard areas which are outside of designated floodways.

R324.2.1 Pools located in designated floodways. Where pools are located in designated floodways, documentation shall be submitted to the *building official*, which demonstrates that the construction of the pool will not increase the design elevation at any point within the *jurisdiction*.

R324.2.2 Pools located where floodways have not been designated. Where pools are located where design flood elevations are specified but floodways have not been designated, the applicant shall provide a floodway analysis that demonstrates that the proposed pool will not increase the design flood elevation more than 1 foot (305 mm) at any point within the jurisdiction.

R324.3 In-ground pools. In-ground pools shall be designed and constructed in conformance with ANSI/NSPI-5 as listed in Chapter 35.

R324.4 Above-ground and on-ground pools. Above-ground and on-ground pools shall be designed and constructed in conformance with ANSI/NSPI-4 as listed in Chapter 35.

R324.5 Pools in flood hazard areas. In flood hazard areas established by Table R301.2(1), pools in coastal high hazard areas shall be designed and constructed in conformance with ASCE 24.

R324.6 Permanently installed spas and hot tubs. Permanently installed spas and hot tubs shall be designed and constructed in conformance with ANSI/NSPI-3 as listed in Chapter 35

R324.7 Portable spas and hot tubs. Portable spas and hot tubs shall be designed and constructed in conformance with ANSI/NSPI-6 as listed in Chapter 35.

SECTION R325 BARRIER REQUIREMENTS

R325.1 Application. The provisions of this chapter shall control the design of barriers for residential swimming pools, spas and hot tubs. These design controls are intended to provide protection against potential drownings and near drownings by restricting access to swimming pools, spas and hot tubs.

R325.2 Outdoor swimming pools. An outdoor swimming pool, including an in-ground, above-ground or on-ground pool, hot tub or spa, shall be surrounded by a barrier which shall comply with the following:

- 1. The top of the barrier shall be at least 48 inches (1219 mm) above grade measured on the side of the barrier which faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches (51 mm) measured on the side of the barrier which faces away from the swimming pool. Where the top of the pool structure is above grade, such as an above-ground pool, the barrier may be at ground level, such as the pool structure, or mounted on top of the pool structure. Where the barrier is mounted on top of the pool structure, the maximum vertical clearance between the top of the pool structure and the bottom.
- 2. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere.
- 3. Solid barriers which do not have openings, such as a masonry or stone wall, shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.
- 4. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed 1 ¾ inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1 ¾ inches (44 mm) in width.

- 5. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall not exceed 4 inches (102 mm). Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1 ³/₄ inches (44 mm) in width.
- 6. Maximum mesh size for chain link fences shall be a 2 ¹/₄ inch (57 mm) square unless the fence has slats fastened at the top or the bottom which reduce the openings to not more than 1 ³/₄ inches (44 mm).
- 7. Where the barrier is composed of diagonal members, such as a lattice fence, the maximum opening formed by the diagonal members shall not be more than 1 ³/₄ inches (44 mm).
- 8. Access gates shall comply with the requirements of Section R325.2, Items 1 through 7, and shall be equipped to accommodate a locking device. Pedestrian access gates shall open outward away from the pool and shall be self-closing and have a self-latching device. Gates other than pedestrian access gates shall have a self-latching device. Where the release mechanism of the self-latching device is located less than 54 inches (1372 mm) from the bottom of the gate, the release mechanism and openings shall comply with the following:
 - 8.1. The release mechanism shall be located on the pool side of the gate at least 3 inches (76 mm) below the top of the gate: and
 - 8.2. The gate and barrier shall have no opening larger than ½ inch (12.7 mm) within 18 inches (457 mm) of the release mechanism.
- 9. Where a wall of a dwelling serves as part of the barrier, one of the following conditions shall be met:
 - 9.1. The pool shall be equipped with powered safety cover in compliance with ASTM F 1346; or
 - 9.2. Doors with direct access to the pool through that wall shall be equipped with an alarm which produces an audible warning when the door and/or its screen, if present, are opened. The alarm shall be listed and labeled in accordance with UL 2017. The deactivation switch(es) shall be located at least 54 inches (1372 mm) above the threshold of the door; or
 - 9.3. Other means of protection, such as self-closing doors with self-latching devices, which are approved by the governing body, shall be acceptable as long as the degree of protection afforded is not less than the protection afforded by Item 9.1 or 9.2 described above.
- 10. Where an above-ground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps;
 - 10.1. The ladder or steps shall be capable of being secured, locked or removed to prevent access; or
 - 10.2. The ladder or steps shall be surrounded by a barrier which meets the requirements of Section R325.2, Items 1 through 9. When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4-inch-diameter (102 mm) sphere.

R325.3 Indoor swimming pool. Walls surrounding an indoor swimming pool shall comply with Section R325.2 Item 9.

R325.4 Prohibited locations. Barriers shall be located to prohibit permanent structures, equipment or similar objects from being used to climb them.

R325.5 Barrier exceptions. Spas or hot tubs with a safety cover which complies with ASTM F1346, as listed in Chapter 35, shall be exempt from these barrier requirement provisions.

SECTION R326 ENTRAPMENT PROTECTION FOR SWIMMING POOL AND SPA SUCTION OUTLETS

R326.1 General. Suction outlets shall be designed and installed in accordance with ANSI/APSP-7.

4. Add new standards as follows:

ANSI/NSPI ANSI/NSPI-3-99 Standard for Permanently Installed Residential Spas. ANSI/NSPI-4-99 Standard for Above-ground/On-ground Residential Swimming Pools. ANSI/NSPI-5-2003 Standard for Residential In-ground Swimming Pools. ANSI/NSPI-6-99 Standard for Residential Portable Spas. ANSI/APSP ANSI/APSP-7-06 Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs and Catch Basins. ASCE ASCE/SEI-24-05 Flood Resistant Design and Construction.

ASTM ASTM F 1346-91 (2003)

Performance Specifications for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs.

UL Standard for General-purpose Signaling Devices and Systems-with Revisions through June 2004. June 2004.

Reason: In December 2007, the National Center for Healthy Housing (NCHH) and the U.S. Centers for Disease Control and Prevention (CDC) convened an Expert Panel consistent with National Institute of Health guidelines to assess the effectiveness of various interventions to make homes healthier and safer. NCHH and CDC published the report of the experts in January 2009. See www.nchh.org/LinkClick.aspx?fileticket=2lvaEDNBIdU%3d&tabid=229 for the full report.

The Expert Panel reviewed the peer-reviewed research on the topic and concluded that that 4-sided isolation pool fencing significantly reduces childhood drowning, and that this type of fencing performs significantly better than 3-sided perimeter fencing. The studies showed the following:

- The risk of drowning in a fenced pool was about three times lower, compared to an unfenced pool (Fergusson DM, Horwood LJ. 1984. Risks of Drowning in Fenced and Unfenced Domestic Swimming Pools. New Zealand Medical Journal 97(767): 777–779. Fergusson and Horwood 1984). See also Pitt WR, Balanda KP. 1991. Childhood Drowning and Near-Drowning in Brisbane—The Contribution of Domestic Pools. Medical Journal of Australia 154(10): 661–665.)
- Four-sided isolation fencing is about five times more effective than three-sided perimeter fencing (Intergovernmental Working Party on Swimming Pool Safety. 1988. Pre-School drowning in private swimming pools. Perth: Health Department of Western Australia. One study (Morgenstern H, Bingham T, Reza A. 2000. Effects of pool fencing ordinances and other factors on childhood drowning in Los

Angeles County, 1990-1995. American Journal of Public Health 90(4): 595–601) failed to show that an ordinance requiring pool fencing in Los Angeles reduced drowning significantly. It is possible that this study was confounded by a public education campaign, the fact that the legislation only required 3-sided fencing, possible inadequate enforcement, and other factors.

Consistent with the Expert Panel conclusion, this code change proposal brings the requirements for swimming pools, spas and hot tubs out of Appendix G and into the body of the code text. Safety requirements for pools should not be optional they need to be mandatory.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: NELTNER-RB-1-R324-R325-R326

RB179–09/10 New Chapter

Proponent: Lorraine Ross, Intech Consulting, Inc., representing the Association of Pool and Spa Professionals

Add new chapter as follows:

Move current **APPENDIX G SWIMMING POOLS**, **SPAS AND HOT TUBS** into the body of the IRC by establishing a new chapter. Number accordingly.

Reason: This code change recognizes the importance of utilizing national consensus standards for the design and construction of residential swimming pools, spas and hot tubs. Provisions for construction of swimming pools, spas and hot tubs have been in the IRC as a non-mandatory appendix for many years. With the increased attention to pool safety, as illustrated by the 2009 IRC adoption of *ANSI/APSP-7 Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins*, this is the opportune time to move the requirements of Appendix G into the main body of the code.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCFILENAME: ROSS-RB-1-NEW CHAPTER

RB180–09/10 R202 (New), R325 (New), Appendix F

Proponent: Jane Malone, Alliance for Healthy Homes, representing National Center for Healthy Housing and Alliance for Healthy Homes

1 Add new definitions as follows:

DRAIN TILE LOOP. A continuous length of drain tile or perforated pipe extending around all or part of the internal or external perimeter of a basement or crawl space footing.

RADON GAS. A naturally-occurring chemically inert, radio-active gas that is not detectable by human senses. As a gas, it can move readily through particles of soil and rock and can accumulate under the slabs and foundations of homes where it can easily enter into the living space through construction cracks and openings.

SOIL-GAS-RETARDER. A continuous membrane of 6-mil (0.15 mm) polyethylene or other equivalent material used to retard the flow of soil gases into a building.

SUBSLAB DEPRESSURIZATION SYSTEM (Active). A system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a fan-powered vent drawing air from beneath the slab.

SUBSLAB DEPRESSURIZATION SYSTEM (Passive). A system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a vent pipe routed through the conditioned space of a building and connecting the sub-slab area with outdoor air, thereby relying on the convective flow of air upward in the vent to draw air from beneath the slab.

SUBMEMBRANE DEPRESSURIZATION SYSTEM. A system designed to achieve lower-sub-membrane air pressure relative to crawl space air pressure by use of a vent drawing air from beneath the soil-gas-retarder membrane.

2. Add new text as follows:

SECTION R325 RADON CONTROL METHODS

R325.1 General. The following construction techniques are required to resist radon entry and prepare the building for post-construction radon mitigation in areas designated by the jurisdiction as having high and moderate potential risk of radon exposure. The determination for designating such areas shall be made using the map contained in Figure R325.1, the list contained in Table R325.1, or locally available data.

R325.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a sub-slab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

- <u>1.</u> <u>A uniform layer of clean aggregate, a minimum of 4 inches (102mm)thick. The aggregate shall consist of material that will pass through a 2-inch (51mm)sieve and be retained by a 1/4-inch (6.4 mm) sieve.</u>
- 2. <u>A uniform layer of sand (native or fill), a minimum of 4 inches (102 mm) thick, overlain by a layer or strips</u> of geotextile drainage matting designed to allow the lateral flow of soil gases.
- 3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire sub-floor area.

R325.3 Soil-gas-retarder. A minimum 6-mil (0.15 mm) [or 3-mil (0.075 mm) cross-laminated] polyethylene or equivalent flexible sheeting material shall be placed on top of the gas-permeable layer prior to casting the slab or placing the floor assembly to serve as a soil-gas-retarder by bridging any cracks that develop in the slab or floor assembly and to prevent concrete from entering the void spaces in the aggregate base material. The sheeting shall cover the entire floor area with separate sections of sheeting lapped at least 12 inches (305 mm). The sheeting shall fit closely around any pipe, wire or other penetrations of the material. All punctures or tears in the material shall be sealed or covered with additional sheeting.

R325.4 Entry routes. Potential radon entry routes shall be closed in accordance with Sections R325.4.1 through R325.4.10.

R325.4.1 Floor openings. Openings around bathtubs, showers, water closets, pipes, wires or other objects that penetrate concrete slabs or other floor assemblies shall be filled with a polyurethane caulk or equivalent sealant applied in accordance with the manufacturer's recommendations.

R325.4.2 Concrete joints. All control joints, isolation joints, construction joints and any other joints in concrete slabs or between slabs and foundation walls shall be sealed with a caulk or sealant. Gaps and joints shall be cleared of loose material and filled with polyurethane caulk or other elastomeric sealant applied in accordance with the manufacturer's recommendations.

R325.4.3 Condensate drains. Condensate drains shall be trapped or routed through nonperforated pipe to daylight.

R325.4.4 Sumps. Sump pits open to soil or serving as the termination point for sub-slab or exterior drain tile loops shall be covered with a gasketed or otherwise sealed lid. Sumps used as the suction point in a sub-slab depressurization system shall have a lid designed to accommodate the vent pipe. Sumps used as a floor drain shall have a lid equipped with a trapped inlet.

R325.4.5 Foundation walls. Hollow block masonry foundation walls shall be constructed with either a continuous course of solid masonry, one course of masonry grouted solid, or a solid concrete beam at or above finished ground surface to prevent passage of air from the interior of the wall into the living space. Where a brick veneer or other masonry ledge is installed, the course immediately below that ledge shall be sealed. Joints, cracks or other openings around all penetrations of both exterior and interior surfaces of masonry block or wood foundation walls below the ground surface shall be filled with polyurethane caulk or equivalent sealant. Penetrations of concrete walls shall be filled.

R325.4.6 Dampproofing. The exterior surfaces of portions of concrete and masonry block walls below the ground surface shall be dampproofed in accordance with Section R406 of this code.

R325.4.7 Air-handling units. Air-handling units in crawl spaces shall be sealed to prevent air from being drawn into the unit.

Exception: Units with gasketed seams or units that are otherwise sealed by the manufacturer to prevent leakage.

R325.4.8 Ducts. Ductwork passing through or beneath a slab shall be of seamless material unless the air-handling system is designed to maintain continuous positive pressure within such ducting. Joints in such ductwork shall be sealed to prevent air leakage. Ductwork located in crawl spaces shall have all seams and joints sealed by closure systems in accordance with Section M1601.4.1.

R325.4.9 Crawl space floors. Openings around all penetrations through floors above crawl spaces shall be caulked or otherwise filled to prevent air leakage.

R325.4.10 Crawl space access. Access doors and other openings or penetrations between basements and adjoining crawl spaces shall be closed, gasketed or otherwise filled to prevent air leakage.

R325.5 Passive submembrane depressurization system. In buildings with crawl space foundations, the following components of a passive sub-membrane depressurization system shall be installed during construction.

Exception: Buildings in which an approved mechanical crawl space ventilation system or other equivalent system is installed.

R325.5.1 Ventilation. Crawl spaces shall be provided with vents to the exterior of the building. The minimum net area of ventilation openings shall comply with Section R408.1 of this code.

R325.5.2 Soil-gas-retarder. The soil in crawl spaces shall be covered with a continuous layer of minimum 6-mil (0.15mm) polyethylene soil-gas-retarder. The ground cover shall be lapped a minimum of 12 inches (305 mm) at joints and shall extend to all foundation walls enclosing the crawl space area.

R325.5.3 Vent pipe. A plumbing tee or other approved connection shall be inserted horizontally beneath the sheeting and connected to a 3- or 4-inch-diameter (76 mm or 102 mm) fitting with a vertical vent pipe installed through the sheeting. The vent pipe shall be extended up through the building floors, terminate at least 12 inches (305 mm) above the roof in a location at least 10 feet (3048 mm) away from any window or other opening into the conditioned spaces of the building that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent buildings.

R325.6 Passive subslab depressurization system. In basement or slab-on-grade buildings, the following components of a passive sub-slab depressurization system shall be installed during construction.

R325.6.1 Vent pipe. A minimum 3-inch-diameter (76 mm) ABS, PVC or equivalent gas-tight pipe shall be embedded vertically into the sub-slab aggregate or other permeable material before the slab is cast. A "T" fitting or equivalent method shall be used to ensure that the pipe opening remains within the sub-slab permeable material. Alternatively, the 3-inch (76 mm) pipe shall be inserted directly into an interior perimeter drain tile loop or through a sealed sump cover where the sump is exposed to the sub-slab aggregate or connected to it through a drainage system. The pipe shall be extended up through the building floors, terminate at least 12 inches (305 mm) above the surface of the roof in

a location at least 10 feet (3048 mm) away from any window or other opening into the conditioned spaces of the building that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent buildings.

R325.6.2 Multiple vent pipes. In buildings where interior footings or other barriers separate the sub-slab aggregate or other gas-permeable material, each area shall be fitted with an individual vent pipe. Vent pipes shall connect to a single vent that terminates above the roof or each individual vent pipe shall terminate separately above the roof.

R325.7 Vent pipe drainage. All components of the radon vent pipe system shall be installed to provide positive drainage to the ground beneath the slab or soil-gas-retarder.

R325.8 Vent pipe accessibility. Radon vent pipes shall be accessible for future fan installation through an attic or other area outside the habitable space.

Exception: The radon vent pipe need not be accessible in an attic space where an approved roof-top electrical supply is provided for future use.

R325.9 Vent pipe identification. All exposed and visible interior radon vent pipes shall be identified with at least one label on each floor and in accessible attics. The label shall read: "Radon Reduction System."

R325.10 Combination foundations. Combination basement/crawl space or slab-on-grade/crawl space foundations shall have separate radon vent pipes installed in each type of foundation area. Each radon vent pipe shall terminate above the roof or shall be connected to a single vent that terminates above the roof.

R325.11 Building depressurization. Joints in air ducts and plenums in unconditioned spaces shall meet the requirements of Section M1601. Thermal envelope air infiltration requirements shall comply with the energy conservation provisions in Chapter 11. Fireblocking shall meet the requirements contained in Section R302.11.

R325.12 Power source. To provide for future installation of an active sub-membrane or sub-slab depressurization system, an electrical circuit terminated in an approved box shall be installed during construction in the attic or other anticipated location of vent pipe fans. An electrical supply shall also be accessible

Insert Figure AF101 and renumber as Figure R325.1 follows:



FIGURE AF101 R325.1 EPA MAP OF RADON ZONES

be measured in a building without the implementation of radon control methods. The radon zone designation of highest priority is Zone 1. Table R325.1 of this spection lists the Zone 1 counties illustrated of the map. More detailed information can be obtained from state-specific booklets (EPA-402-R-93-021 through 070) available through State Radon Offices or from U.S. EPA Regional Offices. The map assigns each of the 3, 141 counties in the United States to one of three zones based on radion potential. Each zone designation reflects the average short-term radion measurement that can be expected to

TABLE AF101(1) R325.1HIGH RADON POTENTIAL (ZONE 1) COUNTIES^a

(No change to table contents)

Insert Figure AF102 and renumber as Figure 2 as follows:



FIGURE AF102 2 RADON-RESISTANT CONSTRUCTION DETAILS FOR FOR FOUR FOUNATION TYPES

3. Delete Appendix F Radon Control Procedures.

APPENDIX F RADON CONTROL METHODS

Reason: The purpose of this requirement is to protect occupants from deadly exposure to radon gas. In the current code, provision for radon control, commonly known as radon-resistant new construction, is contained in the optional Appendix F. This proposal to elevate radon control to a requirement in areas documented to have potential for exposing occupants to radon is in response to the dramatic impact of radon exposure. Radon is the second leading cause of lung cancer – second only to smoking – and more significant than secondhand smoke. In the US alone, 18,000-21,000 lung cancer deaths each year are caused by radon exposure. The World Health Organization estimates that between 6% and 15% of lung cancer cases worldwide are caused by radon exposure.

Radon is a tasteless, colorless and odorless gas that is a decay product of uranium and occurs naturally in soil and rock. The main source of high-level radon pollution in buildings is surrounding uranium-containing soil such as granite, shale, phosphate and pitchblende. Radon enters a home through cracks in walls, basement floors, foundations and other openings.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEILENAME: MALONE-RB-1-R202-R325

RB181–09/10 R325 (New), Chapter 44 (New)

Proponent: Jane Malone, Alliance for Healthy Homes, representing National Center for Healthy Housing and Alliance for Healthy Homes

1. Add new text as follows:

SECTION R325 RADON CONTROL METHODS

R325.1 General. The following radon-resistant new construction techniques are intended to prevent radon entry as required in areas designated by the jurisdiction as having high or moderate potential risk of radon exposure. Such areas shall be designated as high potential (Zone 1) or moderate potential (Zone 2) using the map contained in Figure R325.1, the list contained in Table R325.1, or locally available data.

R325.1.1 Active sub-slab soil depressurization radon reduction (fan-powered). An active sub-slab soil depressurization system (fan powered) shall be provided in accordance with ASTM E 1465 where areas are designated as high radon potential (Zone 1).

R325.1.2 Passive sub-slab soil depressurization system. A passive sub-slab soil depressurization system shall be provided in accordance with ASTM E 1465 where areas are designated as moderate radon potential (Zone 2).

Insert Figure AF101 and renumber as Figure R325.1 as follows:



FIGURE AF101 R325.1 EPA MAP OF RADON ZONES

The map assigns each of the 3, 141 counties in the United States to one of three zones based on radion potential. Each zone designation reflects the average short-term radion measurement that can be expected to

be measured in a building without the implementation of radon control methods. The radon zone designation of highest priority is Zone 1. Table R325.1 of this section lists the Zone 1 counties illustrated of the map. More detailed information can be obtained from state-specific booklets (EPA 402-R-93-021 through 070) available through State Radon Offices or from U.S. EPA Regional Offices.

Insert Table AF101(1) and renumber as Table R325.1 as follows:

TABLE AF101(1) TABLE R325.1 HIGH RADON POTENTIAL (ZONE 1) COUNTIES^a

(No change to table contents)

2. Add new standard to Chapter 44 as follows:

ASTM

E1465-08a Standard Practice for Radon Control Options for the Design and construction of New Low-Rise Residential Buildings

Reason: The purpose of this requirement is to protect occupants from deadly exposure to radon gas. In the current code, provision for radon control, commonly known as radon-resistant new construction, is contained in the optional Appendix F. This proposal to elevate radon control to a requirement in areas documented to have high or moderate potential for exposing occupants to radon is in response to the dramatic impact of radon exposure. Radon is the second leading cause of lung cancer – second only to smoking – and more significant than secondhand smoke. In the US alone, 18,000-21,000 lung cancer deaths each year are caused by radon exposure. The World Health Organization estimates that between 6% and 15% of lung cancer cases worldwide are caused by radon exposure.

Radon is a tasteless, colorless and odorless gas that is a decay product of uranium and occurs naturally in soil and rock. The main source of high-level radon pollution in buildings is surrounding uranium-containing soil such as granite, shale, phosphate and pitchblende. Radon enters a home through cracks in walls, basement floors, foundations and other openings.

Under this proposal, the most recently updated ASTM consensus standard for radon control would be added to the code. Among the advantages of the more health protective ASTM standard over the optional Appendix F is its specification for an active fan-powered radon control system. The US Environmental Protection Agency recommends this standard as the approach for radon resistant new construction; through agreement with ASTM, EPA can provide a free copy of the standard - see http://www.epa.gov/radon/pubs/index.html.

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

Analysis: A review of the standard proposed for inclusion in the code, ASTM E 1465, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing: Committee:	AS ASF	AM AMF	D DF	
/ locombry.		,	D,	ICCFILENAME: MALONE-RB-2-R325

RB182–09/10 Appendix R (New)

Proponent: Diana M. Hanson, representing the North American Deck and Railing Association, Inc. (NADRA)

Add new text as follows:

APPENDIX R DECKS

SECTION AR101 GENERAL

AR101.1 Scope. Decks shall conform to the requirements of this appendix chapter.

SECTION AR102 DEFINITIONS

AR102.1 General. Decks include exterior floor systems that are supported by attachment to at least one exterior wall and/or are self-supporting

DECK. An exterior floor system supported on at least two opposing sides by an adjoining structure and/or post, piers, or other independent supports.

ATTACHED DECKS. Decks that are supported by attachment to one or more exterior walls of a dwelling or accessory structure and/or the ground or grade.

FREE STANDING DECKS. Decks that are self-supporting and are not structurally dependent on support from an attachment to a dwelling or accessory structure.

MANUFACTURED DECKING MATERIALS. Deck boards, railings, balusters, posts, and all other guards, which are made of other than sawn lumber; such as wood/plastic composites, plastic, metal, glazed materials and the like.

SECTION AR103 PERMITTED USES

AR103.1 General. Decks shall be permitted to be attached to or detached from dwelling or accessory structures. Decks shall be used only for recreational, outdoor living purposes and not as storage rooms or habitable rooms.

SECTION AR104 PERMITTING

AR104.1 General. Permits are required for decks unless exempted under Section R105.2 of this code.

SECTION AR105 DESIGN LOADS

AR105.1 General. Decks shall be designed and constructed to sustain, within the stress limits of this code, dead and live loads in accordance with Table R301.5.

SECTION AR106 MATERIALS AND CONSTRUCTION

AR106.1 Columns. Where decks are designed to include columns, they shall comply with Section R407.

AR106.2 Deck boards.

AR106.2.1 Common lumber species deck boards. Decks which are designed with Common Lumber Species Deck Boards shall be installed to comply with Table AR106.2.1 of this Appendix R:

Wet Service Deck Board Span Tables						
Species	Dimension	Perpendicular to Joist	Angled to Joist			
	<u>5/4 x 6</u>	<u>16"</u>	<u>12"</u>			
Southern Pine or Douglas Fir	<u>2 x 4</u>	<u>24"</u>	<u>16"</u>			
	<u>5/4 x 6</u>	<u>16"</u>	<u>12"</u>			
Redwood or Cedar	<u>2 x 4</u>	<u>24"</u>	<u>16"</u>			
	<u>2 x 6</u>	<u>24"</u>	<u>16"</u>			
Mahogany or lpe	<u>1 x 4</u>	<u>20"</u>	<u>16"</u>			
	5/4 x 6	24"	16"			

<u>Table AR106.2.1</u> Wet Service Deck Board Span Tables

AR106.2.2 Manufactured deck boards. Decks which are designed to include Manufactured Deck Boards shall be designed and installed in accordance with the provisions of this code, and the manufacturer's installation instructions.

AR106.2.3 Treated wood deck boards. Decks which are designed to include preservative-treated wood shall be of a type, and installed in accordance with R317.

AR106.3 Fasteners. Where decks are designed to use preservative-treated wood, fasteners shall comply with Section R317.3 of this code.

AR106.4 Footings. Footings shall comply with Section R403 of this code.

Table AR106.5										
Wet Service Joist Span Table ^{a, b}										
Joist Dimension		On-center Joist								
<u>(inches)</u>	Species	Spacing	Live Load 40 pst	Live Load 60 pst	Live Load 100 pst					
		<u>12"</u>	<u>9-6</u>	<u>8-4</u>	<u>6-10</u>					
	<u>Hem Fir</u>	<u>16"</u>	<u>8-8</u>	<u>7-5</u>	<u>5-11</u>					
2 x 6		<u>24"</u>	<u>7-2</u>	<u>6-1</u>	<u>4-10</u>					
2 × 0		<u>12"</u>	<u>10-4</u>	<u>9-1</u>	<u>7-6</u>					
	Southern Pine	<u>16"</u>	<u>9-5</u>	<u>8-1</u>	<u>6-6</u>					
		<u>24"</u>	<u>7-10</u>	<u>6-8</u>	<u>5-3</u>					
		12"	<u>12-6</u>	<u>10-10</u>	<u>8-8</u>					
	<u>Hem Fir</u>	<u>16"</u>	<u>11-1</u>	<u>9-5</u>	<u>7-6</u>					
2 × 9		<u>24"</u>	<u>9-1</u>	<u>7-8</u>	<u>6-1</u>					
2 X O	Southern Pine	<u>12"</u>	<u>13-8</u>	<u>11-11</u>	<u>9-8</u>					
		<u>16"</u>	<u>12-5</u>	<u>10-6</u>	<u>8-4</u>					
		<u>24"</u>	<u>10-2</u>	<u>8-7</u>	<u>6-10</u>					
	<u>Hem Fir</u>	<u>12"</u>	<u>15-8</u>	<u>13-3</u>	<u>10-7</u>					
		<u>16"</u>	<u>13-7</u>	<u>11-6</u>	<u>9-2</u>					
2 x 10		<u>24"</u>	<u>11-1</u>	<u>9-4</u>	<u>7-6</u>					
2 × 10	Southern Pine	<u>12"</u>	<u>17-5</u>	<u>15-2</u>	<u>12-6</u>					
		<u>16"</u>	<u>15-10</u>	<u>13-7</u>	<u>10-10</u>					
		<u>24"</u>	<u>13-1</u>	<u>11-1</u>	<u>8-10</u>					
		<u>12"</u>	<u>18-2</u>	<u>15-4</u>	<u>12-3</u>					
	<u>Hem Fir</u>	<u>16"</u>	<u>15-9</u>	<u>13-4</u>	<u>10-7</u>					
2 x 12		<u>24"</u>	<u>12-10</u>	<u>10-10</u>	<u>8-8</u>					
		<u>12"</u>	<u>21-2</u>	<u>18-5</u>	<u>14-8</u>					
	Southern Pine	<u>16"</u>	<u>18-10</u>	<u>15-11</u>	<u>12-8</u>					
		<u>24"</u>	<u>15-5</u>	<u>13-0</u>	10-4					

AR106.5 Joist spans. Joist spans for decks shall comply with Table AR106.5 of this Appendix R.

a. The following assumptions have been made to perform the calculations used to create these spans: Joist material #2 Grade or better

10 psf dead load

Southern Pine wood of 0.55 Specific Gravity

Hem Fir wood of 0.43 Specific Gravity

Adjustment factors applied for wet service on both woods. Incised factor applied to Hem Fir. Deflection is limited to span in inches divided by I/360 on live load.

b. For species and dimensions not included in this table, see AF&PA Maximum Span Calculator for Joists and Rafters online at http://www.awc.org/calculators/span/calc/timbercalcstyle.asp

AR106.6 Ledger connections. Attached Decks shall comply with Section R502.2.2 of this code.

AR106.7 Manufactured decking materials. Decks which are designed with manufactured decking materials shall be installed according to manufacturer's specifications, and shall comply with the applicable standard(s) in accordance with this code. Manufactured decking materials shall consist of:

- 1. Wood/plastic composites complying with ASTM D7032.
- 2. Glazed material complying with CPSC 16 CFR 1201, or ANSI Z97.1.
- <u>3.</u> Other approved manufactured material.

AR106.7.1 Wood/plastic composites shall be labeled according to R317.4 of this code.

AR106.7.2 Treated wood. Decks which are designed to include preservative-treated wood shall be of a type, and installed in accordance R317.

SECTION R107 FLASHING

AR107.1 General. Attached decks shall comply with Section R703.8 of this code.

SECTION AR108 GLAZING

AR108.1 General. Where decks are designed near or adjacent to glazing, they shall comply with Section R308.4 of this code.

SECTION AR109 GUARD REQUIREMENTS

AR109.1 General. Where decks are designed to include guards, they shall comply with Section R312 of this code, and Table R301.5.

SECTION AR110 STAIRWAYS

AR110.1 General. Where decks are designed to include stairways, they shall comply with Section R311.7 of this code.

Reason: This proposal to add Appendix R to the IRC is to rectify a deficiency currently existing with respect to decks. While many of the components of a deck are addressed the IRC, since a deck is not a house and is sometimes detached, it is at best difficult for the code official and the builder to find and use the correct IRC sections, or specified prescriptive detailed direction on decks that are required to be engineered and certified for the design when done. As a result, approving plans and performing inspections on decks is a frustrating experience for even the most IRC-fluent code official. In addition, because the IRC is written with respect to houses, not everything required of a deck for safe building is contained in the IRC.

All of the above puts the decking industry in a similar situation as both the awning and the pool and spa industry, which already have appendices in the IRC, namely <u>Appendix G</u> "Swimming Pools, Spas and Hot Tubs" and <u>Appendix H</u> "Patio Covers." We are simply looking to use a tool that has been used before, to address specific areas related to decking.

North American Deck and Railing Association, Inc. (NADRA) is a trade organization whose membership is comprised of approximately 2/3rds deck builders, with the remaining members being manufacturers and suppliers of goods and services to the decking industry. NADRA is committed to encouraging safe deck building, and educating the consumer. While NADRA is the proponent of Appendix R, understand that its undertaking involved input from areas outside of our organization including seasoned code officials, engineers, and representatives from other trade organizations, to build an Appendix useful not only the code professional, but to the builder and consumer as well.

While a central function of model codes is to create uniformity in building safety practices, such uniformity is not possible for deck builds due to the complicated way decks are currently referenced in the IRC. The result of this deficiency is that many jurisdictions adopt their own sets of deck regulations. Such locally created regulations routinely contradict each other, are not all based on the IRC, but rather on that jurisdiction's ideas of good building practices; and some even prescribe name brand product. Granting Appendix R a place in the IRC will curb the growing number of single jurisdiction instructions, and will continue the ICC purpose of uniform building safety practices.

Proposed Appendix R directly addresses attached and detached deck builds by indexing specific deck related IRC sections, and standards in one location. It also includes reputable source guidelines to address deficiencies such as wood floor joists rated for outdoor use.

The two wood span tables in proposed Appendix R originate from IRC tables, but include a wet service factor calculation. This is an area of serious frustration for builders and code officials since the IRC does not address exterior use of the types and shapes of wood necessary for safe deck building. Table AR106.5 allows for quick verification of compliance without doing the lengthy math, which is the basis for the wood span tables currently in the dry section of the main body of code. The wet service calculation for Table AR106.5 (joists) comes from AF&PA Maximum Span Calculator for Joists and Rafters. Table AR106.2.1 (deck boards) is based on good building practices within the industry.

Proposed Appendix R provides the reference for basic deck construction. We estimate that this will cover 75 – 80% of the decks being built now. Other more complicated designs will, appropriately, continue to need engineering. However, without the approval of Appendix R, even the most simple prescriptive deck can be said to need an engineer's stamp for a permit. Certainly, proposed Appendix R is an improvement to the code, and will additionally reserve a location for further deck specific code as model code continues to evolve.

References for Table AR106.5:

http://www.calredwood.org/ref/pdf/deckcon.pdf http://newstore.southernpine.com/images/ref307.pdf http://www.wrcla.org/pdf/WRCLA_Specifying_Decking.pdf http://www.wclib.org/pdfs/SimpSpanTbls.pdf

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

Public Hearing: Commit	ee: AS	AM	D	
Assemb	ly: ASI	F AMF	DF	

ICCFILENAME: HANSON-RB-1-APPENDIX R

RB183 –09/10 Appendix R (New)

Proponent: Joseph R. Hetzel, PE, Thomas Associates, Inc., representing Door & Access Systems Manufacturers Association (DASMA)

Add new text as follows:

APPENDIX R AUTOMATIC VEHICULAR GATES

SECTION AR101 GENERAL

AR101.1 General. The provisions of this appendix shall control the design and construction of automatic vehicular gates installed on the lot of a one- or two-family dwelling.

SECTION AR102 DEFINITIONS

AR102.1 General. For the purposes of these requirements, the terms used shall be defined as follows and as set forth in Chapter 2.

VEHICULAR GATE. A gate that is intended for use at a vehicular entrance or exit to the lot of a one- or two-family dwelling, and that is not intended for use by pedestrian traffic.

SECTION AR103 AUTOMATIC VEHICULAR GATES

AR103.1 Vehicular gates intended for automation. Vehicular gates intended for automation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

AR103.2 Vehicular gate openers. Vehicular gate openers, when provided, shall be listed in accordance with UL 325.

SECTION AR104 ABBREVIATIONS

AR104.1 General

<u>ASTM – ASTM International</u> <u>100 Barr Harbor Drive</u> <u>West Conshohocken, PA 19428</u>

<u>UL – Underwriters Laboratories, Inc.</u> <u>333 Pfingsten Road</u> Northbrook, IL 60062-2096

SECTION AR105 STANDARDS

AR105.1 General

ASTM F2200-05 Standard Specification for Automated Vehicular Gate Construction.....AR103.1

<u>UL</u> <u>325-2006</u> <u>Door, Drapery, Gate, Louver, and Window Operators and Systems.....AR103.2</u> **Reason:** The purpose of the proposed code change is to address an omission in the IRC by including an Appendix section on Automatic Vehicular Gates, and to also harmonize the IRC with the IFC and the IBC regarding the subject. The 2009 IFC utilizes the proposed language in Sections 503.5 (required gates or barricades), 503.6 (security gates) and Appendix D103.5 (fire apparatus access road gates). The 2009 IBC utilizes the proposed language in Section 3110. The only deviation from the language in the IBC is the definition of "automatic gate" which has been modified to fit the scope of the IRC.

The current Code provisions are inadequate because public safety needs are not addressed regarding automatic operation of vehicular gates. Protection is needed from potential entrapment of individuals between an automatically moving gate and a stationary object, or surface, in close proximity to such gate. Gates intended for automation require specific design, construction and installation to accommodate entrapment protection to minimize or eliminate certain excessive gate gaps, openings and protrusions identified as contributing to the hazard of entrapments that have historically caused numerous serious injuries and deaths.

The Code will be improved by including provisions referencing UL 325 and ASTM F 2200. UL 325 is an ANSI recognized safety standard containing provisions governing gate openers. Gate openers listed to the requirements of UL 325 provide the public with assurance that safety requirements have been met for such openers. ASTM F 2200 is a consensus document containing provisions governing the construction of vehicular gates intended for automation, and has been harmonized with the applicable provisions of UL 325.

Death and injury data does exist associated with automated vehicular gates. A previous related proposal on the topic, submitted in 2002 by the Consumer Product Safety Commission and designated as E34-02, pointed out the following information compiled by the CPSC from 1985 to that time:

- 1. Reports of 32 deaths relating to automatically operated vehicular gates were received, many as a result of entrapment between a moving gate and a stationary object.
- 2. Data from the National Electronic Injury Surveillance System estimated that approximately 2,000 people are treated annually in hospital emergency rooms due to injuries in such gates. Many of these injuries have been identified as serious, involving amputation, broken arms and broken legs.

Cost Impact: The code change proposal will increase the cost of construction. However, the resulting safety benefits will outweigh the increased cost.

Analysis: A review of the standard proposed for inclusion in the code, ASTM F2200 and UL 325, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCEII ENAME: HETZEL-RB-2-APPENDIX R

RE1 –09/10 N1101.2, N1101.2.1 through N1101.9, N1102, N1103, Appendix R (New)

Proponent: Bill Fay, Efficient Codes Coalition; Brian Dean, ICF International

1. Revise as follows:

N1101.2 Compliance. Compliance shall be demonstrated by either-meeting the requirements of the *International Energy Conservation Code* or meeting the requirements of this chapter. Climate zones from Figure N1101.2 or Table N1101.2 shall be used in determining the applicable requirements from this chapter.

2. Delete Sections N1101.2.1-N1101.9, N1102 and N1103 in their entirety (including all tables).

3. Add new text as follows to the appendix to the International Residential Code:

APPENDIX R INTERNATIONAL ENERGY CONSERVATION CODE

(This appendix excerpts sections of the *International Energy Conservation Code* relevant to buildings regulated by the *IRC*. This appendix is informative and is not part of the code; however, note that section N1101.2 requires building regulated by the *IRC* to meet the requirements of the *IECC*.)

Reprint the following sections of the International Energy Conservation Code as Appendix R:

(1) IECC Chapter 1 Administration (all Sections, except Sections 101.1-101.2, 101.4.6, and 101.5) (2) IECC Chapters 2-4 and Chapter 6.

Reason: This proposal is intended to permanently resolve the growing inconsistencies between the *IECC* (which is also referenced in the IBC) and the *IRC* by referencing a single set of energy efficiency requirements for all three codes (the *IECC*) and, for ease of reference, including the requirements in new Appendix R of the *IRC*. The proposal also makes code compliance and enforcement more uniform and streamlined.

The Problem. The problem of an inconsistent *IRC* and *IECC*, where the *IRC* energy provisions are weaker and less rigorous than the *IECC*, is well-known. The *IECC* and *IRC* are reviewed by two different code development committees. Proposals must be heard twice (using substantially more resources and prolonging the hearings by days), and the outcome is frequently different. It is then up to the code officials at the Final Action Hearing to sort through the two committees' differing opinions and decide on the best course. As long as there are two codes and two committees, inconsistency will continue to grow, creating problems for jurisdictions that seek to implement a single set of energy efficiency requirements for residential buildings.

The Solution. This proposal presents the best long-term solution for code consistency and uniform enforcement. Just as *IBC* Chapter 13 references the *IECC* for its energy efficiency requirements, *IRC* Chapter 11 would reference the *IECC*. To preserve the convenience of a single-volume residential code, ICC would reprint the relevant sections of the *IECC* in a new Appendix at the end of the *IRC*. In subsequent cycles, as the *IECC* is updated, the *IRC* Chapter 11 would be automatically (and identically) updated by virtue of the reference to the *IECC*. Because Chapter 11 would already require compliance with the IECC, jurisdictions would not need to specifically adopt the new appendix in order for the IECC to be effective.

The general approach of replacing the *IRC* energy chapter with the *IECC* has already been tested in several states. In fact, the *IRC* already references the *IECC* for the performance path (N1101.2), so any state that adopts the *IRC* already automatically adopts the requirements of the *IECC* as a compliance option. Several states have already taken the step suggested by this proposal by exclusively referencing the *IECC* for energy efficiency requirements. The new appendix will add even more convenience to this solution.

The *IECC* Is the Best Single Energy Efficiency Standard. The *IECC* is recognized in federal law and nationwide as the comprehensive model energy code for all residential and commercial buildings. More than two thirds of states have adopted the *IECC* as their mandatory statewide energy code. National, state and local policymakers are demanding a substantially improved level of energy efficiency in building energy codes to meet the nation's security, environmental and energy cost needs. At the same time, building officials demand uniformity and consistency in the International family of codes.

Under the federal Energy Policy Act of 1992, the US Department of Energy (DOE) is required to review each new version of the *IECC* and determine if it is an improvement in energy efficiency over previous versions. (*IRC* Chapter 11 does not undergo such a rigorous assessment by DOE, so it is not clear whether it would meet the same high standard for energy efficiency improvement.) States are also required by federal law to undertake a review of the state energy code and determine whether state energy efficiency requirements meet the stringency of the *IECC* every time the Department of Energy makes a determination on the updated *IECC*.

The *IECC* also serves as the basis for federal tax credits for energy efficient homes, energy efficiency standards for federal buildings, and qualification for FHA mortgages. The *IECC* is also referenced in LEED and many other state and federal programs.

Most recently, the adoption of the 2009 *IECC* was designated by Congress as a threshold requirement for states to receive \$3.2 billion in State Energy Program funds through the American Recovery and Reinvestment Act (Stimulus Bill). None of these programs even references the *IRC*. For all these reasons, the *IECC* is the logical selection as the single energy efficiency standard for the International Codes.

The Benefits of the IECC as the Single Energy Efficiency Standard

• True Consistency. This proposal fixes inconsistencies between the *IRC* and the *IECC/IBC* that have developed over time, and ensures consistency in the future. Even if all code change proposals in the current cycle were 100% consistent, the *IECC* and *IRC* would still be different because of changes made in earlier editions, and would likely be different in the future because two separate committees are reviewing the same code language.

This proposal does not expand or reduce the number of compliance options available to builders. It simply consolidates them in the most reasonable place. The energy efficiency requirements of the *IBC*, *IRC* and *IECC* would be unified into a single set of requirements that comply with all three codes and ensures that all three codes meet the same energy efficiency and building quality standards in the future.

• **Proposals Reviewed and Approved By a Balanced Committee of Experts.** The *IECC* is currently developed by a committee that it is populated by experts in building energy efficiency and where no organization has more than one voting seat.

• Streamlined Enforcement. Once all three I-codes have a unified set of energy efficiency requirements, enforcement will become much simpler. A builder complying with the *IRC* Chapter 11 will automatically meet the requirements of the *IBC* and *IECC*. Builders will only need to follow one set of requirements, and code officials can enforce a single set of requirements.

Less Complicated Code Hearings. This proposal would eliminate a good deal of redundancy in the current code development process by centralizing the energy efficiency requirements in a single committee. Rather than force proponents and code officials to endure hours – even days – of the same testimony before two different committees, this proposal would streamline the process and yield a more consistent result.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: FAY-RE-1-N1101.2-APPENDIX R

RE2 -09/10 N1101.2-N1101.9, N1102 and N1103

Proponent: Jeff Harris, Alliance to Save Energy and Ronald Majette, US Department of Energy

1. Revise as follows:

N1101.2 Compliance. Compliance shall be demonstrated by either-meeting the requirements of the *International Energy Conservation Code* or meeting the requirements of this chapter. Climate zones from Figure N1101.2 or Table N1101.2 shall be used in determining the applicable requirements from this chapter. For consistency and convenience, the relevant administrative provisions, supplemental definitions, prescriptive and mandatory requirements of the *IECC* applicable to buildings regulated by this code are reprinted below. For the Simulated Performance Alternative, buildings regulated by this code shall comply with *IECC* Section 405. Solely for the purpose of compliance with this section, in the event of any conflicts in definitions or referenced standards between the *IECC* and *IRC*, the respective definition or referenced standard from the *IECC* shall control.

2. Delete Sections N1101.2.1-N1101.9, N1102 and N1103 in their entirety (including all tables), and reprint the following sections of the IECC, coordinated with the section numbering of the IRC:

- (1) IECC Chapter 1 Administration (all Sections, except Sections 101.1-101.2, 101.4.6, and 101.5)
- (2) IECC Chapter 2 Definitions (all Sections)
- (3) IECC Chapter 3 Climate Zones (all Sections)
- (4) IECC Chapter 4 Residential Energy Efficiency (Sections 401-404)
- (5) IECC Chapter 6 Referenced Standards (All Standards).

Reason (Harris): This proposal is intended to permanently resolve the growing inconsistencies between the *IECC* (which is referenced by the *IBC*) and the *IRC* by referencing a single set of energy efficiency requirements for all three codes (the *IECC*) and reprinting those requirements directly in Chapter 11 of the *IRC*. The proposal also makes code compliance and enforcement more uniform and streamlined.

The Problem. The problem of an inconsistent *IRC* and *IECC*, where the *IRC* energy provisions are weaker and less rigorous than the *IECC*, is well-known. The *IECC* and *IRC* are reviewed by two different code development committees. Proposals must be heard twice (using substantially more resources and prolonging the hearings by days), and the outcome is frequently different. It is then up to the code officials at the Final Action Hearing to sort through the two committees' differing opinions and decide on the best course. As long as there are two codes and two committees, inconsistency will continue to grow, creating problems for jurisdictions that seek to implement a single set of energy efficiency requirements for residential buildings.

The Solution. This proposal presents a reasonable long-term solution for code consistency and uniform enforcement. Just as *IBC* Chapter 13 references the *IECC* for its energy efficiency requirements, *IRC* Chapter 11 would reference the *IECC*. To preserve the convenience of a single-volume residential code, ICC would reprint the relevant sections of the *IECC* in chapter 11 of the *IRC*. In subsequent cycles, as the *IECC* is updated, the *IRC* Chapter 11 would be automatically (and identically) updated by virtue of the reference to the *IECC*.

The general approach of replacing the *IRC* energy chapter with the *IECC* has already been tested in several states. In fact, the *IRC* already references the *IECC* for the performance path (N1101.2), so any state that adopts the *IRC* already automatically adopts the requirements of the *IECC* as a compliance option. Several states have already taken the step suggested by this proposal by exclusively referencing the *IECC* for energy efficiency requirements. The new appendix will add even more convenience to this solution.

The *IECC* Is the Best Single Energy Efficiency Standard. The *IECC* is recognized in federal law and nationwide as the comprehensive model energy code for all residential and commercial buildings. More than two thirds of states have adopted the *IECC* as their mandatory statewide energy code. National, state and local policymakers are demanding a substantially improved level of energy efficiency in building energy codes to meet the nation's security, environmental and energy cost needs. At the same time, building officials demand uniformity and consistency in the International family of codes.

Under the federal Energy Policy Act of 1992, the US Department of Energy (DOE) is required to review each new version of the *IECC* and determine if it is an improvement in energy efficiency over previous versions. (*IRC* Chapter 11 does not undergo such a rigorous assessment by DOE, so it is not clear whether it would meet the same high standard for energy efficiency improvement.) States are also required by federal law to undertake a review of the state energy code and determine whether state energy efficiency requirements meet the stringency of the *IECC* every time the Department of Energy makes a determination on the updated *IECC*.

The *IECC* also serves as the basis for federal tax credits for energy efficient homes, energy efficiency standards for federal buildings, and qualification for FHA mortgages. The *IECC* is also referenced in LEED and many other state and federal programs.

Most recently, the adoption of the 2009 *IECC* was designated by Congress as a threshold requirement for states to receive \$3.2 billion in State Energy Program funds through the American Recovery and Reinvestment Act (Stimulus Bill). None of these programs even references the *IRC*. For all these reasons, the *IECC* is the logical selection as the single energy efficiency standard for the International Codes.

The Benefits of the IECC as the Single Energy Efficiency Standard

• **True Consistency**. This proposal fixes inconsistencies between the *IRC* and the *IECC/IBC* that have developed over time, and ensures consistency in the future. Even if all code change proposals in the current cycle were 100% consistent, the *IECC* and *IRC* would still be different because of changes made in earlier editions, and would likely be different in the future because two separate committees are reviewing the same code language.

This proposal does not expand or reduce the number of compliance options available to builders. It simply consolidates them in the most reasonable place. The energy efficiency requirements of the *IBC*, *IRC* and *IECC* would be unified into a single set of requirements that comply with all three codes and ensures that all three codes meet the same energy efficiency and building quality standards in the future.

- Proposals Reviewed and Approved By a Balanced Committee of Experts. The IECC is currently developed by a committee that it is
 populated by experts in building energy efficiency and where no organization has more than one voting seat.
- Streamlined Enforcement. Once all three I-codes have a unified set of energy efficiency requirements, enforcement will become much simpler. A builder complying with the *IRC* Chapter 11 will automatically meet the requirements of the *IBC* and *IECC*. Builders will only need to follow one set of requirements, and code officials can enforce a single set of requirements.

Less Complicated Code Hearings. This proposal would eliminate a good deal of redundancy in the current code development process by centralizing the energy efficiency requirements in a single committee. Rather than force proponents and code officials to endure hours – even days – of the same testimony before two different committees, this proposal would streamline the process and yield a more consistent result.

Reason (Majette): The proposed change is intended to eliminate inconsistencies between the IECC and IRC, the two primary codes that relate to residential buildings, and reduce the significant burden of maintaining two similar but not quite identical codes in the ICC's code development process. It does so by eliminating the nearly duplicative provisions of IRC Chapter 11 and replacing them with a reference to the IECC.

This approach is consistent with the way the IBC (Chapter 13) references the IECC for energy efficiency requirements, but to accommodate residential builders' need for a single-volume code solution, the portions of the IECC relevant to one- and two-family dwellings and townhouses three stories or less above grade will be reprinted for convenience in place of the current Chapter 11 text.

The consolidation of the ICC's two residential energy efficiency codes around the IECC is appropriate for the following reasons:

 <u>The IECC is the unambiguous standard of reference</u> that DOE, by Congressional mandate, establishes <u>for its energy code determinations</u>. The Energy Policy Act of 1992 (EPAct-92) requires DOE to evaluate each new version of the IECC to determine whether it will save energy in residences. Because the IRC energy chapter differs in substantive ways from the IECC, DOE is unable to recognize it as an equivalent code.

- The IECC is the unambiguous standard of reference for DOE's evaluations of state energy codes. EPAct-92 requires that states, following any DOE determination that a new version of the IECC saves energy, certify to DOE whether it is appropriate to upgrade their code(s) to meet or exceed that new IECC version.
- <u>The IECC is the predominant residential building energy code in the U.S.</u> About two-thirds of the states reference or are based on some version of the IECC.
- <u>The IECC is the predominant standard of reference for residential above-code programs in the U.S.</u> It serves as the baseline for federal tax credits for energy efficient homes, energy efficiency standards for federal buildings, and qualification for FHA mortgages. It is also referenced in LEED and many other state and federal programs and has been used as the primary source for baseline assumptions in RESNET's home energy rating systems.
- <u>The IECC is the unambiguous threshold for states seeking State Energy Program funds</u> made available by the American Recovery and Reinvestment Act of 2009.
- Because the <u>IRC currently lags behind the IECC in overall energy efficiency</u>, <u>DOE cannot provide compliance tools and support</u> for states that adopt it.
- Maintaining both the IECC and the IRC energy chapter in the ICC's code development process represents a <u>near doubling of efforts by</u> interested parties and ICC staff, with the typical outcome that the IRC energy chapter cannot be used in any of the programs listed above.

This proposal would eliminate the duplicative efforts, eliminate confusion within state governments, streamline code enforcement and the necessary training and tool development, lessen the bureaucratic load on the U.S. DOE, guarantee true consistency between the IECC and the IRC, and sustain the availability of the IRC as a single-volume residential code.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: HARRIS-RE-1-MAJETTE-RE-1-N1101.2, N1101.9

RE3-09/10 Chapter 11

Proponent: Guy Tomberlin, Fairfax County, VA, representing Plumbing and Mechanical Inspectors/VA Building and Code Officials and ICC Region 7

Delete and substitute as follows:

Delete existing Chapter 11 in its entirety. Replace with Chapter 4 of the International Energy Conservation Code.

Reason: The process has become far too cumbersome trying to keep these two documents coordinated. There should not be two different sets of rules, that simply goes against the foundation of the energy code. Unfortunately, giving control of Chapter 11 to the IECC Code Development Committee cannot be accomplished in a code change proposal, but this would certainly be the ideal situation. This proposal is a fresh approach at starting over and "clearing the slate." It will allow a new beginning with the two documents containing the exact same provisions. Making Chapter 11 of the IRC identical with Chapter 4 of the IECC, right now, will establish total consistency and encourage them to remain parallel in the future.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: TOMBERLIN-RE-1-CHAPTER 11

RE4–09/10 Chapter 11

Proponent: Guy Tomberlin, Fairfax County, VA, representing Plumbing and Mechanical Inspectors/VA Building and Code Officials and ICC Region 7

1. Delete without substitution as follows:

Delete the current text of Chapter 11 in its entirety with the exception of Section N1101.1.

2. Add new text as follows:

N1101.2 Requirements. Buildings shall be designed and constructed in accordance with Chapter 4 of the *International Energy Conservation Code*.

Reason: The process has become far too cumbersome trying to keep these two documents coordinated. The there should not be two different sets of rules, that simply goes against the foundation of the energy code. The International Code Council already has a similar situation as this recommended practice set in place and it is working quite well with the International Fuel Gas Code and the International Residential Code Chapter 24 provisions. Maintaining consistency between the commercial and residential provisions should not be a membership function and it is not

reasonable for the members to be responsible for this administrative task. It has become extremely time consuming, not to mention nearly impossible, just trying to cover all the changes applicable to both codes and then come back the next code cycle and attempt to coordinate. In the current process one code or the other is behind a complete cycle while proponents work feverishly to try to catch up. Now with the new policies in place, for the code development hearings between print editions, the current system will equal 3 years of inconsistent regulations. The make–up of the IECC Code Development Committee could easily be altered to accommodate all the interested parties. An added benefit to this proposal would be the time savings during the code change process by just by having a single committee hear all the energy proposals.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: TOMBERLIN-RE-1-CHAPTER 11-2

RE5-09/10 N1102.3.7 (New)

Proponent: Garrett A. Stone, Brickfield Burchette Ritts & Stone, representing Cardinal Glass Industries

Add new text as follows:

N1102.3.7 Maximum fenestration U-factor and SHGC. The area-weighted average maximum fenestration U-factor permitted using trade-offs under this code shall be 0.48 in Zones 4 and 5 and 0.40 in Zones 6 through 8 for vertical fenestration, and 0.75 in zones 4 through 8 for skylights. The area weighted average maximum fenestration SHGC permitted using trade-offs under this code in Zones 1 through 3 shall be 0.50.

Reason: This proposal will make the IECC and IRC consistent by inserting the trade-off maximum from the IECC into the IRC.

Given that windows are the weakest energy efficiency link in the building envelope, it is critical that we get windows right in homes. The best windows are typically about R-3 – less efficient than an un-insulated wall. The fenestration trade-off maximums proposed here are simple, mandatory limits that ensure all new homes contain high-quality, cost-effective windows. This objective is important to save energy and reasonably preserve comfort in all climate zones. These limits will result in windows that resist condensation in colder climates and block unwanted solar gain in warmer climates. Peak demand and HVAC sizing will also be reduced. In short, the limits are necessary to make sure that reasonable windows are not traded away with enormous unintended negative consequences.

The Limits Allow Sufficient Flexibility: The proposed provision allows considerable flexibility for builders to install decorative glass, glass block, and other fenestration products, while maintaining a baseline performance for the home's overall glazing – this flexibility comes from the fact that the provision is satisfied based on area-weighted average SHCG or U-factor. As a result, not all products need to individually meet the limits; only the area weighted average of all products in the home is required to meet the designated limit. Flexibility is further enhanced because the limit in each climate zone is one value – in northern climates the limit is based on U-factor and in southern climates on SHGC. Thus, there is substantial room and flexibility for the builder to use products that are exceptions. The limits are modest numbers that are achievable by most glazing products currently on the market in each climate zone. The *IRC and IECC* currently employs a number of other mandatory measures (including a madatory maximum fenestration air leakage number) to ensure that the minimum code house is reasonably constructed –this proposal is no different.

The Limits Facilitate Ease of Compliance: These trade-off limits are effective and easy to understand and comply with. They have been successfully applied under the *IECC* for the past few years. All states that have already adopted the 2006 or 2009 *IECC*s have adopted these maximums without amendment. They are also already built in "under the hood" for compliance software such as REScheck.

The Limits Protect the Consumer and Builder. The trade-off limits are a key safety net and homeowner protection in a code that allows unlimited glazing area in the Prescriptive and Total UA compliance paths (indeed, the adoption of the maximums in the first place was in part a response to the elimination of glazing restrictions in 2004). By ensuring good windows, consumers are protected from higher energy bills, condensation and discomfort – while builders are protected from call-backs on these fronts.

The Limits Result in Improved Condensation Resistance. Efficient windows as required by the proposed limits will improve condensation resistance. The following chart is found on the Efficient Window Collaborative (EWC) website (www.efficientwindows.org). It shows the condensation potential for different window types.



Note: Condensation occurs above the lines for each product type

According to the chart, a typical double-glazed low-e window can withstand a 0 degree outdoor temperature and 60% relative humidity inside before condensation will begin to collect. By contrast, a regular double-glazed window can only withstand 40% humidity at the same outdoor temperature. In other words, a low-e window has a 50% more effective ability to resist condensation. A single-glazed window is far worse – it can withstand less than 15% humidity at the same temperature – a virtual guarantee of damaging condensation. The fenestration maximums substantially reduce the likelihood of condensation in the colder months, reducing call-back and consumer dissatisfaction and enhancing durability and long-term benefits for the homeowner.

The Limits Result in More Comfortable Homes and Less Energy Use. Without adequate occupant comfort, any perceived energy savings will be instantly lost when an occupant adjusts the thermostat to correct their discomfort. Relatively small changes in window U-factors and SHGCs can have a disproportionate impact on occupant comfort. Everyone has experienced discomfort at some point due to poor windows. Hot spots created by high solar gain in the summer and cold or drafty glass in the winter months can force an occupant to adjust the thermostat to compensate. The charts below, again displayed on the EWC website, show that the likelihood of significant occupant discomfort can double or triple, depending on the type of glass installed.

For example, the following graph shows the probability of discomfort during winter from poorer windows ranging from over 60% with single pane clear windows and almost 40% with double pane clear windows. This risk declines to almost 20% with a low-e window as specified by the limits for northern climates. This problem is due to the cold window -- at zero degrees outdoors, the single pane glass is less than 20 degrees on the inside surface, the double clear glass is slightly over 40 degrees, while the low-e glass is approaching 60 degrees. Obviously, the warmer the interior glass surface, the less likelihood of discomfort.



Similarly, the following graph from the same source shows the probability of discomfort during summer from sunlight and hot glass. The potential comfort problem from bad windows is even worse in the summer. The summertime probability of discomfort ranges from almost 80% with single clear and over 60% with double clear declining to almost 20% with windows as specified by the proposed limits.

Probability of Discomfort



The Limits Reduce Peak Demand and HVAC Sizing. By requiring efficient windows, the limits create immediate cost savings for the builder by permitting the downsizing of heating and cooling equipment. On a national policy level, high-quality windows can help reduce the strain on both the electric grid and gas transmission system and delay the need to build peak generation.

The following chart, also from the EWC website, shows the potential for saving peak demand and reducing HVAC sizing for different window types. Window F is the low SHGC, low U-factor window that would satisfy the window maximums across the country (by contrast, window A is a single pane window). As is readily apparent, improved windows are crucial to lower peak cooling loads and smaller HVAC sizes (with lower costs). Trade-offs against other building components, even if one believed that they saved the same amount of energy, would clearly lose these benefits.



As shown above, the fenestration limits in the *IECC* serve an important role in ensuring residential energy efficiency and meeting national policy goals. We recommend that the fenestration maximums be adopted in the *IRC* to correct the *IRC/IECC* inconsistency.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
,				ICCFILENAME: STONE-RE-1-N1102.3.7

RE6-09/10 N1102.4.5

Proponent: Alex Bosenberg, National Electrical Manufacturers Association, representing the Luminaire Product Section

Delete and substitute as follows:

N1102.4.5 Recessed lighting. Recessed luminaires installed in the *building thermal envelope* shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC-rated and *labeled* as meeting ASTM E 283 when tested at 1.57 psi (75 Pa) pressure differential with no more than 2.0 cfm (0.944 L/s) of air movement from the *conditioned space* to the ceiling cavity. All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

Recessed luminaires. Recessed luminaires installed in contact with the building thermal envelope shall be sealed to limit air-leakage between conditioned and unconditioned spaces. When installed in contact with the building thermal envelope, recessed luminaires shall be Type IC rated and certified to have no more than 2.0 cfm (0.944 L/s) air movement from the conditioned space to the ceiling cavity. The luminaire shall be tested at or 1.57 lbs/ft² (75 Pascals) pressure difference and have a label attached, showing compliance with this test method. All recessed luminaires in contact with the building thermal envelope shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

Reason: The proposed changes clarify that only those recessed luminaires that are in contact with the thermal envelope need to be sealed, IC rated, and be tested to the air leakage requirement as described in ASTM E 283. Many recessed luminaires are installed in unconditioned spaces, or in walls or ceilings between similarly conditioned spaces, and no benefit is gained by adding these requirements where they are unnecessary. Further, IC rated luminaires are allowed to be buried in insulation and could be installed in the building thermal envelope without compromising the envelope or reducing the efficiency. Only those that are installed in contact with the envelope where there is a clear difference in temperature between the two spaces present the potential for energy loss. The current language could be interpreted to require application of this section for all recessed luminaires even if they are installed far from the building thermal envelope.

The recessed luminaires that are built to be compliant with this section are already tested and marked by the manufacturer as complying with the requirement. ASTM E283 is a standard for air leakage for windows, curtain walls, and doors between spaces of similar temperature and humidity, and it is inappropriate to require any product to be listed to a standard that was developed for a different purpose. The revised language makes it clear that those products installed through the building thermal envelope must have a visible marking verifying compliance with the air leakage requirement to aid in inspection. Requiring these products to be "Labeled", per the definition in the IECC, means tested and certified by a third party testing laboratory, usually for very specific applications. There was no substantiation given in the proposal for the 2009 Edition to add this requirement, and none was offered in testimony at either the Code Development Hearings or the Final Action Hearings. The only problem cited by the submitter was poor workmanship by installers. Adding the cost of third-party listing and labeling of the product to the ASTM air leakage standard will do nothing to improve the construction of the product or the quality of the installation. Adding this requirement will drive up the cost of these products, and the cost of construction, with no benefit in efficiency. (Note that these products are already listed by a recognized testing laboratory for electrical and fire safety.)

Cost Impact: The code change proposal will reduce the cost of construction by eliminating requirements where there is no benefit, and will maintain an equal standard of energy efficiency compared with the 2009 Edition of the IECC.

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
•				ICCEILENAME: BOSENBERG-RE-1-N1102.4.5

RE7-09/10 N1103.4

Proponent: John R. Addario, PE, NYS Department of State-Division of code Enforcement and Administration

Revise as follows:

N1103.4 Circulating Hot water supply temperature maintenance systems. All circulating service hot water and heat traced piping shall be insulated to at least R-2. Circulating Hot water systems shall include an automatic or readily accessible manual switch that can turn off the hot water circulating pump or heat trace system when the system is not in use.

Reason: The intent of this section is to require systems that maintain system hot water temperature to be properly insulated. Heat traced systems, like circulating systems, should be required to limit the amount of energy they consume by requiring a minimum amount of insulation. This proposed change includes heat trace systems within the intent of the code and renames the title to include both types of systems.

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

Public Hearing: Committee:	AS	AM	D	
Assembly:	ASF	AMF	DF	
				ICCFILENAME: ADDARIO-RE-1-N1103.4