# CTC MEETING # 17
# April 9 – 10, 2009

## 2007/2008 code changes for consideration in the 2009/2010 cycle

## CLIMBABLE GUARDS - SEATBOARDS

## E85-07/08, Part I IBC MEANS OF EGRESS – AS

**SECTION 1013.0**
**GUARDS**

*Public Comment 2:*

**Ed Roether, HOK SVE, requests Approval as Modified by this public comment.**

**Modify proposal as follows:**

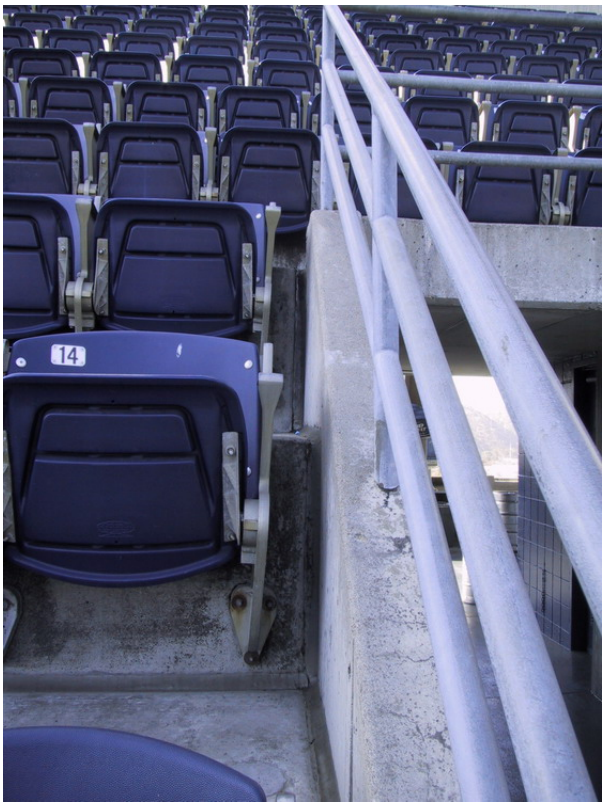
**1013.2 (IFC [B] 1013.2) (Supp) Height.** Required guards shall be not less than 42 inches (1067 mm) high, measured vertically above the adjacent walking surfaces, adjacent ~~fixed seating~~ seatboard or the line connecting the leading edges of the treads.

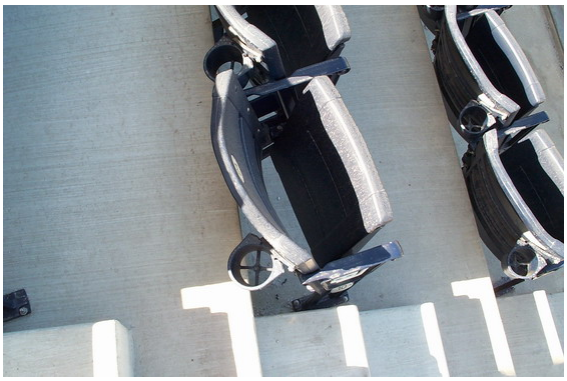
**Exceptions:**

1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, 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.
2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, 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 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.
3. The height in assembly seating areas shall be in accordance with Section 1024.14.
4. Along alternating tread device, guards whose top rail also serves as a handrail, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread nosing.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The term "seatboard" that was replaced with the term "fixed seating" should be maintained for several reasons. The term "fixed seating" does not offer any greater clarity in determining the height of a guard than did the original term "seatboard". In fact, the term "fixed seating" offers more confusion. Where do you measure the height of the guard on the fixed seats in these photographs.





Even though the term “seatboard” is not defined in the building code, offering debate about what might be considered a seatboard, neither is the term “fixed seating”. The use of the term “fixed seating” will not end the debate. The term “fixed seating” is used in Section 1108 and elsewhere within the building code in order to determine accessible seating requirements. Therefore, the term “fixed seating” potentially is more limiting than the term “seatboard”. Would it only apply to fixed seating in assembly seating if it stands as written? This is not the proponent’s intent. The proponent’s reason stated that “a fixed seat becomes a walking surface to a child and thus warrants the guard height to be measured from that point.” While this would certainly be true for some cases, it is not true in <u>all</u> cases. The “seatboards” in the following photographs certainly become a walking surface and measurable. The fixed seating in the photographs above is not.

## NIST WTC RECOMMENDATIONS

## S81-07/08 – WIND TUNNEL TEST STANDARD - WP

**1. Revise as follows:**

**1609.1.1 (Supp) Determination of wind loads:** Wind loads on every building or structure shall be determined in accordance with Chapter 6 of ASCE 7. The type of opening protection required, the basic wind speed and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

**Exceptions:**

1. Subject to the limitations of Section 1609.1.1.1, the provisions of SBCCI SSTD 10 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of the AF&PA WFCM.
3. Designs using NAAMM FP 1001.
4. Designs using TIA/EIA-222 for antenna-supporting structures and antennas.
5. Wind tunnel tests in accordance with Section 6.6 of ASCE 7, subject to the limitations in Section 1609.1.1.2.
6. Wind tunnel tests in accordance with ASCE/SEI 49, subject to the limitations in Section 1609.1.1.2.

**1609.1.1.2 (Supp) Wind tunnel test limitations.** The lower limit on pressures for main wind-force-resisting systems and components and cladding shall be in accordance with Sections 1609.1.1.2.1 and 1609.1.1.2.2. The minimum design wind load shall not be less than the minimum prescribed in Chapter 6 of ASCE 7.

**2. Add standard to Chapter 35 as follows:**

**American Society of Civil Engineers/Structural Engineering Institute**

ASCE/SEI 49-07 Wind Tunnel Testing for Buildings and Other Structures

**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 twelve meetings - all open to the public.

**This proposed change is a follow-up to S16-06/07 which was a result of the CTC's investigation of the area of study entitled "Review of NIST WTC Recommendations". The scope of the activity is noted as:**
**Review the recommendations issued by NIST in its report entitled "Final Report on the Collapse of the World Trade Center Towers", issued September 2005, for applicability to the building environment as regulated by the I-Codes.**

This proposal is intended to address NIST recommendation 2. For this specific proposed change, CTC is working in cooperation with the NIBS/MMC Committee to Translate the NIST World Trade Center Investigation Recommendations for the Model Codes. The CTC notes in their investigation that many of the recommendations contained in the NIST report require additional information for the CTC to further investigate. As such, CTC intends to continue to study the other NIST recommendations.

**NIST Recommendation 2 recommends that nationally accepted performance standards be developed for: (1) conducting wind tunnel testing of prototype structures based on sound technical methods that result in repeatable and reproducible results among testing laboratories; and (2) estimating wind loads and their effects on tall buildings for use in design, based on wind tunnel testing data and directional wind speed data.**

The IBC requires that wind loads be determined in accordance with Chapter 6 of ASCE 7, with specific exceptions depending on the size, configuration and location of the building. Section 6.1 of ASCE 7-05 provides three procedures to determine design wind loads: Method 1- Simplified Procedure; Method 2- Analytical Procedure; and Method 3- Wind Tunnel Procedure. Due to unique wind load considerations for certain building configurations and locations, Section 6.5.2 of ASCE 7 - 05 further mandates compliance with either the wind tunnel procedure of Section 6.6 of ASCE 7 or requires the design to be based on recognized literature documenting the wind load effects. Section 6.6 of ASCE does not currently prescribe specific wind tunnel test procedures. These are being developed by an ASCE Wind Tunnel Testing standard committee.

The purpose of this change is not to mandate wind tunnel testing in the IBC, but rather to achieve uniformity in results where the design involves wind tunnel testing – either as required by ASCE 7 or where the designer determines that wind tunnel testing is to be used to determine the wind loads.

The proposed revision that stipulates that the minimum design loads can not be less than the minimums of ASCE 7 (10 psf) is in response to the committees concern stated in the reason for disapproval of S16 -06/07. It is CTC's understanding that the standard will have been completed by the 2008 Palm Springs Code Development Hearings.

**References:**

Interim Report No. 1 of the CTC, Area of Study – Review of NIST WTC Recommendations, March 9, 2006.
National Institute of Standards and Technology. Final Report of the National Construction Safety Team on the Collapses of the World Trade Center Towers. United States Government Printing Office: Washington, D.C. September 2005.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The proposed standard has not been completed. It is hoped that a public comment can be submitted to allow this standard to be referenced by the code.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Paul K. Heilstedt, P.E., AIA, representing ICC Code Technology Committee (CTC), requests Approval as Submitted.**

**Commenter's Reason:** The reason this code change was not approved was due to the lack of completion/availability of the standard ASCE/SEI 49 entitled "Wind Tunnel Testing for Buildings and Other Structures". At the time this public comment is submitted, the standard is still under development. As such, this comment is submitted in anticipation of the standard being completed by the Final Action Hearings. If it is not completed, this public comment will not be pursued, with the proposed reference held until the 2009/2010 Cycle.

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

Final Action: AS AM AMPC____ D

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## S101-07/08 – STRUCTURAL INTEGRITY – AMPC 1
## 1614 (New)

**SECTION 1614**
**STRUCTURAL INTEGRITY**

**1614.1 General.** Buildings and other structures assigned to Occupancy Category II, III, or IV, exceeding three stories above grade plane shall comply with the requirements of this section. Frame structures shall comply with the requirements of Section 1614.3. Bearing wall structures shall comply with the requirements of Section 1614.4.

> **Exception:** Structures other than buildings with structural systems that are not like building structures including, but not limited to, billboards, signs, silos, tanks, stacks, mechanical and electrical equipment.

**1614.2 Definitions.** The following words and terms shall, for the purposes of Section 1614, have the meanings shown herein.

**BEARING WALL STRUCTURE**. A building or other structure in which vertical loads from floors and roofs are primarily supported by walls.

**FRAME STRUCTURE.** A building or other structure in which vertical loads from floors and roofs are primarily supported by columns.

**1614.3 Frame structures.** Frame structures shall comply with the requirements of this section.

**1614.3.1 Concrete frame structures.** Frame structures constructed primarily of reinforced or prestressed concrete, either cast-in-place or precast, or a combination of these, shall conform to the requirements of ACI 318 Sections 7.13, 13.3.8.5, 13.3.8.6, 16.5 and 18.12.6, b18.12.7 and 18.12.8 as applicable. Where ACI 318 requires that nonprestressed reinforcing or prestressing steel pass through the region bounded by the longitudinal column reinforcement, that reinforcing or prestressing steel shall have a minimum nominal tensile strength equal to 2/3 of the required one-way vertical strength of the connection of the floor or roof system to the

column in each direction of beam or slab reinforcement passing through the column.

**Exception:** Where concrete slabs with continuous reinforcing having an area not less than 0.0015 times the concrete area in each of two orthogonal directions are present and are either monolithic with or equivalently bonded to beams, girders or columns, the longitudinal reinforcing or prestressing steel passing through the column reinforcement shall have a nominal tensile strength of 1/3 of the required one-way vertical strength of the connection of the floor or roof system to the column in each direction of beam or slab reinforcement passing through the column.

**1614.3.2 Structural steel, open web steel joist or joist girder, or composite steel and concrete frame structures.** Frame structures constructed with a structural steel frame or a frame composed of open web steel joists, joist girders with or without other structural steel elements or a frame composed of composite steel or composite steel joists and reinforced concrete elements shall conform to the requirements of this section.

**1614.3.2.1 Columns.** Each column splice shall have the minimum design strength in tension to transfer the design dead and live load tributary to the column between the splice and the splice or base immediately below.

**1614.3.2.2 Beams**. End connections of all beams and girders shall have a minimum nominal axial tensile strength equal to the required vertical shear strength for Allowable Strength Design (ASD) or 2/3 of the required shear strength for Load and Resistance Factor Design (LRFD) but not less than 10 kips (45 kN). For the purpose of this section, the shear force and the axial tensile force need not be considered to act simultaneously.

**Exception:** Where beams, girders, open web joist, and joist girders support a concrete slab or concrete slab on metal deck that is attached to the beam or girder with not less than 3/8 in. (9.5 mm) diameter headed shear studs, at a spacing of not more than 12 in. (305 mm) on center, averaged over the length of the member, or other attachment having equivalent shear strength, and the slab contains continuous distributed reinforcement in each of two orthogonal directions with an area not less than 0.0015 times the concrete area, the nominal axial tension strength of the end connection shall be permitted to be taken as half the required vertical shear strength for ASD or 1/3 of the required shear strength for LRFD, but not less than 10 kips (45 kN).

**1614.4 Bearing wall structures**. Bearing wall structures shall have vertical ties in all load bearing walls and longitudinal ties, transverse ties, and perimeter ties at each floor level in accordance with this section and as shown in Figure 1614.4.

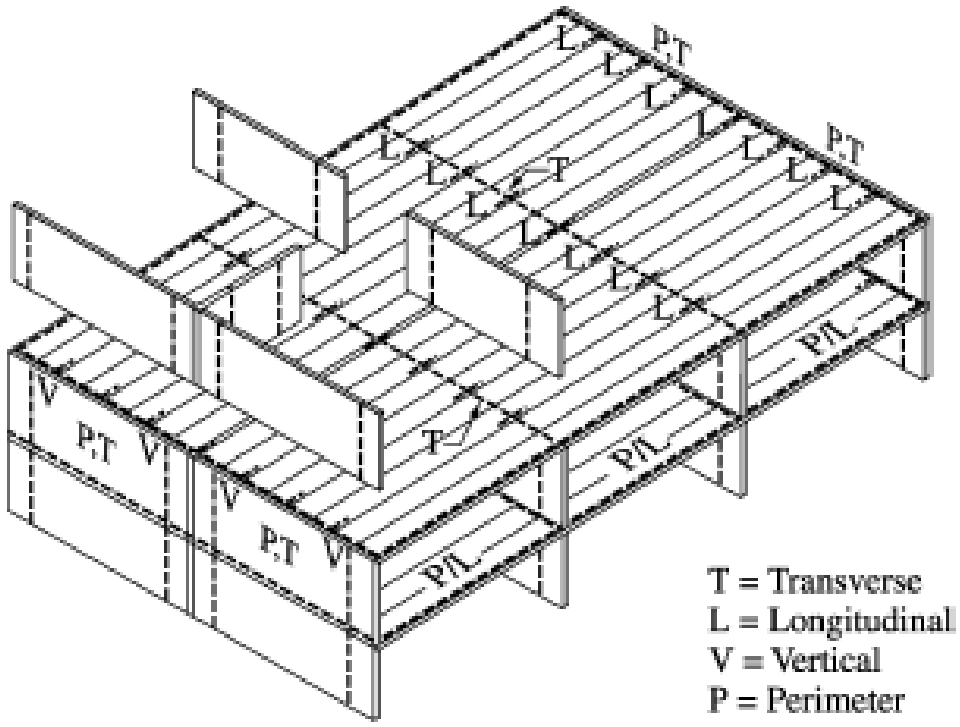


**FIGURE 1614.4**
**LONGITUDINAL, PERIMETER, TRANSVERSE AND VERTICAL TIES**

**1614.4.1 Concrete wall structures**. Precast bearing wall structures constructed solely of reinforced or prestressed concrete, or combinations of these shall conform to the requirements of Sections 7.13, 13.3.8.5 and

16.5 of ACI 318.

**1614.4.2 Other bearing wall structures.** Ties in bearing wall structures other than those covered in Section 1614.4.1 shall conform to this section.

**1614.4.2.1 Longitudinal ties**. Longitudinal ties shall consist of continuous reinforcement in slabs; continuous or spliced decks or sheathing; continuous or spliced members framing to, within, or across walls; or, connections of continuous framing members to walls. Longitudinal ties shall extend across interior load bearing walls and shall connect to exterior load bearing walls and shall be spaced at not greater than 10 feet (3038 mm) on center. Ties shall have a minimum nominal tensile strength, $T_T$, given by Equation 16-45. For ASD the minimum nominal tensile strength may be taken as 1.5 times the allowable tensile stress times the area of the tie.

$$T_T = wLs \le \alpha_T s \qquad \textbf{(Equation 16-45)}$$

where:

$L$ = the span of the horizontal element in the direction of the tie, between bearing walls, ft, (m)

$w$ = the weight per unit area of the floor or roof in the span being tied to or across the wall, psf, ($N/m^2$)

$S$ = the spacing between ties, ft (m)

$\alpha_T$ = a coefficient with a value of 1,500 lb/ft (2.25 kN/m) for masonry bearing wall structures and a value of 375 lb/ft (0.6 kN/m) for structures with bearing walls of light wood or cold formed steel frame construction.

**1614.4.2.2 Transverse ties.** Transverse ties shall consist of continuous reinforcement in slabs; continuous or spliced decks or sheathing; continuous or spliced members framing to, within, or across walls; or, connections of continuous framing members to walls. Transverse ties shall be placed no farther apart than the spacing of load bearing walls. Transverse ties shall have minimum nominal tensile strength $T_T$, given by Equation 16-45. For ASD the minimum nominal tensile strength may be taken as 1.5 times the allowable tensile stress times the area of the tie.

**1614.4.2.3 Perimeter ties.** Perimeter ties shall consist of continuous reinforcement in slabs; continuous or spliced decks or sheathing; continuous or spliced members framing to, within, or across walls; or, connections of continuous framing members to walls. Ties around the perimeter of each floor and roof shall be located within 4 feet (1219 mm) of the edge and shall provide a nominal strength in tension not less than $T_p$, given by Equation 16-46. For ASD the minimum nominal tensile strength may be taken as 1.5 times the allowable tensile stress times the area of the tie.

$$T_p = 200w \le \beta_T \qquad \textbf{(Equation 16-46)}$$

For SI:

$$T_p = 90.7w \le \beta_T$$

where

$w$ = as defined in Section 1614.4.2.1

$\beta_T$ = a coefficient with a value of 16,000 lbs (7.200 KN) for structures with masonry bearing walls and a value of 4,000 lbs (1,300 KN) for structures with bearing walls of light wood or cold formed steel frame construction.

**1614.4.3.4 Vertical ties.** Vertical ties shall consist of continuous or spliced reinforcing, continuous or spliced members, wall sheathing or other engineered systems. Vertical tension ties shall be provided in bearing walls and shall be continuous over the height of the building. The minimum nominal tensile strength for vertical ties within a bearing wall shall be equal to the weight of the wall within that story plus the weight of diaphragm tributary to the wall in the story below. No fewer than two ties shall be provided for each wall. The strength of each tie need not exceed 3,000 lb/ft (450 kN/m) of wall tributary to the tie for walls of masonry construction or 750 lb/ft (140 kN/m) of wall tributary to the tie for walls of light wood or steel frame construction.

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

Protection Association. In addition, there was nonvoting participation by the National Institute of Building Sciences and the National Institute of Standards and Technology.

It is the general consensus of NCSEA and the other members of the Ad Hoc Joint Industry Committee on Structural Integrity that the requirements already embodied in the building codes and standards together with the common structural design and construction practices prevalent in the United States today provide the overwhelming majority of structures with adequate levels of reliability and safety. The proposed provisions contained in this proposal are predicated upon requirements contained within the ACI 318 for many years. by adapting those requirements to structures of other construction types based on the differing conditions of weight and detailing. It is the opinion of the Ad Hoc Joint Industry Committee that these provisions will generally enhance the general structural integrity and resistance of structures by establishing minimum requirements for tying together the primary structural elements.

No cost impact on structures that are three stories or less in height. For some structures exceeding three stories in height, this proposal may result in minor increases in structural cost due to the additional strength of connections that are required. However, as the provisions contained in this proposal embody common design practices employed by many structural engineers, for many structures, the cost impact will be negligible.

**Cost Impact:** No cost impact on structures that are three stories or less in height. For some structures exceeding three stories in height, this proposal may result in minor increases in structural cost due to the additional strength of connections that are required. However, as the provisions contained in this proposal embody common design practices employed by many structural engineers, for many structures, the cost impact will be negligible.

**Committee Action:** **Disapproved**

**Committee Reason:** There is a need for some structural integrity measures and some committee members feel this proposal would be a good step. However, it appears, as proposed, the current ACI 318 provisions for concrete have been extended to other materials without adequate explanation. The logic in doing so is lacking. These provisions would involve too many buildings that do not have integrity issues and there is no demonstrated need for enhancing these structures. There are also concerns about the consequences of requiring these provisions for buildings that are currently built all the time. There is some concern regarding how, or if, this analysis would relate to other required loading conditions – in particular, lateral loads.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment 1:*

**Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee and Gerry Jones/Herman Brice, representing NIBS/MMC Committee for Translating the NIST World Trade Center Investigation Recommendations into Building Codes, request Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**1614.1 General**. Buildings classified as high rise buildings in accordance with Section 404 and ~~other structures~~ assigned to Occupancy Category ~~II,~~ III, or IV, ~~exceeding three stories above grade plane~~ shall comply with the requirements of this section. Frame structures shall comply with the requirements of Section 1614.3. Bearing wall structures shall comply with the requirements of Section 1614.4.

~~**Exception:** Structures other than buildings with structural systems that are not like building structures including, but not limited to, billboards, signs, silos, tanks, stacks, mechanical and electrical equipment.~~

**1614.4.2.1 Longitudinal ties**. Longitudinal ties shall consist of continuous reinforcement in slabs; continuous or spliced decks or sheathing; continuous or spliced members framing to, within, or across walls; or, connections of continuous framing members to walls. Longitudinal ties shall extend across interior load bearing walls and shall connect to exterior load bearing walls and shall be spaced at not greater than 10 feet (3038 mm) on center. Ties shall have a minimum nominal tensile strength, $T_T$, given by Equation 16-45. For ASD the minimum nominal tensile strength ~~may~~ shall be permitted to be taken as 1.5 times the allowable tensile stress times the area of the tie.

$$T_T = wLs \le \alpha_T s \qquad \textbf{(Equation 16-45)}$$

where:

L = the span of the horizontal element in the direction of the tie, between bearing walls, ft, (m)
w = the weight per unit area of the floor or roof in the span being tied to or across the wall, psf, ($N/m^2$)
S = the spacing between ties, ft (m)
$\alpha_T$= a coefficient with a value of 1,500 lb/ft (2.25 kN/m) for masonry bearing wall structures and a value of 375 lb/ft (0.6 kN/m) for structures with bearing walls of ~~light wood or~~ cold formed steel frame construction.

**1614.4.2.3 Perimeter ties**. Perimeter ties shall consist of continuous reinforcement in slabs; continuous or spliced decks or sheathing; continuous or spliced members framing to, within, or across walls; or, connections of continuous framing members to walls. Ties around the perimeter of each floor and roof shall be located within 4 feet (1219 mm) of the edge and shall provide a nominal strength in tension not less than $T_p$, given by Equation 16-46. For ASD the minimum nominal tensile strength ~~may~~ shall be permitted to be taken as 1.5 times the allowable tensile stress times the area of the tie.

$$T_p = 200w \le \beta_T$$ **(Equation 16-46)**

For SI:

$$T_p = 90.7w \le \beta_T$$

where
w = as defined in Section 1614.4.2.1
$\beta_T$ = a coefficient with a value of 16,000 lbs (7.200 KN) for structures with masonry bearing walls and a value of 4,000 lbs (1,300 KN) for structures with bearing walls of ~~light wood or~~ cold formed steel frame construction.

**1614.4.3.4 Vertical ties**. Vertical ties shall consist of continuous or spliced reinforcing, continuous or spliced members, wall sheathing or other engineered systems. Vertical tension ties shall be provided in bearing walls and shall be continuous over the height of the building. The minimum nominal tensile strength for vertical ties within a bearing wall shall be equal to the weight of the wall within that story plus the weight of diaphragm tributary to the wall in the story below. No fewer than two ties shall be provided for each wall. The strength of each tie need not exceed 3,000 lb/ft (450 kN/m) of wall tributary to the tie for walls of masonry construction or 750 lb/ft (140 kN/m) of wall tributary to the tie for walls of ~~light wood or~~ steel frame construction.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason: Reason**: As noted in the reason for disapproval, there is a need for structural integrity provisions in the code and the reason further states that the provisions would involve too many building that do not have integrity issues. The CTC concurs with this philosophy - the need for such provisions should be a function of the relative risk. Low rise buildings which typically employ a less sophisticated structural system do not represent the same risk as taller buildings such as high rise buildings. Further, inclusion of Category II buildings also represents a large volume of buildings which would envelope a large population of buildings without detailing the risk. Category III buildings which are noted in Table 1604.5 of the code as "representing a substantial hazard to human life in the event of failure" such as high occupant load buildings, as well as Category IV buildings which are classified as "essential facilities" such as hospitals, warrant such provisions.

This public comment responds to these two fundamental issues by limiting the application to only Category III and IV buildings which are considered high rises.

Sections 164.4.2.1, 1614.4.2.3 and 1614.4.3.4 are correspondingly revised to remove the reference to wood construction as the application is now limited to high rises for which wood bearing walls would not be permitted based on type of construction.

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

*Public Comment 2:*

**Joseph J. Messersmith, Portland Cement Association, requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**1614.1 General.** Buildings ~~and other structures~~ assigned to Occupancy Category ~~II,~~ III~~,~~ or IV, ~~exceeding three stories above grade plane~~ with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, and other structures assigned to Occupancy Category III or IV greater than 75 feet (22 860 mm) in height shall comply with the requirements of this section. Frame structures shall comply with the requirements of 1614.3. Bearing wall structures shall comply with the requirements of Section 1614.4.

**Exception:** ~~Structures other than buildings with structural systems that are not like building structures including, but not limited to, billboards, signs, silos, tanks, stacks, mechanical and electrical equipment.~~ Nonbuilding structures (see ASCE 7, Chapter 15).

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** This code change was disapproved in part because the "provisions would involve too many buildings that do not have integrity issues." The modifications proposed will reduce the scope of application by deleting Occupancy Category II buildings and structures, and by increasing the height threshold from greater than 3 stories to high rise buildings as currently defined in Section 403.1, and greater than 75 feet in the case of other structures. The exception has been revised to refer to "nonbuilding structures" which is terminology used in Chapter 15 of ASCE 7, which seems to be consistent with the intent of the proposal.

Based on the forgoing, you are urged to overturn the motion for disapproval, and vote for a subsequent motion to approve the change as modified above.

Final Action: AS AM AMPC____ D

**Revise as follows:**

**704.8.1 (Supp) Allowable area of openings.** The maximum area of unprotected and protected openings permitted in an exterior wall in any story of a building shall not exceed the percentages specified in Table 704.8.

**Exceptions:**

1. In other than Group H occupancies, unlimited unprotected openings are permitted in the first story above grade either:
   1.1. Where the wall faces a street and has a fire separation distance of more than 15 feet (4572 mm); or
   1.2. Where the wall faces an unoccupied space. The unoccupied space shall be on the same lot or dedicated for public use, shall not be less than 30 feet (9144 mm) in width, and shall have access from a street by a posted fire lane in accordance with the *International Fire Code*.
2. Buildings whose exterior bearing walls, exterior nonbearing walls and exterior primary structural frame are not required to be fire-resistance rated shall be permitted to have unlimited unprotected openings.

**714.1 (Supp) Requirements**. The fire-resistance ratings of structural members ~~and assemblies~~ shall comply with this section and the requirements for the type of construction as specified in Table 601 ~~and~~. The fire-resistance ratings shall not be less than the ratings required for the fire-resistance-rated assemblies supported by the structural members.

**Exception**: Fire barriers, fire partitions, smoke barriers and horizontal assemblies as provided in Sections 706.5, 708.4, 709.4 and 711.4, respectively.

**714.1.1 (Supp) Primary structural frame.** The primary structural frame shall ~~be~~ include all of the following structural members:

1. The columns ~~and other~~ ;
2. Structural members ~~including the girders, beams, trusses and spandrels~~ having direct connections to the columns, including girders, beams, trusses and spandels;
3. Members of the floor construction and roof construction having direct connections to the columns; and
4. Bracing members designed to carry gravity loads.

~~**714.2**~~ **714.1.2 (Supp) Secondary members.** The following structural members ~~of floor or roof construction that are not connected to the columns~~ shall be considered secondary members and not part of the primary structural frame:

1. Structural members not having direct connections to the columns;
2. Members of the floor construction not having direct connections to the columns; and
3. Bracing members not designed to carry gravity loads.

~~**714.4**~~ **714.2 (Supp) Column protection.** Where columns are required to be fire-resistance rated, the entire column, ~~including its connections to beams or girders,~~ shall be provided individual encasement protection by protecting it on all sides for the full column length, including connections to other structural members, with materials having the required fire-resistance rating. Where the column extends through a ceiling, the ~~fire resistance rating of the column~~ encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

~~**714.2**~~ **714.3 (Supp)** ~~**Individual encasement protection**~~ **Protection of the primary structural frame other than columns.** ~~Girders, trusses, beams, lintels or other structural~~ Members of the primary structural frame other than columns that are required to have a fire-resistance rating and ~~that~~ support more than two floors or one floor and roof, or support a load-bearing wall or a nonload-bearing wall more than two stories high, shall be ~~individually protected~~ provided individual encasement protection by protecting them on all sides for ~~the~~ their full length, including connections to other structural members, with materials having the required fire resistance rating.

**Exception:** Individual encasement protection on all sides shall be permitted on all exposed sides provided

the extent of protection is in accordance with the required fire-resistance rating, as determined in Section 703.

**~~714.2.1~~ 714.4 (Supp) ~~Alternative~~ Protection of secondary members.** ~~The structural~~ Secondary members that are required to have a fire-resistance rating ~~and are not required to be provided individual encasement protection according to Section 714.2~~ shall be protected by individual encasement protection, by ~~a~~ the membrane or ceiling ~~protection as specified in~~ of a horizontal assembly in accordance with Section 711, or by a combination of both.

**~~714.3~~ 714.4.1 (Supp) ~~Membrane protection~~ Light-frame construction.** King studs and boundary elements that are integral elements in load-bearing walls of light-framed construction shall be permitted to have required fire-resistance ratings provided by the membrane protection provided for the load-bearing wall.

(Renumber Sections 714.2.3-714.2.5 as Sections 714.5-714.7, and Sections 714.3-714.5 as Sections 714.8-714.10)

**~~714.6~~ 714.11 Bottom flange protection.** Fire protection is not required at the bottom flange of lintels, shelf angles and plates, spanning not more than 6 feet (1829 mm) whether part of the primary structural frame or not, and from the bottom flange of lintels, shelf angles and plates not part of the primary structural frame, regardless of span.

(Renumber subsequent sections)

**Reason:** The purpose for this proposal is to make the provisions approved by Proposal FS98-06/07-AS more technically sound and to improve coordination with other provisions of the IBC. Reference to "columns, girders and trusses" in the item under "Building Element" for primary structural frame" in Table 601 is deleted because it is effectively replaced by the reference to Section 714.1.1 and conflicts with the references in Section 714.1.1 to columns, girders, beams, trusses and spandrels.

In Section 714.1, "and assemblies" is deleted because the subject of Section 714.1 is structural members, not assemblies, which implies floor, roof or wall assemblies. The other revisions are editorial. Note that "structural member" is not currently defined in the IBC.

The revision to Section 714.1.1 may appear editorial but it is being done to make it clear which components of the structure are part of the primary structural frame. The current language implies that, in addition to columns and bracing members designed to carry gravity loads, only girders, beams, trusses and spandrels having direct connections to the columns are part of the primary structural frame. The intent, however, is that, in addition to columns, all structural members having direct connections to the columns, including structural members of the floor construction and roof construction and bracing members that are designed to carry gravity loads, are part of the primary structural frame. The listing of girders, beams, trusses and spandrels in Section 714.1.1 should be viewed as examples of such structural members.

Section 714.1.1 is also revised to specify all members of the primary structural frame as structural members. This revision makes it clear that bracing members are structural members and reduces questions over the scope of Section 714.1, which specifies structural members but not bracing members. Structural members of the floor construction and roof construction having direct connections to the columns are also identified as members of the primary structural frame. This revision correlates Section 714.1.1 with Section 714.1.2 on secondary members, which specifies members of the floor construction and roof construction not connected to columns.

Section 714.1.2 is revised because the current language does not make it clear whether structural members not having direction connections to the columns and bracing members not designed to carry gravity loads are members of the floor or roof construction such that they are considered secondary members. The current language also creates a gap between what structural members are considered part of the primary structural frame and what are considered secondary members. This gap consists of a third group of structural members that are neither part of the primary structural frame nor secondary members. Section 714.1.2 is revised to close this gap by clearly specifying what structural members are secondary members, including structural members not having direct connections to the columns as structural members and bracing members not designed to carry gravity loads.

Also in Section 714.1.2, members of the floor or roof construction "not connected" to the columns is changed to "not having direct connections" to the columns to make it clear that structural members indirectly connected via supporting beams or girders that are directly connected to the columns are not intended to be members of the primary structural frame. Note that horizontal bracing members typically are part of the floor or roof construction. The format of Section 714.1.2 is revised to specify individual items in the same manner as Section 714.1.1.

In conjunction with the proposed changes to Section 714.1.2, secondary members are added to the listings of floor construction and roof construction in Table 601 along with references to Sections 714.1.1 and 714.1.2 in the same manner as the listing for primary structural frame. With the approval of FS98-06/07, secondary members become a distinct type of building element and should be specified in Table 601 along with primary structural frame.

The order of the technical provisions in Section 714 is revised. The primary structural frame consists of the columns with the most restrictive technical provisions (Section 714.4), other members of the primary structural frame with technical provisions that are less restrictive than columns (Section 714.3), and secondary members with technical provisions that are less restrictive than the primary structural frame (Section 714.2.1). These sections are rearranged beginning with the most restrictive: columns in Section 714.2, primary structural frame members other than columns in Section 714.3 and secondary members in Section 714.4.

References to individual encasement protection are clarified. Renumbered Sections 714.2 and 714.3 (current Sections 714.4 and 714.2) reference individual encasement protection but neither section contains technical provisions for it. Also, the title of renumbered Section 714.3 is "individual encasement protection" but the provisions in the section do not mention it. Instead, individual protection on all sides of the structural member for its full length, including connections to other structural members, is specified. If individual encasement protection is the intent, it is not achieved by reliance on the title of the section, which is nonmandatory. Renumbered Sections 714.2 and 714.3 are revised by specifying individual encasement protection as individual protection on all sides of the structural member for its full length, including connections to other structural members, with materials having the required fire-resistance rating.

An exception is added to renumbered Section 714.3 (current Section 714.2) on primary structural frame members other than columns. Beams and girders typically support floor or roof construction, which prevents the protection of their surfaces that bear against floor or roof members (i.e., steel decks). The exception permits the protection on all sides to be only on exposed sides provided the assembly being

relied on for the required fire resistance rating limits protection to the exposed sides.

"Structural frame" in Item (a) of Table 601, Section 704.8.1 (Exception 2) and Section 714.6 (Section 714.11 in proposal) is changed to "primary structural frame" for better consistency with the changes approved by FS98-06/07. With these changes a clear distinction will be established between "primary structural frame" in the nonstructural provisions of the IBC and "structural frame" in the structural provisions. The use of "structural frame" is found in Sections 2104.2.1, 2109.4.3, 2109.7.4, 2110.1.1, 3402.1 (technically infeasible) and H109.1.

Additional references to the footnotes in Table 601 at the fire-resistance ratings for roof construction in Table 601 are made to restore the original references, which were inadvertently deleted in the 2007 IBC Supplement. Note that Footnotes (c) and (d) in the 2006 IBC are Footnotes (b) and (c) in the 2007 IBC Supplement.

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

## PART I – IBC FIRE SAFETY
## Committee Action: Approved as Modified

**Modify the proposal as follows:**

**714.1 (Supp) Requirements**. The fire-resistance ratings of structural members and assemblies shall comply with this section and the requirements for the type of construction as specified in Table 601. The fire-resistance ratings shall not be less than the ratings required for the fire-resistance-rated assemblies supported by the structural members.

(Portions of the proposal not shown remain unchanged)

**Committee Reason:** The committee felt that the reorganization of Section 714 orders the requirements to create a more user-friendly code, for both the designer and the code official. The modification put back the words "and assemblies" to cover items other than structural members.

## Assembly Action: None

## *Individual Consideration Agenda*

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

*Public Comment 1:*

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

**Modify proposal as follows:**

**714.1.1 (Supp) Primary structural frame.** The primary structural frame shall include all of the following structural members:

1. The columns;
2. Structural members having direct connections to the columns, including girders, beams, trusses and spandrels;
3. Members of the floor construction and roof construction having direct connections to the columns; and
4. ~~Bracing members designed to carry gravity loads.~~ Bracing members that are essential to the vertical stability of the primary structural frame under gravity loading shall be considered part of the primary structural frame whether or not the bracing member carries gravity loads.

**714.1.2 (Supp) Secondary members.** The following structural members shall be considered secondary members and not part of the primary structural frame:

1. Structural members not having direct connections to the columns;
2. Members of the floor construction not having direct connections to the columns; and
3. ~~Bracing members not designed to carry gravity loads.~~ Bracing members other than those that are part of the primary structural frame in accordance with Section 714.1.1

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The purpose of this public comment is to coordinate the code committee's action on code changes FS 113 and FS 115. Code change FS 113 included technical revisions to the primary structural frame provisions of Section 714.1.1 while FS 115 is primarily an editorial re-formatting of Section 714.

Specifically, approved code change FS 113 revised the requirements for bracing considered part of the structural frame of the building. The approved language from FS 113 has been incorporated in Item 4 to Section 714.1.1. In order to coordinate this change, Item 3 to Section 714.1.2 needs to be revised to clarify that bracing which is not part of the structural frame is not limited to bracing which is not designed to carry gravity loads.

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 fifteen meetings - all open to the public. This public comment is a result of the CTC's investigation of the area of study entitled "NIST World Trade Center Recommendations". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html

*Public Comment 2:*

### Maureen Traxler, City of Seattle, Department of Planning and Development, representing Washington

**Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this public comment for Part I.**

**Modify proposal as follows:**

**Section 202 ~~714.1.1~~ (Supp) Primary structural frame.** The primary structural frame shall include all of the following structural members:

1. The columns;
2. Structural members having direct connections to the columns, including girders, beams, trusses and spandrels;
3. Members of the floor construction and roof construction having direct connections to the columns; and
4. Bracing members designed to carry gravity loads.

**Section 202 ~~714.1.2~~ (Supp) Secondary members.** The following structural members shall be considered secondary members and not part of the primary structural frame:

1. Structural members not having direct connections to the columns;
2. Members of the floor construction not having direct connections to the columns; and
3. Bracing members not designed to carry gravity loads.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** Sections 714.1.1 and 714.1.2 function as definitions of "primary structural frame" and "secondary members". We are proposing to clearly identify them as definitions to make it obvious to code users that the terms are defined. The terms are used in both Chapters 6 and 7, and, therefore, should be located in Chapter 2. If the definition is located in Chapter 2 it is obvious that the definition applies to both chapters.

Final Action: AS AM AMPC____ D

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## FS115-07/08, Part II – STRUCTURAL FRAME - AMPC

**Revise table as follows:**

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

| | TYPE I | | TYPE II | | TYPE III | | TYPE IV | TYPE V | |
|---|---|---|---|---|---|---|---|---|---|
| **BUILDING ELEMENT** | **A** | **B** | **A [d]** | **B** | **A [d]** | **B** | **HT** | **A [d]** | **B** |
| Primary structural frame [g]<br>See Section 714.1.1<br>~~Including columns, girders, trusses~~ | 3[a] | 2[a] | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Bearing walls<br>Exterior [f, g]<br>Interior | 3<br>3[a] | 2<br>2[a] | 1<br>1 | 0<br>0 | 2<br>1 | 2<br>0 | 2<br>1/HT | 1<br>1 | 0<br>0 |
| Nonbearing walls and partitions<br>Exterior | See Table 602 | | | | | | | | |
| Nonbearing walls and partitions<br>Interior [e] | 0 | 0 | 0 | 0 | 0 | 0 | See Section 602.4.6 | 0 | 0 |
| Floor construction <u>and secondary members</u><br><u>See Sections 714.1.1 and 714.1.2</u><br>~~Including supporting beams and joists~~ | 2 | 2 | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Roof construction <u>and secondary members</u><br><u>See Sections 714.1.1 and 714.1.2</u><br>~~Including supporting beams and joists~~ | 1-½[b] | 1[b, c] | 1 [b, c] | 0[b, c] | 1[b, c] | 0[b, c] | HT | 1[b, c] | 0 |

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of <u>primary</u> structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

c. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.
d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.
e. Not less than the fire-resistance rating required by other sections of this code.
f. Not less than the fire-resistance rating based on fire separation distance (see Table 602).
g. Not less than the fire-resistance rating as referenced in Section 714.5

**Reason:** The purpose for this proposal is to make the provisions approved by Proposal FS98-06/07-AS more technically sound and to improve coordination with other provisions of the IBC. Reference to "columns, girders and trusses" in the item under "Building Element" for primary structural frame" in Table 601 is deleted because it is effectively replaced by the reference to Section 714.1.1 and conflicts with the references in Section 714.1.1 to columns, girders, beams, trusses and spandrels.

In Section 714.1, "and assemblies" is deleted because the subject of Section 714.1 is structural members, not assemblies, which implies floor, roof or wall assemblies. The other revisions are editorial. Note that "structural member" is not currently defined in the IBC.

The revision to Section 714.1.1 may appear editorial but it is being done to make it clear which components of the structure are part of the primary structural frame. The current language implies that, in addition to columns and bracing members designed to carry gravity loads, only girders, beams, trusses and spandrels having direct connections to the columns are part of the primary structural frame. The intent, however, is that, in addition to columns, all structural members having direct connections to the columns, including structural members of the floor construction and roof construction and bracing members that are designed to carry gravity loads, are part of the primary structural frame. The listing of girders, beams, trusses and spandrels in Section 714.1.1 should be viewed as examples of such structural members.

Section 714.1.1 is also revised to specify all members of the primary structural frame as structural members. This revision makes it clear that bracing members are structural members and reduces questions over the scope of Section 714.1, which specifies structural members but not bracing members. Structural members of the floor construction and roof construction having direct connections to the columns are also identified as members of the primary structural frame. This revision correlates Section 714.1.1 with Section 714.1.2 on secondary members, which specifies members of the floor construction and roof construction not connected to columns.

Section 714.1.2 is revised because the current language does not make it clear whether structural members not having direction connections to the columns and bracing members not designed to carry gravity loads are members of the floor or roof construction such that they are considered secondary members. The current language also creates a gap between what structural members are considered part of the primary structural frame and what are considered secondary members. This gap consists of a third group of structural members that are neither part of the primary structural frame nor secondary members. Section 714.1.2 is revised to close this gap by clearly specifying what structural members are secondary members, including structural members not having direct connections to the columns as structural members and bracing members not designed to carry gravity loads.

Also in Section 714.1.2, members of the floor or roof construction "not connected" to the columns is changed to "not having direct connections" to the columns to make it clear that structural members indirectly connected via supporting beams or girders that are directly connected to the columns are not intended to be members of the primary structural frame. Note that horizontal bracing members typically are part of the floor or roof construction. The format of Section 714.1.2 is revised to specify individual items in the same manner as Section 714.1.1.

In conjunction with the proposed changes to Section 714.1.2, secondary members are added to the listings of floor construction and roof construction in Table 601 along with references to Sections 714.1.1 and 714.1.2 in the same manner as the listing for primary structural frame. With the approval of FS98-06/07, secondary members become a distinct type of building element and should be specified in Table 601 along with primary structural frame.

The order of the technical provisions in Section 714 is revised. The primary structural frame consists of the columns with the most restrictive technical provisions (Section 714.4), other members of the primary structural frame with technical provisions that are less restrictive than columns (Section 714.3), and secondary members with technical provisions that are less restrictive than the primary structural frame (Section 714.2.1). These sections are rearranged beginning with the most restrictive: columns in Section 714.2, primary structural frame members other than columns in Section 714.3 and secondary members in Section 714.4.

References to individual encasement protection are clarified. Renumbered Sections 714.2 and 714.3 (current Sections 714.4 and 714.2) reference individual encasement protection but neither section contains technical provisions for it. Also, the title of renumbered Section 714.3 is "individual encasement protection" but the provisions in the section do not mention it. Instead, individual protection on all sides of the structural member for its full length, including connections to other structural members, is specified. If individual encasement protection is the intent, it is not achieved by reliance on the title of the section, which is nonmandatory. Renumbered Sections 714.2 and 714.3 are revised by specifying individual encasement protection as individual protection on all sides of the structural member for its full length, including connections to other structural members, with materials having the required fire-resistance rating.

An exception is added to renumbered Section 714.3 (current Section 714.2) on primary structural frame members other than columns. Beams and girders typically support floor or roof construction, which prevents the protection of their surfaces that bear against floor or roof members (i.e., steel decks). The exception permits the protection on all sides to be only on exposed sides provided the assembly being relied on for the required fire resistance rating limits protection to the exposed sides.

"Structural frame" in Item (a) of Table 601, Section 704.8.1 (Exception 2) and Section 714.6 (Section 714.11 in proposal) is changed to "primary structural frame" for better consistency with the changes approved by FS98-06/07. With these changes a clear distinction will be established between "primary structural frame" in the nonstructural provisions of the IBC and "structural frame" in the structural provisions. The use of "structural frame" is found in Sections 2104.2.1, 2109.4.3, 2109.7.4, 2110.1.1, 3402.1 (technically infeasible) and H109.1.

Additional references to the footnotes in Table 601 at the fire-resistance ratings for roof construction in Table 601 are made to restore the original references, which were inadvertently deleted in the 2007 IBC Supplement. Note that Footnotes (c) and (d) in the 2006 IBC are Footnotes (b) and (c) in the 2007 IBC Supplement.

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

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

**Committee Reason:** Part II of the proposal was heavily dependant upon the action on Part I, which at the time of the IBC General

Committee hearings had not been discussed yet.

**Assembly Action:**
**None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**Maureen Traxler, City of Seattle Department of Planning and Development, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this public comment.**

**Modify proposal as follows:**

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

| | TYPE I | | TYPE II | | TYPE III | | TYPE IV | TYPE V | |
|---|---|---|---|---|---|---|---|---|---|
| **BUILDING ELEMENT** | **A** | **B** | **A [d]** | **B** | **A [d]** | **B** | **HT** | **A [d]** | **B** |
| Primary structural frame [g]<br>See Section ~~714.1.1~~ 202 | 3[a] | 2[a] | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Bearing walls<br>Exterior [f, g]<br>Interior | 3<br>3[a] | 2<br>2[a] | 1<br>1 | 0<br>0 | 2<br>1 | 2<br>0 | 2<br>1/HT | 1<br>1 | 0<br>0 |
| Nonbearing walls and partitions<br>Exterior | See Table 602 | | | | | | | | |
| Nonbearing walls and partitions<br>Interior [e] | 0 | 0 | 0 | 0 | 0 | 0 | See Section 602.4.6 | 0 | 0 |
| Floor construction and secondary members<br>See Section~~s 714.1.1 and 714.1.2~~ 202 | 2 | 2 | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Roof construction and secondary members<br>See Section~~s 714.1.1 and 714.1.2~~ 202 | 1-½[b] | 1[b, c] | 1 [b, c] | 0[b, c] | 1[b, c] | 0[b, c] | HT | 1[b, c] | 0 |

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
b. through g. (No change)

**Commenter's Reason:** Sections 714.1.1 and 714.1.2 function as definitions of "primary structural frame" and "secondary members". We are proposing to clearly identify them as definitions to make it obvious to code users that the terms are defined. The terms are used in both Chapters 6 and 7, and, therefore, should be located in Chapter 2. If the definition is located in Chapter 2 it is obvious that the definition applies to both chapters.

Final Action: AS AM AMPC____ D

## G69-07/08 – DENSITY OF SPRAYED FIRE PROOFING - D

**Delete without substitution:**

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

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

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

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

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

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

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

**Committee Action:** **Disapproved**

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

**Assembly Action:** **None**

*Individual Consideration Agenda*

*Public Comment 2:*

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

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

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

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

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

- Increased number of sampling locations
- Specific sampling for columns, beams, joists and trusses

- Physical and visual tests for: substrates; thickness; density, bond strength

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

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

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## E3-07/08 – EVACUATION PLANS - D

**Add new text as follows:**

**1001.4 Fire safety and evacuation plans:** Fire safety and evacuation plans shall be provided for all occupancies and buildings where required by the *International Fire Code*. Such fire safety and evacuation plans shall comply with the applicable provisions of Section 404 of the *International Fire Code*.

**Reason:** The purpose of this code change proposal is to provide consistent requirements for jurisdictions regarding requirements for fire safety and evacuation plans. We feel fire safety and evacuation plans are important issues that impact occupant egress during an emergency and therefore meets the intent of the IBC and needs to be addressed. In addition, many jurisdictions across the country currently have adopted the IBC, however many of these same jurisdictions have not adopted the IFC. This reference will ensure that at least the fire safety and evacuation plans of the IFC are adopted by reference. Enforcement of the provisions is not an issue. The provisions are clearly within the scope of the IFC.

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

**Committee Action:** **Approved as Submitted**

**Committee Reason:** The reference to Section 404 in the *International Fire Code* would result in consistency between jurisdictions in the application of Fire and Safety Evacuation Plans. This is an important part of the means of egress system.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment 1:*

**Jonathon D. Hamrick, Florida Department of Education, requests Disapproval.**

**Commenter's Reason:** The *International Fire Code* has not been adopted by all states. This change imposes on a state a code which the state has purposely not adopted. Some states have adopted the *International Fire Code* while others have adopted the National Fire Prevention Association family of fire codes. This change conflicts directly with Florida laws.

*Public Comment 2:*

**Michael Vieira, Wildan, representing Sacramento Valley Association of Building Officials (SVABO), requests Disapproval.**

**Commenter's Reason:** Fire Safety and Evacuation plans are documents that require annual maintenance and are required to include a number of provisions not a part of the building codes. Minor changes in building use or changes in business procedures can trigger a modification to the Fire Safety and Evacuation Plan that would not trigger a building permit. Additionally, building department personnel typically are only trained to apply Chapter 10 means of egress requirements and do not have the training or expertise to evaluate all of the other important aspects of an adequate Fire Safety and Evacuation Plan—putting the review of the plan in the building code would in fact create the false impression that building department approval of plans would indicate that the required Fire Safety and Evacuation Plan is completely adequate and correct. This is clearly within the purview of the Fire official. While there needs to be communication between Building and Fire officials for new construction activity, there is no need for revised fire and evacuation plans required by the Fire Code to be reviewed by the Building official.

Final Action: AS AM AMPC____ D

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