Reason: The purpose of this proposed code change is to reference an ANSI standard published specifically for the windborne debris resistance testing of garage doors. ANSI/DASMA 115 should be the primary standard referenced for this purpose. Other standards exist that could be deemed "approved impact resisting standards", including ASTM E 1886 / ASTM E 1996 and TAS 201 / TAS 203. It should be noted that ASTM E 1886 and ASTM E 1996 require interpretation regarding their use with garage doors. ASTM E6.51.17 (impact resistance task group) has not developed specific references to garage doors in those standards because of their awareness of the existence of, and industry use of, ANSI/DASMA 115.

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

Analysis: Results of review of the proposed standard(s) will be posted on the ICC website by August 20, 2006.

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

S21–06/07
1612.1

Proponent: Jerry R. Tepe, JRT-AIA Architect

Revise as follows:

1612.1 General: Within flood hazard areas as established in Section 1612.3, all new construction of buildings structures, ~~and~~ portions of buildings and structures within flood hazard areas, ~~including~~ and substantial improvements and restoration of substantial damage to buildings and structures, shall be designed and constructed to resist the effects of flood hazards and flood loads. For buildings that are located in more than one flood hazard area, the provisions associated with the most restrictive flood hazard area shall apply.

Exception: Construction that does not meet the definition of substantial improvement or substantial damage.

Reason: The purpose of this proposal is to clarify the intent of the code language.

Recent experience has indicated there is confusion as to the application of this section as it relates to construction that does not meet the definition of substantial improvement or substantial damage. The stated original purpose of this section was to parallel the requirements of the National Flood Insurance Program (NFIP) as administered by the Federal Emergency Management Administration (FEMA). As noted in the Code of Federal Regulations (44 CFR), only new construction and substantial improvement (and damage) are required to comply in order to qualify for program participation.

Per the definitions of substantial improvement and substantial damage, this would have limited application, namely where relatively minor (less than 50 percent of market value) additions, renovations and/or repairs are being made to a building or structure that existed prior to the adoption of the flood hazard areas by a local jurisdiction. This is logical and similar to other instances in the code where it does not make sense to have a small portion comply while the majority of the building or structure remains non-compliant (grand-fathered if you will). By using the language "including" substantial improvement, it implies "excluding" construction that does not meet this threshold criteria. However, deleting the word "including" matches the language of 44 CFR 60.3 that was the stated intent of the original code change in 1999. Note this does not change the requirement to upgrade the existing building or structure to compliance when the improvement/damage exceeds the 50 percent threshold.

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

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

S22–06/07
1612.3.1 (New), 106.2.1 (New)

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

Revise as follows:

1612.3 Establishment of flood hazard areas. To establish flood hazard areas, the governing body shall adopt a flood hazard map and supporting data. The flood hazard map shall include, at a minimum, areas of special flood hazard as identified by the Federal Emergency Management Agency in an engineering report entitled "The Flood Insurance Study for (insert Name of Jurisdiction)," dated (insert date of issuance), as amended or revised with the accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) and related supporting data along with any revisions thereto. The adopted flood hazard map and supporting data are hereby adopted by reference and declared to be part of this Section.

1612.3.1 Design flood elevations. Where design flood elevations are not included in the flood hazard areas established in Section 1612.3, or where floodways are not designated, the code official is authorized to require the applicant to:

1. Obtain and reasonably utilize any design flood elevation and floodway data available from a federal, state, or other source, or
2. Determine the design flood elevation and/or floodway in accordance with accepted hydrologic and hydraulic engineering practices used to define special flood hazard areas. Determinations shall be undertaken by a registered design professional who shall document that the technical methods used reflect currently accepted engineering practice.

106.2 Site plan. The construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, distances from lot lines, the established street grades and the proposed finished grades and, as applicable, flood hazard areas, floodways, and design flood elevations; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. The building official is authorized to waive or modify the requirement for a site plan when the application for permit is for alteration or repair or when otherwise warranted.

106.2.1 Design flood elevations. Where design flood elevations are not specified, they shall be established in accordance with Section 1612.3.1.

Reason: The purpose of this code change proposal is to clarify how design flood elevations are to be obtained or determined for those flood hazard areas shown on community flood hazard maps that do not have such flood elevation already specified.

This proposed code change to Section 1612.3 clarifies the authority of the code official to require use of other data which may be obtained from other sources, or to require the applicant to develop flood hazard data. Section 106.2 requires that the construction documents submitted are to be accompanied by a site plan. The site plan is to show, as applicable "flood hazard areas, floodways, and design flood elevations." As written, there appears to be an assumption in Sec. 106.2 and in Section 1612 that flood elevations and floodway designations are available on all flood hazard maps. A large percentage of areas that are mapped as special flood hazard area by the National Flood Insurance Program do not have flood elevations and/or do not have floodway designations (floodways are areas along riverine bodies of water that convey the bulk of floodwaters). The language in this code change proposal parallels language in the IRC at R106.1.3 and R324.1.3.1 (Determination of design flood elevations).

The technical information used to substantiate this proposal is the NFIP regulation §60.3(b)(4).

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

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

S23–06/07
1613.1

Proponent: Phillip A. Brown, American Fire Sprinkler Association

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7, excluding Chapter 14 and Appendix 11A. The seismic design category for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to Seismic Design Category A, B or C, or located where the mapped short-period spectral response acceleration, S_S, is less than 0.4 g.
2. The seismic-force-resisting system of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. Automatic fire sprinkler systems, designed and constructed in accordance with NFPA 13 shall be deemed to meet the requirements of ASCE 7.

Reason: The purpose of the code change proposal is to add a new exception to the code. The proposed exception will bring the IBC to the forefront of the latest developments in earthquake protection for automatic fire sprinkler systems. With the help of professionals involved with the NEHRP and ASCE 7, NFPA 13 has undergone extensive enhancements to its earthquake protection criteria, as is evident in the tentative interim amendment to the 2002 edition and the forthcoming 2006 edition criteria. The new criteria meet or exceed ASCE 7 requirements with regard to force and displacement. As such, ASCE 7, in its interim update process, will defer to NFPA 13 without caveat for earthquake protection of fire sprinkler systems.

The NFPA Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems made several modifications to Section 9.3.5 to ensure that the seismic brace criteria within NFPA 13 would properly align with the requirements and permitted limits of ASCE 7. These changes, in combination with the initial TIA, and the Report on Proposals will ensure that NFPA 13 is applicable for all seismic applications, In addition, the

changes provide a simplified method to meet the requirements of ASCE 7 without having to develop a complete engineering analysis. These requirements do not prohibit an engineer from doing a complete design and analysis in compliance with ASCE 7 requirements, but have been developed to address the requirements of ASCE 7 and present the material in a way that allows for the requirements to remain in NFPA 13 for seismic design of sprinkler systems. Additionally, these requirements have been developed to provide as much material as possible in NFPA 13 while limiting the amount of required information needed from outside sources.

Bibliography: 13-259a Log #CC101 AUT-HBS NFPA 13 Report on Comments A2006 – Copyright NFPA

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

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

S24–06/07
1613.6, 2101.2.2

Proponent: Ronald E. Barnett, AERCON Florida, LLC, representing Autoclaved Aerated Concrete Products Association

1. Add new text as follows:

1613.6.3 Autoclaved aerated concrete (AAC) masonry shear wall design coefficients and system limitations. Add the following text at the end of Section 12.2.1 of ASCE 7:

For ordinary reinforced AAC masonry shear walls used in the seismic force-resisting system of structures, the response modification factor, R, shall be permitted to be taken as 3, the deflection application factor, C_d, shall be permitted to be taken as 3, and the system overstrength factor, Ω_o, shall be permitted to be taken as 2½. The maximum height for ordinary reinforced AAC masonry shear walls shall not be limited for buildings assigned to Seismic Design Category B , shall be limited to 160 feet (48768 mm) for buildings assigned to Seismic Design Category C, shall be limited to 65 feet (19812 mm) for buildings assigned to Seismic Design Category D, and is not permitted for buildings assigned to Seismic Design Categories E and F.

For ordinary plain (unreinforced) AAC masonry shear walls used in the seismic force-resisting system of structures, the response modification factor, R, shall be permitted to be taken as 1½, the deflection application factor, C_d, shall be permitted to be taken as 1½, and the system overstrength factor, Ω_o, shall be permitted to be taken as 2½. The maximum height for ordinary plain (unreinforced) AAC masonry shear walls shall not be limited for buildings assigned to Seismic Design Category B and is not permitted for buildings assigned to Seismic Design Category B and is not permitted for buildings assigned to Seismic Design Categories C, D, E and F..

2. Revise as follows:

2101.2.2 Strength design. Masonry designed by the strength design method shall comply with the provisions of Sections 2106 and 2108, except that AAC masonry shall comply with the provisions of Section 2106, Section 1613.6.3, and Chapter 1 and Appendix A of ACI 530/ASCE 5/TMS 402. ~~AAC Masonry shall not be used in the seismic force-resisting system of structures classified as Seismic Design Category B, C, D, E or F.~~

Reason: The sentence “AAC Masonry shall not be used in the seismic force resisting system of structures classified as Seismic Design Category B, C, D, E or F.” is not in the 2005 MSJC *Code and Specification*. It was added during the 2005 ICC Structural Hearings in Cincinnati through a floor amendment proposed by the Code Resource Support Committee (CRSC) of the Building Seismic Safety Council (BSSC). This amendment was presented due to CRSC’s concerns that the seismic provisions had not been reviewed by BSSC, as well as a specific concern over the lack of height limitations in the 2005 MSJC provisions. We bring this modified proposal to you at these hearings after amicable and productive dialog with many key members of BSSC, CRSC, and ASCE 7. Based on those discussions, this modified proposal includes prescriptive height limitations; it limits ductile reinforced AAC masonry shear-wall systems to SDC A through D; it limits unreinforced AAC masonry shear-wall systems to SDC A and B; and it prescribes seismic design factors for each system. The adoption of this proposal will permit this well-established and well-documented structural system to be used in the U.S.A. as it is in Europe, Japan and elsewhere. Since the ASCE 7 cycle is not complete, we are proposing to add information on the seismic factors to Section 1613.6 Alternatives to ASCE 7 as a temporary measure until they can be incorporated into ASCE 7. This is not a unique situation; the proposed exception would join two other exceptions to ASCE 7 in that section. Through ASCE 7 itself, and through the BSSC PUC working group charged with coordination with ASCE 7, we intend to work for direct inclusion of these seismic design factors into ASCE 7 as soon as the ASCE 7 cycle permits.

The proposed modification is based on the results of the ANSI-consensus provisions of the 2005 MSJC *Code and Specification*, including its provisions for AAC masonry and considerable review and discussion with other committees charged with protection of the seismic safety of the public. This is a far better solution than the current prohibition outside of SDC A, which was made on procedural rather than technical grounds. Also, the proposed values of R and CD, which were determined in accordance with AC215 and already approved by ICC-ES, are consistent with the stated intentions of the Code Resource Support Committee (CRSC) of the Building Seismic Safety Council (BSSC) for development of acceptance criteria for new materials.

The first basis for our proposed modification is technical. No technical data was advanced in support of the current exclusion -- only that the intervening group had not had time to study it. They have now undertaken that study. Ample technical justification confirming the seismic reliability of AAC masonry, and supporting the proposed seismic design factors, has been published in refereed conference proceedings since June 2003. The 2005 MSJC provisions for AAC masonry are supported by three refereed journal papers, many refereed conference proceedings, and a coherent and rigorously applied body of uncontested technical information. The refereed journal papers are listed below:

Tanner, J.E., Varela, J.L., Klingner, R.E., "Design and Seismic Testing of a Two-story Full-scale Autoclaved Aerated Concrete (AAC) Assemblage Specimen," *Structures Journal*, American Concrete Institute, Farmington Hills, Michigan, vol. 102, no. 1, January - February 2005, pp. 114-119.

Tanner, J.E., Varela, J.L., Klingner, R.E., Brightman M. J. and Cancino, U., "Seismic Testing of Autoclaved Aerated Concrete (AAC) Shear Walls: A Comprehensive Review," *Structures Journal*, American Concrete Institute, Farmington Hills, Michigan, vol. 102, no. 3, May - June 2005, pp. 374-382.

Varela, J. L., Tanner, J. E. and Klingner, R. E., "Development of Seismic Force-Reduction and Displacement Amplification Factors for AAC Structures," *EERI Spectra* (accepted for publication, May 2005).

Prior to our work in developing the procedure for AAC as described in the ICC-ES AC215 document entitled "ACCEPTANCE CRITERIA FOR SEISMIC DESIGN FACTORS AND COEFFICIENTS FOR SEISMIC-FORCE-RESISTING SYSTEMS OF AUTOCLAVED AERATED CONCRETE (AAC)", approved in October 2003, there had not been any procedure developed for the establishment of R and CD values for new materials. The values proposed in this modification for AAC were developed in accordance with the acceptance criteria approved in AC215 and are consistent with the stated intentions of the Code Resource Support Committee (CRSC) of the Building Seismic Safety Council (BSSC) for development of acceptance criteria for new materials.

As can be seen in that research, for ductile reinforced AAC masonry shear walls the requested values of 3 for the response modification factor, R and the deflection application factor, CD, are conservative, which provides an additional factor of safety beyond that which would normally be expected for any building material or system. In addition, for unreinforced AAC masonry shear walls, the requested values of 1.5 for the response modification factor, R and the deflection application factor, CD, are consistent with the values currently prescribed for unreinforced masonry.

The second basis for our proposed modification is the life safety of the public that the ICC is charged with protecting. There is no justification for denying to that public a building system that was introduced in 1929; that is demonstrably safe, environmentally friendly, energy-efficient, and comfortable to live in; and that is recognized throughout the world, including many areas of high seismic risk and strict design and construction standards.

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

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

S25–06/07
1613.7

Proponent: David Bonneville, S.E., Degenkolb Engineers, representing NCSEA CAC

Add new text as follows:

1613.7 Modifications to ASCE 7.

1613.7.1 Exemption of nonstructural components. Revise section 13.1.4 of ASCE 7 to read as follows:

13.1.4 Exemptions. The following nonstructural components are exempt from the requirements of this section:

1. Architectural components in Seismic Design Category B other than parapets supported by bearing walls or shear walls provided that the component importance factor, I_p, is equal to 1.0.
2. Mechanical and electrical components in Seismic Design Category B.
3. Mechanical and electrical components in Seismic Design Category C provided that the component importance factor, I_p, is equal to 1.0.
4. Mechanical and electrical components in Seismic Design Categories D, E, and F where the component importance factor, I_p, is equal to 1.0 and both of the following apply:
   4.1. Flexible connections between the components and associated ductwork, piping, and conduit are provided.
   4.2. Components are mounted at 4 ft (1.22 m) or less above a floor level and weigh 400 lb (1780 N) or less.
5. Mechanical and electrical components in Seismic Design Categories D, E, and F where the component importance factor, I_p, is equal to 1.0 and both of the following apply:
   5.1. Flexible connections between the components and associated ductwork, piping, and conduit are provided.
   5.2. The components weigh 20 lb (95N) or less or, for distribution systems, weighing 5 lb/ft (7 N/m) or less.

Reason: In the reformatting of ASCE 7, the wording in section 13.1.4 Exemption 4 was incorrectly modified to create the unintended effect of permitting almost all mechanical and electrical equipment to be exempted by adding the word either. As it is currently worded in ASCE 7-05, this would permit any piece of mechanical and electrical components having flexible connections between it and its associated elements to be unbraced, regardless of its weight. The proposed wording allows for exempting only mechanical and electrical components having flexible connections between it and its associated elements and weighing less than 400 lbs and mounted less than 4 feet above a floor.

The words both of the following apply are added to 13.1.4 Exemption 4 and 5 to clarify that both a. and b. must be satisfied.

Cost Impact: The code change proposal will not increase the cost of construction because it rewords the current language to have the same intent as the previous code language.

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

S26–06/07
1613.7 (new)

Proponent: Edward A. Donoghue, Edward A. Donoghue Associates Inc., representing National Elevator Industry, Inc.

Add new text as follows:

1613.7 Modifications to ASCE 7.

1613.7.1 ASCE 7, Section 13.6.10.3 Seismic Controls. Modify ASCE 7, Section 13.6.10.3 to read as follows:

13.6.10.3 Seismic Controls. Seismic switches shall be in accordance with Section 8.4.10 of ASME A17.1.

Reason: Delete duplicate requirements.

Seismic switches and elevator operation, after switch activation, are already defined in A17.1-2004, Section 8.4.10, Emergency Operation and Signaling Devices. A17.1 and ASCE 7 seismic switch and mounting requirements are different and inconsistent. A17.1 requires mounting the switch, when exclusively to control elevators, in the machine room and, where possible, adjacent to a vertical load bearing building structural member with its axis of sensitivity in the vertical direction and set to trigger at 0.15g. Placing the switch near a vertical structural support member will prevent significant amplification of vertical motions between the foundation and seismic trigger. At small and moderate ground motions, buildings often exhibit horizontal amplifications at the top of 3 or more. Thus, with horizontal ground motions of 0.1 g, a value commonly experienced in California, the ASCE 7 seismic switch shall trigger elevator shutdowns. This requires the elevator be inspected by an elevator mechanic, adding unnecessary disruption and cost. The seismic switch used by A17.1 is designed to trigger on the P wave so that, in many cases, it will provide adequate time to stop the elevator and allow passengers to exit the elevator before severe shaking in the building starts. This earlier trigger is also more likely to allow passengers to exit the elevator prior to loss of building power, a common occurrence in moderate earthquakes. This early exit would avoid having passengers trapped in an elevator during an earthquake and the need for first responders to rescue them from the elevator.

Movement of the elevator after the seismic switch has triggered, even in "life-safety" facilities, is a significant elevator operation. It is felt that ASCE 7 does not go into enough detail of procedures for this operation. A17.1-2004, 8.4.10, has a prescribed elevator operation in the event a seismic switch or counterweight (CWT) derailment switch is activated. An activated CWT derailment switch indicates that the CWT is out of its normal running position and may be totally out of its guide rails. Upon activation of the CWT derailment switch, A17.1 does not allow movement of the car towards the CWT, in order to prevent the possible collision of the elevator car and CWT. There could be great risk of injury and death to elevator passengers and damage to building structures by having an elevator running while its CWT derailment switch is activated. A17.1 Earthquake Safety Committee is currently working on a post-earthquake procedure/operation guideline to expedite returning elevator service to key buildings.

Reference ASME A17.1 – 2004, 8.4.10.

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

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

S27–06/07
1701.4

Proponent: T. Eric Stafford, Institute for Business and Home Safety

Add new text as follows:

1701.4 Tested materials and assemblies. Assemblies and materials required by this code to be tested shall be installed in the configuration described in the applicable test reports.

Reason: This proposal is quite simple and straightforward. It is intended to state a requirement that is already implied by the code and that is enforced by code officials. This proposal does not prohibit deviations from the tested configuration provided the configuration used complies with one that is outlined in the test report. This proposal is simply a clarification.

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

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

S28–06/07
1702.1

Proponent: Sam Francis, American Forest & Paper Association

Revise as follows:

SECTION 1702
DEFINITIONS

FABRICATED ITEM. Structural, load-bearing or lateral load-resisting assemblies consisting of materials assembled prior to installation in a building or structure, or subjected to operations such as heat treatment, thermal cutting, cold working or reforming after manufacture and prior to installation in a building or structure. Materials produced in accordance with ~~standard specifications referenced by this code, such as rolled structural steel shapes, steel reinforcing bars, masonry units, and wood structural panels~~ a standard, listed in Chapter 35, that requires quality

control to be provided under the supervision of a third party quality control agency shall not be considered "fabricated items."

Reason: This proposal is intended to clarify the code requirements for special inspections. Many common items are fabricated under standards cited in the IBC. Many of those items are fabricated with strict quality assurance done under third party supervision. In addition, the proposal also eliminates laundry lists from the code text. Such lists make interpretation and maintenance of the code awkward at best but potentially very, very difficult.

The reason for this change is to eliminate what amounts to a duplicate requirement in the code. Special Inspections are exactly analogous to the QC program required by some standards listed in the code. This change makes it clear that the code is not intended to require a redundant set of inspection requirements for those items. They have been produced satisfactorily for many years under the code mandated third party QC and inspection.

Cost Impact: The code change proposal will not increase the cost of construction. Elimination of unnecessary and redundant requirements lower costs of various amounts.

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

S29–04/05
1702, 202

Proponent: William W. Stewart, FAIA, Chesterfield, MO, representing himself

1. Add new definitions as follows:

SECTION 202
DEFINITIONS

LABEL. ~~See Section 1702.1.~~ An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material, and the name and identification of an approved agency and that indicates that the representative sample of the product or material has been tested and evaluated by an approved agency (see Section 1703.5 and "Inspection certificate," "Manufacturer's designation" and "Mark").

MANUFACTURER'S DESIGNATION. ~~See Section 1702.1.~~ An identification applied on a product by the manufacturer indicating that a product or material complies with a specified standard or set of rules (see also "Inspection certificate," "Label" and "Mark").

MARK. ~~See Section 1702.1.~~ An identification applied on a product by the manufacturer indicating the name of the manufacturer and the function of a product or material (see also "Inspection certificate," "Label" and "Manufacturer's designation").

2. Delete definitions without substitution:

SECTION 1702
DEFINITIONS

~~**LABEL.** An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material, and the name and identification of an approved agency and that indicates that the representative sample of the product or material has been tested and evaluated by an approved agency (see Section 1703.5 and "Inspection certificate," "Manufacturer's designation" and "Mark").~~

~~**MANUFACTURER'S DESIGNATION.** An identification applied on a product by the manufacturer indicating that a product or material complies with a specified standard or set of rules (see also "Inspection certificate," "Label" and "Mark").~~

~~**MARK.** An identification applied on a product by the manufacturer indicating the name of the manufacturer and the function of a product or material (see also "Inspection certificate," "Label" and "Manufacturer's designation").~~

Reason: Since label is a term used in many sections (715.3.5, 1404.10, 2303.21 and 2405.5 for example) the definition should be in Chapter 2 not Chapter 17. I have not changed any text, just moved it to 202. The same is true for Manufacturer's Designation and Mark. They are rarely used in the code but they appear more often in other chapters than in Chapter 17. If moved then they should then be deleted from Chapter 17.

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

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

S30–06/07
1703.6, 3403.1.1 (New) [IEBC 302.1.1 (New)]

Proponent: William W. Stewart, FAIA, Chesterfield, MO, representing himself

1. Delete without substitution:

~~**1703.6 Heretofore approved materials.** The use of any material already fabricated or of any construction already erected, which conformed to requirements or approvals heretofore in effect, shall be permitted to continue, if not detrimental to life, health or safety to the public.~~

(Renumber subsequent sections)

2. Add new text as follows:

3403.1.1 (IEBC 302.1.1) Heretofore approved materials. The use of any material already fabricated or of any construction already erected, which conformed to requirements or approvals heretofore in effect, shall be permitted to continue, if not detrimental to life, health or safety to the public.

Reason: This section covers all existing materials and belongs in Chapter 34 Existing Structures. Section 1703.6 has been moved, with no changes to Chapter 34.

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

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

S31–06/07
1704.1

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Revise as follows:

1704.1 General. Where application is made for construction as described in this section, the owner or the registered design professional in responsible charge acting as the owner's agent shall employ one or more special inspectors to provide inspections during construction on the types of work listed under Section 1704. The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the building official, for inspection of the particular type of construction or operation requiring special inspection. These inspections are in addition to the inspections specified in Section 109.

Exceptions:

1. Special inspections are not required for work of a minor nature or as warranted by conditions in the jurisdiction as approved by the building official.
2. Special inspections are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
3. Unless otherwise required by the building official, special inspections are not required for occupancies in ~~Group R-3 as applicable in Section 101.2 and occupancies in~~ Group U that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.

Reason: In the 2003 IBC, there were approximately 45 provisions applicable to "Group R-3 as applicable in Section 101.2." Section 101.2 requires application of the provisions of the IBC to every building or structure or any appurtenances connected to or attached to such buildings or structures. Detached one- and two-family dwellings and multiple single-family dwellings not more than three stories above grade with a separate means of egress and their accessory structures, however, are required to comply with the IRC. Existing buildings undergoing repair, alteration or additions and changes of occupancy are permitted to comply with the IEBC.

In the 2006 IBC, the phrase, "as applicable in Section 101.2," has been deleted in virtually all cases except for Exception 3 to Section 1704.1. Currently, Exception 3 exempts Group R-3 occupancies complying with the IRC from the requirements for special inspection in the IBC. If deletion of the phrase, "as applicable in Section 101.2," in Section 1704.1 were to occur, Group R-3 occupancies complying with the IBC would be exempt from the requirements for special inspection in the IBC.

The proposal deletes the exemption for Group R-3 occupancies. The structural systems of Group R-3 buildings can just as complex and challenging as those of commercial structures. The use of high-strength concrete, structural steel, high-strength bolting, complete-penetration grove welds, engineered masonry, pile foundations and other materials, components and systems that typically receive special inspection in commercial structures are often seen in Group R-3 buildings. In Seismic Design Categories C, D, E and F, engineered seismic-force-resisting systems are also common.

The requirement for special inspection of Group R-3 occupancies in the IBC is warranted and should be retained. Exception 1 to Section 1704.1 will continue to provide the building official with the discretion to exempt work of a minor nature or as warranted by conditions in the jurisdiction from the requirement for special inspection.

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

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

S32–06/07
1704.1

Proponent: Brian Scot Tollisen, P.E., New York Department of State Division of Code Enforcement and Administration

Revise as follows:

1704.1 General. Where application is made for construction as described in this section, the owner or the registered design professional in responsible charge acting as the owner's agent shall employ one or more special inspectors to provide inspections during construction on the types of work listed under Section 1704. ~~The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the building official, for the inspection of the particular type of construction or operation requiring special inspection.~~ These inspections are in addition to the inspections identified in Section 109.

The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the building official, for the inspection of the particular type of construction or operation requiring special inspection. The special inspector shall provide written documentation to the building official demonstrating their competence and relevant experience. Experience shall be considered relevant when the documented experience is related in complexity to the same type of special inspection activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

Exceptions:

1. Special inspections are not required for work of a minor nature or as warranted by conditions in the jurisdiction as approved by the building official.
2. Special inspections are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
3. Unless otherwise required by the building official, special inspections are not required for occupancies in Group R-3 as applicable in Section 101.2 and occupancies in Group U that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.

Reason: The purpose of this proposal is to provide an adequate pool of qualified and knowledgeable special inspectors. The additions to IBC Section 1704.1 are proposed with the intention to standardize special inspection qualifications within the model code.

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

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

S33–06/07
1704.1

Proponent: Maureen Traxler, City of Seattle, representing Washington Association of Building Officials

Revise as follows:

1704.1 General. Where application is made for construction as described in this section, the owner or the registered design professional in responsible charge acting as the owner's agent shall employ one or more special inspectors to provide inspections during construction on the types of work listed under Section 1704. The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the building official, for inspection of the particular type of construction or operation requiring special inspection. These inspections are in addition to the inspections specified in Section 109.

Exceptions:

1. Special inspections are not required for work of a minor nature or as warranted by conditions in the jurisdiction as approved by the building official.
2. Special inspections are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
3. Unless otherwise required by the building official, special inspections are not required for occupancies in Group R-3 ~~as applicable in Section 101.2~~ and occupancies in Group U that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.

Reason: The deleted phrase refers to the "Scope" section of the IBC. It limits the use of the exception to those Group R occupancies that are within the scope of the IBC, such as those that are more than three stories or that do not have a separate means of egress. The phrase has been deleted from every other section of the 2006 edition of the IBC.

Some dwellings that are subject to the IRC will use the structural provisions of the IBC as a means of complying with the structural provisions of the IRC. For instance, IRC Section R301.2.2.4.1 and Table R602.10.1 limit the height of wood-framed buildings in Seismic Design Category D1 and D2 to two stories. Three-story buildings will still be subject to the IRC, but the seismic design may be done according to the IBC. Those dwellings should be excepted from special inspection, the same as those that are within the scope 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

S34–06/07
1704.3.3

Proponent: Brian Scot Tollisen, New York Department of State Division of Code Enforcement and Administration

1. Revise as follows:

1704.3.3 High-strength bolts. Installation of high-strength bolts shall ~~be periodically inspected in accordance with AISC specifications~~ have periodic special inspection in accordance with RCSC specifications or other approved inspection standard.

2. Add standard to Chapter 35:

RCSC Research Council on Structural Connections
c/o American Institute of Steel Construction, Inc.
One East Wacker Drive, Suite 3100
Chicago, Illinois 60601-2001

RCSC-00 Specification for Structural Joints Using ASTM A325 or A490 Bolts, June 23, 2000

Reason: To revise this section to be consistent with the definition of *special inspection, periodic* and to reference the appropriate bolting specification. As written, section 1704.3.3 is not correct. *Periodically inspected* is not defined and the reference should be made to the appropriate inspection standard. Note that this code change proposal would require the RCSC specification to be listed in Chapter 35.

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

Analysis: Results of review of the proposed standard(s) will be posted on the ICC website by August 20, 2006.

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

S35–06/07
1704.4, 1705.3, 1709.2, 1805.5.7, 1805.9, 1808.2.5, 1808.2.23.2, 1904.2.2, 1909.4, 1915.5, 2308.3.3, 2308.11.1, 2308.12.1

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Revise as follows:

1704.4 Concrete construction. The special inspections and verifications for concrete construction shall be as required by this section and Table 1704.4.

Exception: Special inspections shall not be required for:

1. Isolated spread concrete footings of buildings three stories or less ~~in height~~ above grade plane that are fully supported on earth or rock.
2. Continuous concrete footings supporting walls of buildings three stories or less ~~in height~~ above grade plane that are fully supported on earth or rock where:
   2.1. The footings support walls of light frame construction;
   2.2. The footings are designed in accordance with Table 1805.4.2; or
   2.3. The structural design of the footing is based on a specified compressive strength, f'_c, no greater than 2,500 pounds per square inch (psi) (17.2 Mpa), regardless of the compressive strength specified in the construction documents or used in the footing construction.
3. Nonstructural concrete slabs supported directly on the ground, including prestressed slabs on grade, where the effective prestress in the concrete is less than 150 psi (1.03 Mpa).
4. Concrete foundation walls constructed in accordance with Table 1805.5(5).
5. Concrete patios, driveways and sidewalks, on grade.

1705.3 Seismic resistance. The statement of special inspections shall include seismic requirements for the following cases:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F, in accordance with Section 1613.
2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
3. The following additional systems and components in structures assigned to Seismic Design Category C:
   3.1. Heating, ventilating and air-conditioning (HVAC) ductwork containing hazardous materials and anchorage of such ductwork.
   3.2. Piping systems and mechanical units containing flammable, combustible or highly toxic materials.
   3.3. Anchorage of electrical equipment used for emergency or standby power systems.
4. The following additional systems and components in structures assigned to Seismic Design Category D:
   4.1. Systems required for Seismic Design Category C.
   4.2. Exterior wall panels and their anchorage.
   4.3. Suspended ceiling systems and their anchorage.
   4.4. Access floors and their anchorage.
   4.5. Steel storage racks and their anchorage, where the importance factor is equal to 1.5 in accordance with Section 15.5.3 of ASCE 7.
5. The following additional systems and components in structures assigned to Seismic Design Category E or F:
   5.1. Systems required for Seismic Design Categories C and D.
   5.2. Electrical equipment.

Exception: Seismic requirements are permitted to be excluded from the statement of special inspections for structures designed and constructed in accordance with the following:

1. The structure consists of light-frame construction; the design spectral response acceleration at short periods, S_{DS}, as determined in Section 1613.5.4, does not exceed 0.5g; and the height of the structure does not exceed 35 feet (10 668 mm) above grade plane; or
2. The structure is constructed using a reinforced masonry structural system or reinforced concrete structural system; the design spectral response acceleration at short periods, S_{DS}, as determined in Section 1613.5.4, does not exceed 0.5g, and the height of the structure does not exceed 25 feet (7620 mm) above grade plane; or
3. Detached one- or two-family dwellings not exceeding two stories ~~in height~~ above grade plane, provided the structure does not have any of the following plan or vertical irregularities in accordance with Section 12.3.2 of ASCE 7:
   3.1. Torsional irregularity.
   3.2. Nonparallel systems.
   3.3. Stiffness irregularity–extreme soft story and soft story.
   3.4. Discontinuity in capacity–weak story.

1709.2 Structural observations for seismic resistance. Structural observations shall be provided for those structures included in Seismic Design Category D, E or F, as determined in Section 1613.5.6, where one or more of the following conditions exist:

1. The structure is classified as Occupancy Category III or IV in accordance with Table 1604.5.
2. The height of the structure is greater than 75 feet (22 860 mm) above the base.

3. The structure is assigned to Seismic Design Category E, is classified as Occupancy Category I or II in accordance with Table 1604.5, and is greater than two stories ~~in height~~ above grade plane.
4. When so designated by the registered design professional in responsible charge of the design.
5. When such observation is specifically required by the building official.

1805.5.7 Pier and curtain wall foundations. Except in Seismic Design Categories D, E and F, pier and curtain wall foundations are permitted to be used to support light-frame construction not more than two stories ~~in height~~ above grade plane, provided the following requirements are met:

1. All load-bearing walls shall be placed on continuous concrete footings bonded integrally with the exterior wall footings.
2. The minimum actual thickness of a load-bearing masonry wall shall not be less than 4 inches (102 mm) nominal or 3-5/8 inches (92 mm) actual thickness, and shall be bonded integrally with piers spaced 6 feet (1829 mm) on center (o.c.).
3. Piers shall be constructed in accordance with Chapter 21 and the following:
   3.1. The unsupported height of the masonry piers shall not exceed 10 times their least dimension.
   3.2. Where structural clay tile or hollow concrete masonry units are used for piers supporting beams and girders, the cellular spaces shall be filled solidly with concrete or Type M or S mortar.

   Exception: Unfilled hollow piers are permitted where the unsupported height of the pier is not more than four times its least dimension.

   3.3. Hollow piers shall be capped with 4 inches (102 mm) of solid masonry or concrete or the cavities of the top course shall be filled with concrete or grout.
4. The maximum height of a 4-inch (102mm)load-bearing masonry foundation wall supporting wood frame walls and floors shall not be more than 4 feet (1219 mm) in height.
5. The unbalanced fill for 4-inch (102 mm) foundation\ walls shall not exceed 24 inches (610 mm) for solid masonry, nor 12 inches (305mm)for hollow masonry.

1805.9 Seismic requirements. See Section 1908 for additional requirements for footings and foundations of structures assigned to Seismic Design Category C, D, E or F.

For structures assigned to Seismic Design Category D, E or F, provisions of ACI 318, Sections 21.10.1 to 21.10.3, shall apply when not in conflict with the provisions of Section 1805. Concrete shall have a specified compressive strength of not less than 3,000 psi (20.68 MPa) at 28 days.

Exceptions:

1. Group R or U occupancies of light-framed construction and two stories or less ~~in height~~ above grade plane are permitted to use concrete with a specified compressive strength of not less than 2,500 psi (17.2 MPa) at 28 days.
2. Detached one- and two-family dwellings of light-frame construction and two stories or less ~~in height~~ above grade plane are not required to comply with the provisions of ACI 318, Sections 21.10.1 to 21.10.3.

1808.2.5 Stability. Piers or piles shall be braced to provide lateral stability in all directions. Three or more piles connected by a rigid cap shall be considered braced, provided that the piles are located in radial directions from the centroid of the group not less than 60 degrees (1 rad) apart. A two-pile group in a rigid cap shall be considered to be braced along the axis connecting the two piles. Methods used to brace piers or piles shall be subject to the approval of the building official.

Piles supporting walls shall be driven alternately in lines spaced at least 1 foot (305 mm) apart and located symmetrically under the center of gravity of the wall load carried, unless effective measures are taken to provide for eccentricity and lateral forces, or the wall piles are adequately braced to provide for lateral stability. A single row of piles without lateral bracing is permitted for one- and two-family dwellings and lightweight construction not exceeding two stories above grade plane or 35 feet (10 668 mm) in height, provided the centers of the piles are located within the width of the foundation wall.

1808.2.23.2 Seismic Design Category D, E or F. Where a structure is assigned to Seismic Design Category D, E or F in accordance with Section 1613, the requirements for Seismic Design Category C given in Section 1808.2.23.1 shall be met, in addition to the following. Provisions of ACI 318, Section 21.10.4, shall apply when not in conflict with the provisions of Sections 1808 through 1812. Concrete shall have a specified compressive strength of not less than 3,000 psi (20.68 MPa) at 28 days.

Exceptions:

1. Group R or U occupancies of light-framed construction and two stories or less ~~in height~~ above grade plane are permitted to use concrete with a specified compressive strength of not less than 2,500 psi (17.2 MPa) at 28 days.
2. Detached one- and two-family dwellings of light-frame construction and two stories or less in height are not required to comply with the provisions of ACI 318, Section 21.10.4.
3. Section 21.10.4.4(a) of ACI 318 need not apply to concrete piles.

1904.2.2 Concrete properties. Concrete that will be subject to the following exposures shall conform to the corresponding maximum water-cementitious materials ratios and minimum specified concrete compressive strength requirements of ACI 318, Section 4.2.2.

1. Concrete intended to have low permeability where exposed to water;
2. Concrete exposed to freezing and thawing in a moist condition or deicer chemicals; or
3. Corrosion protection of reinforcement in concrete exposed to chlorides from deicing chemicals, salt, salt water, brackish water, seawater, or spray from these sources.

Exception: For occupancies and appurtenances thereto in Group R occupancies that are in buildings less than four stories ~~in height~~ above grade plane, normal-weight aggregate concrete shall comply with the requirements of Table 1904.2.2(2) based on the weathering classification (freezing and thawing) determined from Figure 1904.2.2.

In addition, concrete that will be exposed to deicing chemicals shall conform to the limitation of Section 1904.2.3.

1909.4 Design. Structural plain concrete walls, footings and pedestals shall be designed for adequate strength in accordance with ACI 318, Sections 22.4 through 22.8.

Exception: For Group R-3 occupancies and buildings of other occupancies less than two stories ~~in height~~ above grade plane of light-frame construction, the required edge thickness of ACI 318 is permitted to be reduced to 6 inches (152 mm), provided that the footing does not extend more than 4 inches (102 mm) on either side of the supported wall.

1915.5 Fire-resistance-rating protection. Pipe columns shall be of such size or so protected as to develop the required fire-resistance ratings specified in Table 601. Where an outer steel shell is used to enclose the fire protective covering, the shell shall not be included in the calculations for strength of the column section. The minimum diameter of pipe columns shall be 4 inches (102 mm) except that in structures of Type V construction not exceeding three stories above grade plane or 40 feet (12 192 mm) in height, pipe columns used in the basement and as secondary steel members shall have a minimum diameter of 3 inches (76 mm).

2308.3.3 Sill anchorage. Where foundations are required by Section 2308.3.4, braced wall line sills shall be anchored to concrete or masonry foundations. Such anchorage shall conform to the requirements of Section 2308.6 except that such anchors shall be spaced at not more than 4 feet (1219 mm) o.c. for structures over two stories ~~in height~~ above grade plane. The anchors shall be distributed along the length of the braced wall line. Other anchorage devices having equivalent capacity are permitted.

2308.11.1 Number of stories. Structures of conventional light-frame construction shall not exceed two stories ~~in height~~ above grade plane in Seismic Design Category C.

2308.12.1 Number of stories. Structures of conventional light-frame construction shall not exceed one story ~~in height~~ above grade plane in Seismic Design Category D or E.

Reason: All of the code sections in this proposal have one thing in common. They specify requirements for a building based on its number of stories. A story is defined in Sections 202 and 502.1 as "that portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above," which includes portions of a building below grade plane (i.e., basements). Consequently, the number of stories specified in of these code sections would be determined beginning at the bottommost level in the building, which could be several levels (stories) below grade plane. The proposal will establish that the determination begins at the first story above grade plane, which is the probable intent in each case.

This proposal does not include each code section in the IBC that specifies requirements for a building based on its number of stories. There are cases where the determination of the number of stories in a building beginning at the bottommost level is warranted. Please refer to Sections 406.1.1, 415.4, 415.5, 415.7.3.3, 903.2.8.1(1), 1015.2, 2305.1.5, 2305.2.5, 2603.5, 3310.1 and 3311.1.

There are also several code sections in the IBC that currently specify requirements for a building based on its number of stories above grade plane. Please refer to Sections 101.2 (Exception 1), 402.1, 402.7.3, 415.7.3.5, 415.9.2.3, 903.2.3(2), 903.2.6(2), 903.2.8(2), 1009.12, 1002.6 (Exception 1), 1018.2 (Item 1), 1025.1, 1407.11.1, 1407.11.2, 1705.1 (Exceptions 1 and 2), 1509.5, 1807.1.1, 2308.2(1), 2308.2.2 (Exception 2), 2308.11.2 (Exception 1), 2308.12.2 (Exception 1), 2607.3, 2608.2 (Item 1) and 3002.4. See code change proposal G44-04/05 (AM) for further information.

This proposal is partly a continuation of code change proposal G44-04/05 (AM), which successfully distinguished between requirements based on the height or number of stories of a building by measuring from grade plane versus the height of a component of a building by measuring from grade. There is also a similar proposal before the IBC General Committee.

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

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

S36–06/07
Table 1704.4

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Revise table as follows:

TABLE 1704.4
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD [a]	IBC REFERENCE
3. Inspect bolts and anchors to be installed in concrete prior to and during placement of concrete ~~where~~ except where allowable loads ~~have been increased~~ are based on values in Table 1911.2 without increases for special inspection	X			1911.5

(Portions of table not shown do not change)

Reason: The purpose of this proposal is to expand the special inspection of anchors, bolts, rods and studs in concrete construction to include ones whose design values are determined other than by use of Table 1911.2. There are numerous types of anchors, bolts, rods and studs used for the connection of (typically) wood and steel construction to concrete. They can be cast-in-place or post-installed. The predominant example of cast-in-place installation is an anchor rod complying with ASTM F 1554 but materials complying with other ASTM standards can also be used. Welded head studs and deformed bar anchors are also commonly used. Prominent examples of post-installed anchors are expansion anchors, adhesive anchors, undercut anchors and screw anchors. Post-installed are not specifically permitted by the IBC but are commonly qualified for use through nationally recognized evaluation services (i.e., ICC-ES) and approved for use by applying the provisions of IBC Section 104.11 on alternative materials, design and methods of construction and equipment. Appendix D of the Building Code Requirements for Structural Concrete (ACI 318) now has design procedures for expansion anchors that are prequalified for use with Appendix D (i.e., ACI 355.2).

The design and installation of some anchors, bolts and rods can be complex but the designer is rewarded with high-capacity connections that provide reliable and demonstrated levels of performance. This expected performance, however, will not occur unless the installation follows applicable specifications, which often includes the manufacturer's recommendations. Verification that the installation is done in accordance with applicable specifications and recommendations warrants higher levels of quality assurance than are employed for anchors, bolts, rods or studs with less complex demands on design and installation. In the IBC, higher levels of quality assurance are provided through special inspection.

One would expect that the provisions for special inspection in the IBC would be consistent with this and require special inspection for all anchors, bolts, rods and studs in concrete construction except those with less complex demands on their design and installation, but this is not the case. According to Item #3 of Table 1704.4, special inspection is required for bolts where allowable loads have been increased. A reference to Section 1911.5 is included. Section 1911.5 permits a 100-percent increase in the allowable tension values of Table 1911.2 where special inspection is provided. This means that special inspection is not required for bolts whose design values are derived directly from Table 1911.2 without any increases. Table 1911.2 provides allowable service loads for embedded bolts, referred to as headed anchors in the charging language of Section 1911.2. For all other cases of anchors, bolts, rods or studs used for the support of structural loads in concrete construction, including all applications of the procedures for strength design in Section 1912, which specifies compliance with Appendix D of ACI 318, special inspection is not required. This proposal seeks to correct this oversight.

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

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

S37–06/07
1704.7, 1704.8, 1704.9, 1708.4, 1708.5, 1709.2, 1709.3

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Revise as follows:

1704.7 Soils. Special inspections for existing site soil conditions, fill placement and load-bearing requirements shall be as required by this section and Table 1704.7. The approved soils report, required by Section 1802.2, and the documents prepared by the registered design professional ~~in responsible charge~~ shall be used to determine compliance. During fill placement, the special inspector shall determine that proper materials and procedures are used in accordance with the provisions of the approved soils report, as specified in Section 1803.5.

Exception: Special inspection is not required during placement of controlled fill having a total depth of 12 inches (305 mm) or less.

1704.8 Pile foundations. Special inspections shall be performed during installation and testing of pile foundations as required by Table 1704.8. The approved soils report, required by Section 1802.2, and the documents prepared by the registered design professional ~~in responsible charge~~ shall be used to determine compliance.

1704.9 Pier foundations. Special inspections shall be performed during installation and testing of pier foundations as required by Table 1704.9. The approved soils report, required by Section 1802.2, and the documents prepared by the registered design professional ~~in responsible charge~~ shall be used to determine compliance.

1708.4 Structural steel. The testing contained in the quality assurance plan shall be as required by AISC 341 and the additional requirements herein. The acceptance criteria for nondestructive testing shall be as required in AWS D1.1 as specified by the registered design professional.

Base metal thicker than 1.5 inches (38 mm), where subject to through-thickness weld shrinkage strains, shall be ultrasonically tested for discontinuities behind and adjacent to such welds after joint completion. Any material discontinuities shall be accepted or rejected on the basis of ASTM A 435 or ASTM A 898 (Level 1 criteria) and criteria as established by the registered design professional~~(s)~~ in responsible charge and the construction documents.

1708.5 Seismic qualification of mechanical and electrical equipment. The registered design professional ~~in responsible charge~~ shall state the applicable seismic qualification requirements for designated seismic systems on the construction documents. Each manufacturer of designated seismic system components shall test or analyze the component and its mounting system or anchorage and submit a certificate of compliance for review and acceptance by the registered design professional ~~in responsible charge of~~ for the design of the designated seismic system and for approval by the building official. Qualification shall be by actual test on a shake table, by three-dimensional shock tests, by an analytical method using dynamic characteristics and forces, by the use of experience data (i.e., historical data demonstrating acceptable seismic performance) or by more rigorous analysis providing for equivalent safety.

1709.2 Structural observations for seismic resistance. Structural observations shall be provided for those structures included in Seismic Design Category D, E or F, as determined in Section 1613, where one or more of the following conditions exist:

1. The structure is classified as Occupancy Category III or IV in accordance with Section 1604.5.
2. The height of the structure is greater than 75 feet (22 860 mm) above the base.
3. The structure is assigned to Seismic Design Category E, is classified as Occupancy Category I or II in accordance with Section 1604.5 and is greater than two stories in height.
4. When so designated by the registered design professional in responsible charge ~~of the design~~.
5. When such observation is specifically required by the building official.

1709.3 Structural observations for wind requirements. Structural observations shall be provided for those structures sited where the basic wind speed exceeds 110 mph (49 m/sec) determined from Figure 1609, where one or more of the following conditions exist:

1. The structure is classified as Occupancy Category III or IV in accordance with Table 1604.5.
2. The building height of the structure is greater than 75 feet (22 860 mm).
3. When so designated by the registered design professional in responsible charge ~~of the design~~,
4. When such observation is specifically required by the building official.

Reason: This proposal is in response to Recommendation 28 of the "Final Report on the Collapse of the World Trade Center Towers" (NIST NCSTAR 1). The recommendation assumes that the IBC already defines "design professional in responsible charge," which is not the case. A related proposal before the General Code Committee will provide a definition in the IBC as well as the IEBC. Note that the term "registered design professional in responsible charge" is used throughout the IBC (i.e., Sections 106.3.4.1, 106.3.4.2, 1704.1, 1704.1.1, 1704.1.2, 1704.7, 1704.8, 1704.9, 1705.1, 1708.4, 1708.5, 1709.2 and 1709.3) as well as the IEBC. Note also that the term is typically not used in other codes published by the International Code Council. Specially, there are no instances of the term "registered design professional in responsible charge" in the 2003 IECC, IFC, IFGC, IMC, IPC or IRC.

The proposed definition in the related proposal before the General Code Committee is consistent with the role the IBC and IEBC currently specify for the registered design professional in responsible charge, which is typically the review and coordination of submittal documents prepared by others, deferred submittal documents and phased submittal documents for compatibility with the design of the building or structure. Refer to Section 106.3.4 in the IBC and IEBC for specific language.

This proposal revises references to "registered design professional in responsible charge" in the structural chapters of the IBC to eliminate conflicts with Section 106.3.4. Sections 1704.7, 1704.8 and 1704.9 use "registered design professional in responsible charge" when referring to the registered design professional responsible for the structural design of a building or structure. Section 1708.5 uses the same term when referring to the registered design professional responsible for the structural design of a designated seismic system in at a building or structure. Section 106.3.4.1, however, states that the registered design professional in responsible charge is "responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building." Sections 1704.7, 1704.8, 1704.9 and 1708.5 are in conflict with Section 106.3.4.1 by using the same term for registered design professionals with responsibilities other than as specified in Section 106.3.4.1.

The IBC currently uses the term "registered design professional" in approximately 50 code sections, in addition to the code sections using the term "registered design professional in responsible charge." "Registered design professional" refers to an individual responsible for an aspect of the design of a building or structure. Typical examples are the architect, structural engineer, mechanical engineer, electrical engineer, civil engineer, fire protection engineer and others. Referring, instead, to such an individual as a registered design professional in responsible charge is an exercise in stating the obvious. Such individuals are in responsible charge of their individual responsibilities in the design of the building or structure. The term "in responsible change" is implicit in the term "registered design professional."

The proposal will eliminate the conflict between Section 106.3.4, which assigns responsibilities to a registered design professional acting as the registered design professional in responsible charge of a project, and other sections of the IBC, which use the same term but do not intend that the responsibilities in Section 106.3.4 also apply.

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

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

S38–06/07
1704.10

THIS CODE CHANGE PROPOSAL IS ON THE AGENDA FOR THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEE. PLEASE SEE THE HEARING ORDER FOR THE IBC FIRE SAFETY CODE CHANGE COMMITTEE.

Proponent: William M. Connolly, State of New Jersey, Department of Community Affairs, Division of Codes and Standards, representing International Code Council Ad Hoc Committee on Terrorism Resistant Buildings

Revise as follows:

1704.10 Sprayed fire-resistant materials. Special inspections for sprayed fire-resistant materials applied to structural elements and decks shall be in accordance with Sections 1704.10.1 through 1704.10.~~5~~6. Special inspections shall be based on the fire-resistance design as designated in the approved construction documents. The tests described in this section shall be based on samplings of specific floor, roof and wall assemblies, and structural framing members. Special inspections shall be performed after the rough installation of electrical, mechanical and plumbing systems.

1704.10.1 Physical and visual tests. The following physical and visual tests are required to demonstrate compliance with the listing and the fire-resistance-rating:

1. Condition of substrates.
2. Thickness of application.
3. Density in pounds per cubic foot (kgs per m^3).
4. Bond strength -adhesion/cohesion.
5. Condition of finished application.
6. Field bond tests needed to qualify application over certain primers, paints, and encapsulants.

~~**1704.10.1**~~ **1704.10.2 Structural member surface conditions.** The surfaces shall be prepared in accordance with the approved fire-resistance design and the approved manufacturer's written instructions. The prepared surface of structural members to be sprayed shall be inspected before the application of the sprayed fire-resistant material.

~~**1704.10.2**~~ **1704.10.3 Application**. The substrate shall have a minimum ambient temperature before and after application as specified in the approved manufacturer's written instructions. The area for application shall be ventilated during and after application as required by the approved manufacturer's written instructions.

~~**1704.10.3**~~ **1704.10.4 Thickness**. The average thickness minus two times the standard deviation of the thickness measurements of the sprayed fire-resistant materials applied to structural elements shall not be less than the thickness required by the approved fire-resistant design. ~~Individual measured thickness, which exceeds the thickness specified in a design by 1/4 inch (6.4 mm) or more, shall be recorded as the thickness specified in the design plus 1/4 inch (6.4 mm). For design thicknesses 1 inch (25 mm) or greater, the minimum allowable individual thickness shall be the design thickness minus 1/4 inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent.~~ Thickness shall be determined in accordance with ASTM E 605. Samples of the sprayed fire-resistant materials shall be selected in accordance with Sections 1704.10.~~3~~ 4.1 and 1704.10.~~3~~ 4.2.

~~**1704.10.3.1**~~ **1704.10.4.1 Floor, roof and wall assemblies**. The thickness of the sprayed fire-resistant material applied to floor, roof and wall assemblies shall be determined in accordance with ASTM E 605, taking the average minus two times the standard deviation of the thickness measurements of not less than four measurements for each 1,000 square feet (93#m^2) of the sprayed area on each floor or part thereof.

1704.10.4.1.1 Flat decks. Thickness measurements shall be taken from a 12 inches(305mm) square with minimum of four measurements, symmetrically.

1704.10.4.1.2 Fluted decks. Thickness measurements shall be taken from a 12 inches(305mm) square with four random, symmetrical measurements within the square, including one each of the following: valley, crest and sides and report as an average.

~~**1704.10.3.2**~~ **1704.10.4.2 Structural framing members.** The thickness of the sprayed fire-resistant material applied to structural members shall be determined in accordance with ASTM E 605. Thickness testing shall be performed on not less than 25 percent of the structural members on each floor.

1704.10.4.2.1 Beams. Thickness measurements shall be made at nine locations around the beam at each end of a 12 inches(305mm) length.

1704.10.4.2.2 Joists and trusses. Thickness measurements shall be made at seven locations around the joist or truss at each end of a 12 inches(305mm) length.

1704.10.4.2.3 W-Shape columns. Thickness measurements shall be made at 12 locations around the column at each end of a 12 inches(305mm) length.

1704.10.4.2.4 Tube and pipe columns. Thickness measurements shall be made at a minimum of four locations around the column at each end of a 12 inches(305mm) length.

~~**1704.10.4**~~ **1704.10.5 Density**. The density of the sprayed fire-resistant material shall not be less than the density specified in the approved fire-resistant design. Density of the sprayed fire-resistant material shall be determined in accordance with ASTM E 605. The test samples for determining the density of the sprayed fire-resistant materials shall be selected from each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m^2), or part thereof the sprayed area in each story.

~~**1704.10.5**~~ **1704.10.6 Bond strength.** Except as required in Table 403.15, the cohesive/adhesive bond strength of the cured sprayed fire-resistant material applied to structural elements shall not be less than 150 pounds per square foot (psf) (7.18 kN/m^2). The cohesive/adhesive bond strength shall be determined in accordance with the field test specified in ASTM E 736 by testing in-place samples of the sprayed fire-resistant material selected in accordance with Sections 1704.10.~~5~~6.1 and 1704.10.~~5~~6.2.

~~**1704.10.5.1**~~ **1704.10.6.1 Floor, roof and wall assemblies.** The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from each floor, roof and wall assembly at the rate of not less than one sample for every ~~10,000~~ 2,500 square feet (~~929~~232 m^2) or part thereof of the sprayed area in each story.

~~**1704.10.5.2**~~ **1704.10.6.2 Structural framing members.** The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from beams, girders, joists, trusses and columns at the rate of not less than one sample for each type of structural framing member for each ~~10,000~~ 2,500 square feet (~~929~~232m^2) of floor area or part thereof in each story.

1704.10.7 Primer, paint and encapsulant bond field tests. Bond tests to qualify a primer, paint or encapsulant shall be conducted where the fire-resistive coating is applied to a primed, painted or encapsulated surface for which acceptable bond-strength performance between these coatings and the fire resistive material is not covered by the listing.

Reason: This code change proposal is one of fourteen proposals being submitted by the International Code Council Ad Hoc Committee on Terrorism Resistant Buildings.

The purpose of this proposal is to increase the in-place durability of Spray Applied Fire Resistant Material by strengthening and more completely specifying the content of the SFRM special inspections that are already required by Section 1704.10 of the Code.

The National Institute of Standards and Technology's (NIST) investigation of the World Trade Center (WTC) tragedy documented that the proximate cause of the actual collapse was the action of a building contents fire on light steel members in the absence of spray applied fire resistive material, which had been dislodged. Events far less dramatic than an airplane attack have been known to dislodge SFRM. Events as simple as an elevator movement, building sway or maintenance activities can dislodge SFRM if it is not adhered properly.

Recommendation 6 of the NIST WTC Report calls for improvement of the in place durability of SRFM. This proposal is one of three that seeks to achieve that objective. The other two are a proposal for a new Section 403.15 requiring higher bond strengths for SFRM in taller buildings and a proposed new Section 714.8 dealing with application requirements for SFRM.

The Code already recognizes the importance of SFRM application by providing for a special inspection procedure at Section 1704.10. This proposal strengthens that procedure by further specifying what must be inspected, the frequency of measurements and tests, and adding certain pass/fail criteria.

New subsection 1704.10.1 establishes requirements for the matters which need to be documented by the special inspector.

Revised and renumbered section 1704.10.4 amends the pass/fail criteria for thickness. The current language of this section specifies that the average thickness of SFRM must exceed the required thickness as provided for by the listing. This is obviously insufficient since some sections could be very thin and the criteria would still be met if other sections were very thick. The current code responds to this with a series of limitations on how to record thickness. Even with these provisions, some areas of application could be dangerously thin because the approach relies on where individual measurements are taken. This change proposes a new and more scientifically sound method by specifying that the average thickness minus two times the standard deviation of thickness measurements shall not be less than the required thickness. In practical terms, this means that 95% of measurements will meet the required standard or, stated another way, 95% of the surface to which the material is applied will meet the required standard. Standard deviation is a routine statistical concept that will more appropriately ensure the intent of the Code is met. Special inspectors can be expected to calculate it without difficulty.

The proposed changes to renumbered Section 1704.10.4.1 add much greater specificity to the number and location of thickness measurements that will be required to establish average thickness measurements.

The proposed changes to renumbered Section 1704.10.5 specify a sampling rate for density tests. A sampling rate is not specified in the current code text. The one chosen is the same as that specified for bond tests.

The proposed changes to renumbered Section 1704.10.6 changes existing sampling rates for bond tests for from every 10,000 square feet to every 2,500 square feet. The proponents believe that the 10,000 square feet rate is too large and increases the probability that fatal bond weaknesses might not be identified during the special inspection process.

New Section 1704.10.7 qualifies the requirement for field bond tests.

Bibliography:

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: There will be no increase in actual construction costs. There will be a modest increase in special inspection costs.

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

S39–06/07
1704.10

THIS CODE CHANGE PROPOSAL IS ON THE AGENDA FOR THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEE. PLEASE SEE THE HEARING ORDER FOR THE IBC FIRE SAFETY CODE CHANGE COMMITTEE.

Proponent: Paul K. Heilstedt, P.E., representing ICC Code Technology Committee (CTC)

Revise as follows:

1704.10 Sprayed fire-resistant materials. Special inspections for sprayed fire-resistant materials applied to structural elements and decks shall be in accordance with Sections 1704.10.1 through 1704.10.~~5~~ 6 Special inspections shall be based on the fire-resistance design as designated in the approved construction documents. The tests described in this section shall be based on samplings of specific floor, roof and wall assemblies, and structural framing members. Special inspections shall be performed after the rough installation of electrical, sprinkler, mechanical and plumbing systems and suspension for ceiling systems, where applicable.

1704.10.1 Physical and visual tests. The following physical and visual tests are required to demonstrate compliance with the listing and the fire-resistance rating:

1. Condition of substrates.
2. Thickness of application.
3. Density in pounds per cubic foot (kgs per m^3).
4. Bond strength -adhesion/cohesion.
5. Condition of finished application.

~~**1704.10.1**~~ **1704.10.2 Structural member surface conditions.** The surfaces shall be prepared in accordance with the approved fire-resistance design and the approved manufacturer's written instructions. The prepared surface of structural members to be sprayed shall be inspected before the application of the sprayed fire-resistant material.

~~**1704.10.2**~~ **1704.10.3 Application**. The substrate shall have a minimum ambient temperature before and after application as specified in the approved manufacturer's written instructions. The area for application shall be ventilated during and after application as required by the approved manufacturer's written instructions.

~~**1704.10.3**~~ **1704.10.4 Thickness**. The average thickness minus two times the standard deviation of the thickness measurements of the sprayed fire-resistant materials applied to structural elements shall not be less than the thickness required by the approved fire-resistant design. Individual measured thickness, which exceeds the thickness specified in a design by 1/4 inch (6.4 mm) or more, shall be recorded as the thickness specified in the design plus 1/4 inch (6.4 mm). For design thicknesses 1 inch (25 mm) or greater, the minimum allowable individual thickness shall be the design thickness minus 1/4 inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent. Thickness shall be determined in accordance with ASTM E 605. Samples of the sprayed fire-resistant materials shall be selected in accordance with Sections ~~1704.10.3~~ 1704.10.4.1 and ~~1704.10.3.2~~ 1704.10.4.2.

~~**1704.10.3.1**~~ **1704.10.4.1 Floor, roof and wall assemblies**. The thickness of the sprayed fire-resistant material applied to floor, roof and wall assemblies shall be determined in accordance with ASTM E 605, taking the average minus two times the standard deviation of the thickness measurements of not less than four measurements for each 1,000 square feet ($93m^2$) of the sprayed area on each floor or part thereof.

1704.10.4.1.1 Flat decks. Thickness measurements shall be taken from a 12 inches (305 mm) square with a minimum of four measurements, symmetrically.

1704.10.4.1.2 Fluted decks. Thickness measurements shall be taken from a 12 inches (305 mm) square with four random, symmetrical measurements within the square, including one each of the following: valley, crest and sides and report as an average.

~~**1704.10.3.2**~~ **1704.10.4.2 Structural framing members.** The thickness of the sprayed fire-resistant material applied to structural members shall be determined in accordance with ASTM E 605. Thickness testing shall be performed on not less than 25 percent of the structural members on each floor.

1704.10.4.2.1 Beams. Thickness measurements shall be made at nine locations around the beam at each end of a 12 inches. (305 mm) length.

1704.10.4.2.2 Joists and trusses. Thickness measurements shall be made at seven locations around the joist or truss at each end of a 12 inches (305 mm) length.

1704.10.4.2.3 W-shape columns. Thickness measurements shall be made at 12 locations around the column at each end of a 12inches (305 mm) length.

1704.10.4.2.4 Tube and pipe columns. Thickness measurements shall be made at a minimum of four locations around the column at each end of a 12 inches (305 mm) length.

~~**1704.10.4**~~ **1704.10.5 Density**. The density of the sprayed fire-resistant material shall not be less than the density specified in the approved fire-resistant design. Density of the sprayed fire-resistant material shall be determined in accordance with ASTM E 605. The test samples for determining the density of the sprayed fire-resistant materials shall be selected as follows:

1. From each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m^2) or part thereof of the sprayed area in each story.
2. From beams, girders, joists, trusses and columns at the rate of not less than one sample for each type of structural framing member for each 2,500 square feet (232 m^2) of floor area or part thereof in each story.

~~**1704.10.5**~~ **1704.10.6 Bond strength.** The cohesive/adhesive bond strength of the cured sprayed fire-resistant material applied to structural elements shall not be less than 150 pounds per square foot (psf) (7.18 kN/m2). The cohesive/adhesive bond strength shall be determined in accordance with the field test specified in ASTM E 736 by testing in-place samples of the sprayed fire-resistant material selected in accordance with Sections ~~1704.10.5.1 and 1704.10.5.2.~~ 1704.10.6.1 through 1704.10.6.3.

~~**1704.10.5.1**~~ **1704.10.6.1 Floor, roof and wall assemblies.** The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from each floor, roof and wall assembly at the rate of not less than one sample for every ~~10,000~~ 2,500 square feet (~~929~~ 232 m^2) or part thereof of the sprayed area in each story.

~~**1704.10.5.2**~~ **1704.10.6.2 Structural framing members.** The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from beams, girders, joists, trusses and columns at the rate of not less than one sample for each type of structural framing member for each ~~10,000~~ 2,500 square feet (~~929~~ 232 m^2) of floor area or part thereof in each story.

1704.10.6.3 Primer, paint and encapsulant bond tests. Bond tests to qualify a primer, paint or encapsulant shall be conducted only when the fire-resistive coating is applied to a primed, painted or encapsulated surface for which acceptable bond-strength performance between these coatings and the fire resistive material has not been measured. A bonding agent approved by the SFRM manufacturer shall to be applied to a primed, painted or encapsulated surface where the bond strengths are found to be below minimum required values.

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, the CTC has held six meetings - all open to the public.

This proposed change is 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 only a portion of NIST recommendation 6. 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 6 recommends the development of criteria, test methods and standards: (1) for the in-service performance of sprayed fire-resistance 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.

As noted above, this proposed change does not address all aspects of NIST recommendation #6. This proposed change is limited to the necessary inspection parameters for spray applied fire resistant materials after installation and renovation of mechanical, plumbing, electrical and other similar systems.

The proposed revisions are intended to coordinate the text of the IBC with the two standards currently referenced in the code- ASTM 605 and ASTM 736, and also AWCI Technical Manual 12-A Standard Practice for the Testing and Inspection of Filed Applied Sprayed Fire-resistive Materials which is a guide and as such, is not referenced in the code. This proposal also as adds sampling criteria for density measurements (proposed Section 1704.10.5) in addition to the current sampling criteria for bond measurements. However, it is noted that there are two significant differences between this proposal and the standards noted. The first is the determination of thickness in proposed Section 1704.10.4 which is not in the standards. By using the standard deviation method, the test samples must fall within a specified range, otherwise, the combination of very thin samples of spray applied coatings with thick samples may lead to the application passing the test when in reality, the thin sections represent an insufficient amount of fire proofing. The second is the sample size. Currently, ASTM E 605 stipulates the 10,000 square foot sample size that is also in the code. Given the critical nature of spray-applied fire proofing, as noted in the NIST report, this sampling size is viewed as too large, resulting in an increased probability of inadequate protection. This proposal uses a value of 2,500 square feet.

Recommendation #6 also addresses the in-service performance (criteria for performance and durability such as bond strength) of spray applied fire resistance which requires further substantiation.

Bibliography:
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 increase the cost of construction due to more frequent sampling of spray applied material.

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

S40–06/07
1704.15

Proponent: Tony Crimi, A.C. Consulting Solutions, Inc., representing International Firestop Council

THIS CODE CHANGE PROPOSAL IS ON THE AGENDA FOR THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEE. PLEASE SEE THE HEARING ORDER FOR THE IBC FIRE SAFETY CODE CHANGE COMMITTEE.

1. Add new text as follows:

1704.15 Fire-resistant penetrations and joints. Special inspections for through penetrations, membrane penetrations, joints, and perimeter fire barrier systems of the types specified in Sections 712.3.1.2, 712.4.1.2, 713.3 and 713.4 respectively shall be in accordance with Sections 1704.15.1 or 1704.15.2. Special inspections shall be based on the fire-resistance design or system as designated in the approved construction documents.

1704.15.1 Fire-resistant penetrations. Protected penetrations in fire-resistance-rated assemblies shall not be concealed from view until inspected and approved. Inspections of fire-resistant penetration systems of the types specified in Sections 712.3.1.2 and 712.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1704.15.2 Fire-resistive joints. Protection joints within, or at the perimeter of, fire-resistance-rated assemblies shall not be concealed from view until inspected and approved. Inspection of joints of the types specified in 713.3 and 713.4 shall be conducted by an approved inspection agency in accordance with ASTM E 2393.

2. Add standards to Chapter 35:

ASTM

E 2174-04	Standard Practice for On-site Inspection of Installed Fire Stops
E 2393-04	Standard practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

Reason: The purpose of this proposal is to add new requirements to the Code designed to standardize and generally improve the level of Inspection of fire resistant penetrations, joints, and perimeter fire barrier systems. The Code already mandates proper installation of penetration firestops and joints to maintain the integrity of vertical and horizontal fire or smoke separations. Addition of these ASTM Consensus Standards identifies effective techniques for the field inspection of these systems, and provides consistent procedures needed to conduct and document the on-site assessment of the installations.

Installation of firestop systems and joints is often conducted by trades who do not have the extensive knowledge or training needed to ensure that these critical life safety systems are installed correctly. The current code relies heavily on Installers, Designers, and Code Officials to verify proper system selection and installation. Section 1704 of the *International Building Code*® (IBC) provides for special inspection agencies. Under the IBC, final authority for recognition of special inspection agencies rests with the building official having jurisdiction.

Firestop and joint system designs and materials are increasing in number and sophistication. In response to this reality, a standard practice was developed within the ASTM process to allow inspections of through-penetration firestops, joints, and perimeter fire barrier systems to be conducted in a thorough and consistent manner, with standardized report formats, regardless of the Trade or individual conducting the inspection. Part of the impetus for the development of that standard was the recognition that jurisdictions sometimes do not have sufficient resources themselves to ensure that all penetrations and joints are firestopped properly. In any project, the number of joints and penetrations can range from hundreds to a few thousand in a single building. The addition of these new Standards to the Code would provide and identify a means for both large and small building departments to have effective tools to instruct either their own staff or third party inspection agencies on good methodologies for inspection of these important systems. The inclusion of consensus standards would ensure that required inspections are conducted consistently, fairly, and adequately, while also standardizing inspection reports, so that they will be of a uniform high quality.

The proposed code change would provide the code official the option of having a third party (e.g. approved inspection agency) to conduct the inspection of joints and penetrations, while preserving the option to utilize other policies and procedures consistent with the intent of the Code.

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

Analysis: Results of review of the proposed standard(s) will be posted on the ICC website by August 20, 2006.

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

S41–06/07
1707.1

Proponent: William Stewart, FAIA, Chesterfield, MO, representing himself

Revise as follows:

1707.1 Special inspections for seismic resistance. Special inspections itemized in Sections 1707.2 through 1707.10, unless exempted by the exceptions of Section 1704.1, are required for the following:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F, as determined in Section 1613.
2. Designated seismic systems in structures assigned to Seismic Design Category C, D, E or F as required by Sections 1707.7 and 1707.8.
3. ~~Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F that are required in Sections 1707.7 and 1707.8.~~

Reason: Based on the definition of designated seismic system in 1702 item 3 is redundant and can be deleted since it is a duplication of item 2. Seismic design category C is moved up from the deleted item 3. The pointer to 1707.7 and 1707.8 is moved to item 2 so it will not be lost. Please note that this pointer is necessary because all designated seismic systems do not need special inspections and without the pointer to 1707.6 and 1707.7 all designated seismic systems will have to be special inspected.

Item 2 currently says special inspections are necessary for all Designated Seismic Systems which by definition are all architectural, mechanical and electrical components. Item 3 currently says special inspections are necessary for all architectural, mechanical and electrical components required by 1707.7 and 1707.8. Item 3 is much less inclusive. Thus items 2 & 3 in conflict. If item 2 were correct every partition, ceiling, light fixture, etc. that has an I_p greater than 1.0 would need special inspections. This is obviously overkill. Item 3 is the intent 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

S42–06/07
1707.7

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Revise as follows:

1707.7 Architectural components. Periodic special inspection during the erection and fastening of exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer in structures assigned to Seismic Design Category D, E or F.

Exceptions:

1. Special inspection is not required ~~for architectural components~~ in structures 30 feet (9144 mm) or less in height.
2. Special inspection is not required for cladding and veneer weighing 5 psf (24.5N/m^2) or less.
3. Special inspection is not required for ~~interior~~ nonbearing walls weighing 15 psf (73.5 N/m^2) or less.
4. Special inspection is not required for exterior cladding and exterior veneer 30 feet (9144 mm) or less in height above grade.

Reason: In Seismic Design Categories, D, E and F, Section 1707.7 specifies periodic special inspection during the erection and fastening of certain types of architectural components provided certain thresholds are reached. Currently, the charging statement specifies special inspection for exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer. Exception 1, however, exempts architectural components, which are not specified in the charging statement. Presumably, referring to architectural components does not imply that Section 1707.7 applies to architectural components other than exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer (i.e., interior cladding). Exception 2 exempts cladding and veneer weighing 5 psf or less from special inspection. Presumably, referring to cladding and veneer does not imply that Section 1707.7 applies to interior cladding. Exception 3 exempts interior nonbearing walls, but not exterior nonbearing walls, weighing 15 psf or less from special inspection. In summary, for all structures more than 30 feet in height, periodic special inspection is required for the erection and fastening of (1) all exterior nonbearing walls, (2) all exterior cladding and interior and exterior veneer weighing more than 5 psf, and (3) all interior nonbearing walls weighing more than 15 psf.

The current provisions create several unintended consequences. For example, at a structure more than 30 feet in height, special inspection is required, for example, at anchored brick masonry veneer supported by a concrete foundation and extending from finish grade to a few feet above grade (i.e., wainscot). For the same structure, special inspection is not required for any exterior cladding, interior veneer or exterior veneer weighing less than 5 psf, or for any interior nonbearing walls weighing less than 15 psf, but it s required for all of the exterior nonbearing walls. Special inspection is also required for all exterior cladding, interior veneer and exterior veneer weighing more than 5 psf, and for all interior nonbearing walls weighing more than 15 psf, no matter how close the component is to the ground surface (exterior cladding and veneer) or to the floor surface (interior veneer and nonbearing walls). The current requirements for periodic special inspection are summarized in the table below.

	Exterior Cladding	Nonbearing Walls		Veneer	
		Interior	Exterior	Interior	Exterior
Structure ≤ 30'0"	No	No	No	No	No
Structure > 30'0" and Exterior	Component	≤ 30'0":			
Component ≤ 5 psf	No	No	No	No	No
5 psf < Component ≤ 15 psf	Yes	No	Yes	Yes	Yes
Component > 15 psf	Yes	Yes	Yes	Yes	Yes
Structure > 30'0" and Exterior	Component	> 30'0":			
Component ≤ 5 psf	No	No	No	No	No
5 psf < Component ≤ 15 psf	Yes	No	Yes	Yes	Yes
Component > 15 psf	Yes	Yes	Yes	Yes	Yes

The proposed changes will establish thresholds for requiring special inspection that are more consistent with the relative risk posed by exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer in Seismic Design Categories, D, E and F. As modified by the proposal, the requirements for periodic special inspection are summarized in the table below. Differences with the current requirements are highlighted in bold.

	Exterior Cladding	Nonbearing Walls		Veneer	
		Interior	Exterior	Interior	Exterior
Structure ≤ 30'0"	No	No	No	No	No
Structure > 30'0" and Exterior	Component	≤ 30'0":			
Component ≤ 5 psf	No	No	No	No	No
5 psf < Component ≤ 15 psf	**No**	No	**No**	Yes	**No**
Component > 15 psf	**No**	Yes	Yes	Yes	**No**
Structure > 30'0" and Exterior	Component	> 30'0":			
Component ≤ 5 psf	No	No	No	No	No
5 psf < Component ≤ 15 psf	Yes	No	**No**	Yes	Yes
Component > 15 psf	Yes	Yes	Yes	Yes	Yes

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

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

S43–06/07
1708

Proponent: Jerry J. Barbera, P.E., Port of Seattle Airport Building Department, representing Structural Engineers Association of Washington Wind Engineering Committee

1. Add new text as follows:

SECTION 1708
SPECIAL INSPECTIONS FOR WIND RESISTANCE

1708.1 Special inspections for wind requirements. Special inspections itemized in Sections 1708.2 and 1708.3, unless exempted by the exceptions to Section 1704.1, are required buildings and structures containing wood- and steel-framed construction in the following areas:

1. Wind exposure Category B, where the 3-second-gust basic wind speed is 120 miles per hour (52.8 m/sec) or greater.
2. Wind exposure Categories C or D, where the 3-second-gust basic wind speed is 110 mph (49 m/sec) or greater.

1708.2 Structural wood framing. Special inspection shall be performed as listed below.

Continuous special inspection shall be performed for the main wind-force-resisting system:

1. During field gluing operations of elements.

Periodic special inspections shall be performed within the main wind-force-resisting system for:

1. Nailing, bolting, anchoring and other fastening of components. including
   - 1.1. Wood shear walls,
   - 1.2. Wood diaphragms,
   - 1.3. Wood drag struts,
   - 1.4. Strapping over ridges,
   - 1.5. Braces, and
   - 1.6. Uplift Anchorage.

Exception: Wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main wind-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

Periodic special inspection shall be performed within the components-and-cladding systems for:

1. Roof and wall cladding connections and,
2. Permanent connections for opening protection, where applicable in wind-borne debris regions as outlined in Section 1609.1.2.

1708.3 Cold-formed steel framing. Special inspection shall be performed as listed below.

Periodic special inspections shall be performed within the main wind-force-resisting system:

1. During welding operations of the elements of the main wind-force-resisting system.
2. During screw attachment, bolting, anchoring and other fastenings to include:
   2.1. Struts,
   2.2. Braces,
   2.3. Strapping over ridges, and
   2.4. Uplift Anchorage.

Periodic special inspection shall be performed within the components-and-cladding systems for:

1. Roof and wall cladding connections and,
2. Permanent connections for opening protection, where applicable in wind-borne debris regions as outlined in Section 1609.1.2.

(Renumber subsequent sections)

2. Revise as follows:

1705.4.1 Wind requirements in the statement of special inspections. When Section 1705.4 specifies that wind requirements be included, the statement of special inspections shall identify the main windforce-resisting systems and wind-resisting components subject to special inspections as specified in Section 1705.4.2 and the additional special inspections required by Section 1708.

Reason: The Structural Engineers Association of Washington Wind Engineering Committee submits this proposal to provide for certain special inspection in areas of high wind for not only light-framed wood and cold-formed steel framed buildings but to include buildings constructed of other materials such as steel, concrete, and/or masonry but which also have light-framed wood and cold-formed steel framing exposed to high wind pressures.

The proposal is intended to be paralleled to the provisions in the 2006 IBC Section 1707 for seismic risk of buildings of light-frame construction (wood framing and cold-formed steel framing) in the high seismic design categories C, D, E and F. Such buildings are subject to high risk of failure first of the components and cladding and if they are well designed and installed correctly, then the main-wind-force-resisting system will be at risk.

Given the poor performance of such light-frame constructed buildings or buildings containing some of these light-frame elements in the past and the apparent propensity of consistent and larger wind events happening during hurricanes in the future, the Committee asserts that a moderate amount of special inspection focusing on vulnerable portions of a building's wind resisting systems in is equally as important as focusing on such areas in high seismic events and is warranted.

The list of items that will need the proposed special inspection are related to a general list given in existing IBC Section 1705.4.1. The Committee elected to focus on the specific areas of weakness to wind pressures rather than copying that general list.

Construction Costs will increase slightly in areas of high winds. However, with more attention being paid to assuring that the "weak links" of the building are correctly installed per the plan's design and details, such cost is very inexpensive "insurance" for building owners and communities that would be affected by wholesale failures.

Cost Impact: The code change proposal will increase the cost of construction but will be offset by reducing extensive wind damage in high-wind areas of the country.

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

S44–06/07
1708 (New)

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Add new text as follows:

SECTION 1708
SPECIAL INSPECTIONS FOR WIND REQUIREMENTS

1708.1 Special inspections for wind requirements. Special inspections itemized in Sections 1708.2 and 1708.3, unless exempted by the exceptions to Section 1704.1, are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where the 3-second-gust basic wind speed is 120 miles per hour (52.8 m/sec) or greater.
2. In wind Exposure Categories C or D, where the 3-second-gust basic wind speed is 110 mph (49 m/sec) or greater.

1708.2 Structural wood. Continuous special inspection is required during field gluing operations of elements of the main wind-force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the main wind-force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.

Exception: Special inspection is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main wind-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

1708.3 Cold-formed steel framing. Periodic special inspection is required during welding operations of elements of the main wind-force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the main wind-force-resisting system, including struts, braces, and hold-downs.

(Renumber subsequent sections)

Reason: In areas of high seismic risk (i.e., Seismic Design Categories C, D, E and F), the IBC currently requires special inspection of seismic-force-resisting systems in buildings of light-frame construction (wood framing and cold-formed steel framing). The risk addressed by these requirements is equally present in areas of high wind forces and special inspection of main wind-force-resisting systems in buildings of light-frame construction is equally warranted. The purpose of this proposal is to establish these requirements in areas of high wind forces. This proposal is, in part, a response to comments made by the proponent during floor discussion of code change proposal S72-04/05 at the 2004/2005 code development hearings in Cincinnati.

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

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

S45–06/07
1708 (New)

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Add new text as follows:

SECTION 1708
SPECIAL INSPECTIONS FOR WIND REQUIREMENTS

1708.1 Special inspections for wind requirements. Special inspections itemized in Section 1708.2, unless exempted by the exceptions to Section 1704.1, are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where the 3-second-gust basic wind speed is 120 miles per hour (52.8 m/sec) or greater.
2. In wind Exposure Categories C or D, where the 3-second-gust basic wind speed is 110 mph (49 m/sec) or greater.

1708.2 Wind-resisting components. Periodic special inspection is required for the following systems and components:

1. Roof cladding.
2. Wall cladding.

Reason: In areas of high seismic risk (i.e., Seismic Design Categories C, D, E and F), the IBC currently requires special inspection of seismic-force-resisting systems in buildings of light-frame construction (wood framing and cold-formed steel framing). The risk addressed by these requirements is equally present in areas of high wind forces and special inspection of main wind-force-resisting systems in buildings of light-frame construction is equally warranted. A related proposal addresses main wind-force-resisting systems. This proposal addresses the cladding on buildings and structures in areas of high wind forces. Damage to buildings due to high wind forces often begins with failure of the cladding system, which often exposes the main wind-force-resisting system to damage from wind-driven rain and other forces that the wind-force-resisting system is typically not designed to withstand.

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

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

S46–06/07
1708.2

Proponent: William W. Stewart, FAIA, Chesterfield, MO, representing himself

Revise as follows:

1708.2 Testing for seismic resistance. The tests specified in sections 1708.3 through 1708.6 are required for the following:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F, as determined in Section 1613.
2. ~~Designated seismic~~ Vibration isolated systems in structures assigned to Seismic Design Category C, D, E or F where the construction documents require a nominal clearance of 0.25 inches or less between the equipment support frame and restraint.
3. ~~Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F that are required in Section 1708.5.~~

Reason: Based on the definition of designated seismic system in 1702, item 3 is redundant and can be deleted since it is a duplication of item 2. There is a major fault with the pointer in the deleted item 3. Per item 3, 1708.5 is supposed to identify which designated seismic systems need Structural Testing. 1708.5 does not identify any components, therefore no designated seismic systems need Structural Testing. Based on Section 1708.5 I believe that the intent of item 3 was to cover mechanical equipment (mainly air handlers) that have spring mounted vibration isolators with snubbers. I have inserted text from item 5 of 1707.8 that describes those components.

Another way of looking at items 2 & 3; Item 2 currently says Structural Tests are necessary for all Designated Seismic Systems, which by definition are all architectural, mechanical and electrical components. Item 3, as explained above says no structural tests are necessary. Thus items 2 & 3 in conflict. If item 2 were correct, every partition, ceiling, light fixture, etc. that has an I_p greater than 1.0 would need Structural Testing. . This is obviously overkill. Item 3 is the intent of the code.

Seismic Design Category C was added to the retained exception since it was in deleted item 3.

Section 1708.1 and 1707.1 seem to have the same origin. You will see a similar change to 1707.1. The pointer in item 3 of 1707.1 did point to systems that needed special inspections. This change to Section 1708.1 will put the systems that need structural testing directly in 1708.1 and then refer to the qualification and testing as outlined in 1708.5.

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

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

S47–06/07
1702.1 and 1709.1

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Revise as follows:

1702.1 General. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

STRUCTURAL OBSERVATION. The visual observation of the structural system by a registered design professional for general conformance to the approved construction documents ~~at significant construction stages and at completion of the structural system~~. Structural observation does not include or waive the responsibility for the inspection required by Section 109, 1704 or other sections of this code.

1709.1 General. Where required by the provisions of Section 1709.2 or 1709.3, the owner shall employ a registered design professional to perform structural observations as defined in Section 1702.

Prior to the commencement of observations, the structural observer shall submit to the building official a written statement identifying the frequency and extent of structural observations.

At the conclusion of the work included in the permit, the structural observer shall submit to the building official a written statement that the site visits have been made and identify any reported deficiencies which, to the best of the structural observer's knowledge, have not been resolved.

Reason: The purpose of this proposal is to delete an inappropriate phrase from the definition of structural observation. A definition should specify the meaning of the term being defined. If there are technical requirements associated with use of the term, they should be located elsewhere. The current definition of structural observation includes when visual observation by the structural observer shall occur: at significant construction stages and at completion of the structural system. These are technical requirements related to the frequency of observations, which should be placed elsewhere in the IBC. But if such requirements were located elsewhere, they should be substantially altered from their present form. A requirement for visual observation to occur at "significant construction stages" is vague and unenforceable, which is not appropriate for a regulatory document such as the IBC. The determination of the frequency of structural observations by the structural observer is best left to the structural observer and the owner in consultation with the local building official.

In place of the deleted language from the definition for structural observation, the proposal adds a requirement in Section 1709.1 for submittal of a written statement by the structural observer to the building official prior to the commencement of observations identifying the frequency and extent of structural observations. Requiring the submittal prior to commencement of construction authorized by the building permit is avoided because the structural observer will not necessarily know when construction begins and should not be expected to meet a deadline established by others beyond his or her control.

Note that the owner is required to employ a registered design professional to perform structural observation when required by Section 1709.2 or 1709.3. The structural observer, in turn, is required to submit a written statement to the building official at the conclusion of the work included in the permit (see Section 1709.1). Note also that one of the conditions for structural observation by a registered design professional is when so designated by the registered design professional in responsible charge of the design, which is typically the architect of record. See condition #4 in Sections 1709.2 and 1709.3.

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

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

S48–06/07
1714.5.2, Chapter 35

Proponent: Joseph R. Hetzel, P.E., Door & Access Systems Manufacturers Association

1. Revise as follows:

1714.5.2 Exterior windows and door assemblies not provided for in Section 1714.5.1. Exterior window and door assemblies shall be tested in accordance with ASTM E 330. Structural performance of garage doors shall be determined in accordance with either ASTM E 330 or ANSI/DASMA 108, and shall meet the acceptance criteria of ANSI/DASMA 108. Exterior window and door assemblies containing glass shall comply with Section 2403. The design pressure for testing shall be calculated in accordance with Chapter 16. Each assembly shall be tested for 10 seconds at a load equal to 1.5 times the design pressure.

2. Add standard to Chapter 35 as follows:

DASMA
ANSI/DASMA 108-02, Standard Method for Testing Sectional Garage Doors: Determination of Structural Performance Under Uniform Static Air Pressure Difference

Reason: The purpose of this proposed code change is to reference an ANSI standard published specifically for the static air pressure testing of garage doors. ANSI/DASMA 108 includes garage door acceptance criteria, which is not contained within ASTM E 330. Similar language to what is being proposed is contained in 2006 IRC Section R613.5.

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

Analysis: Results of review of the proposed standard(s) will be posted on the ICC website by August 20, 2006.

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

S49–06/07
1715.1

Proponent: Randall Shackelford, Simpson Strong-Tie Co.

Revise as follows:

1715.1 Test standards for joist hangers and connectors.

1715.1.1 Test standards for joist hangers and connectors. The vertical load-bearing capacity, torsional moment capacity and deflection characteristics of joist hangers shall be determined in accordance with ASTM D1761 using lumber having a specific gravity of 0.49 or greater, but not greater than 0.55, as determined in accordance with AF&PA NDS for the joist and headers.

Exception: The joist length shall not be required to exceed 24 inches (610 mm).

Reason: Clarify the code. This section is titled Test Standards for Joist Hangers and Connectors. It is used to test and rate joist hangers and connectors. However, the specific section currently appears to only apply to joist hangers. This is just to make it clear that it applies to other connectors as well.

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

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

S50–06/07
1807.3.1

Proponent: Alan Seymour, Oregon Department of Energy

Revise as follows:

1807.3.1 Floors. Floors required to be waterproofed shall be of concrete and designed and constructed to withstand the hydrostatic pressures to which the floors will be subjected.

Waterproofing shall be accomplished by placing a membrane of rubberized asphalt, butyl rubber, fully adhered/fully bonded HDPE or polyolefin composite membrane or not less than 6-mil [0.006 inch (0.152 mm)] polyvinyl chloride with joints lapped not less than 6 inches (152 mm) or other approved materials under the slab. Joints in the membrane shall be lapped and sealed in accordance with the manufacturer's installation and instructions.

Where soil classifications present poor or unsatisfactory drainage characteristics, the exterior-most vertical perimeter of concrete slabs on grade shall be waterproofed by applying any one of the materials listed in the previous paragraph, underneath any required insulation.

Reason: Where required, this would require waterproofing of exterior slab edges whenever installed. This language references the same material as specified in this code.

This was Dr George Tsongas', Ph.D., P.E., proposal for an Oregon code change. It is to prevent moisture migration from wet soil into the concrete (by capillary wicking). This often causes mold growth in ground floor walls and flooring. Dr Tsongas is a building scientist that is renowned for his building forensics research. He has provided many presentations on this topic to ASHRAE.

The potential for moisture-related problems exist in buildings. Lack of measures necessary to prevent moisture into a structure is lacking in code. A major vehicle for water intrusion into buildings is through the exterior slab edge, which in many cases is the actual foundation wall (floating slabs) for specific soil types and climatic conditions. As stated in Reasons above, this is problematic in more types of construction than covered in current code. In addition, as specified in Cost Impact below, these measures are very expensive, if not nearly impossible to install after a building has been constructed.

Cost Impact: This proposal is related to reducing moisture-related problems within a building. Increased levels of moisture in homes contribute to mold, which can become health issues and lead to dry rot damage in wood components of the building. Insurance for a contractor, architect, or homeowner does not cover damages due to moisture related issues.

While most molds are benign, some can cause devastating health problems and lead to dry rot in wood building components. Requiring replacement of wood components due to dry rot after a building is constructed is much more expensive to mitigate and repair than during construction of a new building.

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

S51–06/07
1808.2.23.1

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

Revise as follows:

1808.2.23.1 Seismic Design Category C. Where a structure is assigned to Seismic Design Category C in accordance with Section 1613, the following shall apply. Individual pile caps, piers or piles shall be interconnected by ties. Ties shall be capable of carrying, in tension and compression, a force equal to the product of the larger pile cap or column load times the seismic coefficient, S_{DS}, divided by 10 unless it can be demonstrated that equivalent restraint is provided by reinforced concrete beams within slabs on grade or reinforced concrete slabs on grade or confinement by competent rock, hard cohesive soils or very dense granular soils.

Exception: In Group R-3 and U occupancies of light-frame construction, pier~~s~~ foundations supporting foundation walls, isolated interior posts detailed so the pier is not subject to lateral loads, or ~~lightly loaded~~ exterior decks and patios, ~~of Group R-3 and U occupancies not exceeding two stories of light-frame construction,~~ are not subject to interconnection if it can be shown the soils are of adequate stiffness, subject to the approval of the building official.

Reason: The current language was approved as submitted by code change proposal 1807.2.23.1 at the IBC First Draft Public Hearings in April, 1998. The staff analysis following the reason statement indicated that the "exception to Section 1807.2.23.1 is not understandable in its current

format. Itemizing each individual condition is suggested." I agree. The purpose of this proposal is to modify the exception to Section 1808.2.23.1 so that it is understandable to the average code user and to the proponent of this proposal. The change from "piers" to "pier foundations" is for consistency with the definition of "pier foundation" in Section 1808.1. The phrase "lightly loaded" is deleted because the language is vague and unenforceable.

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

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

S52–06/07
1808.2.23.2.1

Proponent: Michael Valley, Magnusson Klemencic Associates representing Structural Engineers Association of Washington Earthquake Engineering Committee

Revise as follows:

1808.2.23.2.1 Design details for piers, piles and grade beams. Piers or piles shall be designed and constructed to withstand maximum imposed curvatures from earthquake ground motions and structure response. Curvatures shall include free-field soil strains modified for soil-pile-structure interaction coupled with pier or pile deformations induced by lateral pier or pile resistance to structure seismic forces. Concrete piers or piles on Site Class E or F sites, as determined in Section 1613.5.2, shall be designed and detailed in accordance with Sections 21.4.4.1, 21.4.4.2 and 21.4.4.3 of ACI 318 within seven pile diameters of the pile cap and the interfaces of soft to medium stiff clay or liquefiable strata. For precast prestressed concrete piles, detailing provisions as given in Section 1809.2.3.2.1 and 1809.2.3.2.2 shall apply.

Grade beams shall ~~be designed as beams in accordance with~~ comply with the provisions in Section 21.10.3 of ACI 318 for grade beams, except where they~~, Chapter 21. When grade beams~~ have the capacity to resist the forces from the load combinations in Section 1605.4~~, they need not conform to ACI 318, Chapter 21~~.

Reason: Clarify the Code. This change clarifies the intent of the design requirement for grade beams in the last paragraph of the section. The provision currently requires grade beams to be designed as "beams" (not "grade beams") in accordance with Chapter 21 of ACI 318. Chapter 21 of ACI 318 has design provisions for grade beams (21.10.3), beams in special moment frames (21.3), coupling beams (21.7.7), and beams in intermediate moment frames (21.12.4). The revised text indicates which requirements apply.

This clarification makes the text similar to that in Section 14.2.7.2.2 of ASCE 7-05.

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

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

S53–06/07
1808.2.23.2.1

Proponent: Michael Valley, Magnusson Klemencic Associates, representing Structural Engineers Association of Washington Earthquake Engineering Committee

Revise as follows:

1808.2.23.2.1 Design details for piers, piles and grade beams. Piers or piles on Site Class E or F sites, as determined in Section 1613.5.2, shall be designed and constructed to withstand maximum imposed curvatures from earthquake ground motions and structure response. Curvatures shall include free-field soil strains modified for soil-pile-structure interaction coupled with pier or pile deformations induced by lateral pier or pile resistance to structure seismic forces. Where constructed of nonprestressed ~~C~~concrete, such piers or piles ~~on Site Class E or F sites, as determined in Section 1613.5.2,~~ shall be designed and detailed in accordance with Sections 21.4.4.1, 21.4.4.2 and 21.4.4.3 of ACI 318 within seven pile diameters of the pile cap and within seven pile diameters of the interfaces of strata that are hard or stiff and ~~soft to medium stiff clay or~~strata that are liquefiable or are composed of soft to medium stiff clay~~strata~~.

Exception: Piers or piles that satisfy the following additional detailing requirements shall be deemed to comply with the curvature capacity requirements of this section.

1. ~~For~~ Precast prestressed concrete piles~~,~~ detailed ~~ing provisions as given~~ in accordance with Section ~~1809.2.3.2.1 and~~ 1809.2.3.2.2 ~~shall apply~~.

2. Cast-in-place concrete piles with a minimum longitudinal reinforcement ratio of 0.005 extending throughout the region detailed in accordance with Sections 21.4.4.1, 21.4.4.2 and 21.4.4.3 of ACI 318, but not less than the length required in Section 1810.1.2.2.

Grade beams shall be designed as beams in accordance with ACI 318, Chapter 21. When grade beams have the capacity to resist the forces from the load combinations in Section 1605.4, they need not conform to ACI 318, Chapter 21.

Reason: Revise the scope of these additional pile analysis requirements. Clarify the portions of piles affected. Clarify the exception for precast prestressed piles. Add an exception for prescriptively detailed cast-in-place concrete piles.

Design for "pier or pile moments, shears and lateral deflections" is already required by Section 1808.2.23.1.2, and ductile detailing within three pile diameters of the pile cap is already required by Sections 1809.2.2.2.2 and 1810.1.2.2. The requirements of Section 1808.2.23.2.1, which add to those requirements, are taken from the NEHRP *Recommended Provisions* and are motivated by concern with pile response in soft or liquefiable soils (extended hinging region and kinematic interaction), as indicated in the NEHRP *Commentary* copied below. Such soils are assigned to Site Class E or F, as indicated in IBC Table 1615.1.1, so the corresponding additional requirements should be scoped accordingly.

At present this section applies to all buildings on piers or piles for all site classes, but that scope is inconsistent with both the rationale for the requirement and the state-of-the-practice. Requiring all geotechnical engineers to address the kinematic interaction issue for all projects will result in a large range of response ranging from nothing to potential recommendations for more expensive foundation types that don't significantly reduce societal risk.

As indicated in the NEHRP *Commentary* copied below, properly detailed piles provide the desired performance. For nonprestressed concrete piles, such proper detailing is defined in Sections 21.4.4.1, 21.4.4.2 and 21.4.4.3 of ACI 318. For precast prestressed piles, such proper detailing is defined in Section 1809.2.3.2.2 (which adds to the requirements in 1809.2.3.2.1). The section as modified maintains those detailing requirements and clarifies that this special detailing addresses the requirement related to "maximum imposed curvature."

The text defining the soil interfaces of concern is revised for clarity based on Section 14.2.7.2.1 of ASCE 7-05.

Commentary to the 2003 NEHRP *Recommended Provisions* Section 7.5.4 [**emphasis** added]:

> Special consideration is required in the design of concrete piles subject to significant bending during earthquake shaking. Bending can become crucial to pile design where portions of the foundation piles are supported in soils such as **loose granular materials and/or soft soils** that are susceptible to large deformations and/or strength degradation. Severe pile bending problems may result from various combinations of soil conditions during strong ground shaking, for example:
>
> 1. Soil settlement at the pile-cap interface either from consolidation of **soft soil** prior to the earthquake or from soil compaction during the earthquake can create a free-standing short column adjacent to the pile cap.
> 2. Large deformations and/or reduction in strength resulting from **liquefaction of loose granular materials** can cause bending and/or conditions of free-standing columns.
> 3. Large deformations in **soft soils** can cause varying degrees of pile bending. The degree of pile bending will depend upon thickness and strength of the soft soil layer(s) and/or the properties of the soft/stiff soil interface(s).
>
> **Such conditions** can produce shears and/or curvatures in piles that may exceed the bending capacity of conventionally designed piles and result in severe damage. …
>
> The desired foundation performance can be accomplished by **proper selection and detailing** of the pile foundation system. Such design should accommodate bending from both reaction to the building's inertial loads and those induced by the motions of the soils themselves. Examples of designs of concrete piles include:
> 1. Use of a **heavy spiral reinforcement** and
> 2. Use of exterior steel liners to confine the concrete in the zones with large curvatures or shear stresses.
>
> These provide proper confinement to ensure adequate ductility and maintenance of functionality of the confined core of the pile during and after the earthquake.
> Precast prestressed concrete piles are exempted from the concrete special moment frame detailing requirements adapted for concrete piles since these provisions were never intended for slender precast prestressed concrete elements and will result in unbuildable piles. Piles with substantially less confinement reinforcement than required by ACI 318 equation 10-6 have been proven through cyclic testing to have adequate performance (Park and Hoat Joen, 1990).

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

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

S54–06/07
1810.8

Proponent: Edwin T. Huston, Smith & Huston, Inc., representing National Council of Structural Engineering Associations

Revise as follows:

1810.8 Micropiles. Micropiles shall ~~conform to~~ comply with the requirements of Sections 1810.8.1 through 1810.8.5.

1810.8.1 Construction. Micropiles shall consist of a grouted section reinforced with steel pipe or steel ~~reinforcing~~ reinforcement. Micropiles shall develop their load-carrying capacity through a bond zone in soil, bedrock or a

combination of soil and bedrock. The ~~full length of the micropile shall contain either a~~ steel pipe or steel reinforcement shall extend the full length of the micropile.

1810.8.2 Materials. Grout shall have a ~~28-day~~ specified compressive strength (f'_c) of not less than 4,000 psi (27.58 Mpa). The grout mix shall be designed and proportioned so as to produce a pumpable mixture. Reinforcement ~~steel~~ shall ~~be~~ consist of deformed reinforcing bars in accordance with ASTM A 615 Grade 60 or Grade 75 or ASTM A 722 Grade 150.

~~Pipe/casing~~ The steel pipe shall have a minimum wall thickness of 3/16 inch (4.8 mm) ~~and as required to meet~~. Splices shall comply with Section 1808.2.7. ~~Pipe/casing~~ The steel pipe shall ~~meet the tensile requirements of~~ be in accordance with ASTM A 252 Grade 3, except the minimum yield strength shall be as used in the design submittal ~~[typically 50,000 psi to 80,000 psi (345 MPa to 552 MPa)]~~ and minimum elongation shall be 15 percent.

1810.8.3 Allowable stresses. The allowable ~~design~~ compressive stress ~~on~~ in the grout shall not exceed 0.33 f'_c. The allowable ~~design~~ compressive stress ~~on~~ in the steel pipe and steel reinforcement shall not exceed the lesser of 0.4 F_y, ~~or~~ and 32,000 psi (220 Mpa). The allowable ~~design~~ tensile stress ~~for~~ in the steel reinforcement shall not exceed 0.60 F_y. The allowable ~~design~~ tensile stress ~~for~~ in the cement grout shall be zero.

1810.8.4 Reinforcement. For piles or portions of piles grouted inside a temporary or permanent casing or inside a hole drilled into bedrock or a hole drilled with grout, the steel pipe or steel reinforcement shall be designed to carry at least 40 percent of the design compression load. Piles or portions of piles grouted in an open hole in soil without temporary or permanent casing and without suitable means of verifying the hole diameter during grouting shall be designed to carry the entire compression load in the reinforcing steel. Where a steel pipe is used for reinforcement, the portion of the ~~cement~~ grout enclosed within the pipe is permitted to be included ~~at~~ in the determination of the allowable stress ~~of~~ in the grout.

1810.8.4.1 Seismic reinforcement. Where a structure is assigned to Seismic Design Category C, a permanent steel casing shall be provided from the top of the pile down a minimum of 120 percent ~~times~~ of the flexural length. ~~The flexural length shall be determined in accordance with Section 1808.1.~~ Where a structure is assigned to Seismic Design D, E or F, the pile shall be considered as an alternative system~~. In~~ in accordance with Section 104.11~~, the~~ The alternative pile system design, supporting documentation and test data shall be submitted to the building official for review and approval.

1810.8.5 Installation. The pile shall be permitted to be formed in a hole advanced by rotary or percussive drilling methods, with or without casing. The pile shall be grouted with a fluid cement grout. The grout shall be pumped through a tremie pipe extending to the bottom of the pile until grout of suitable quality returns at the top of the pile. The following requirements apply to specific installation methods:

1. For piles grouted inside a temporary casing, the reinforcing ~~steel~~ bars shall be inserted prior to withdrawal of the casing. The casing shall be withdrawn in a controlled manner with the grout level maintained at the top of the pile to ensure that the grout completely fills the drill hole. During withdrawal of the casing, the grout level inside the casing shall be monitored to check that the flow of grout inside the casing is not obstructed.
2. For a pile or portion of a pile grouted in an open drill hole in soil without temporary casing, the minimum design diameter of the drill hole shall be verified by a suitable device during grouting.
3. For piles designed for end bearing, a suitable means shall be employed to verify that the bearing surface is properly cleaned prior to grouting.
4. Subsequent piles shall not be drilled near piles that have been grouted until the grout has had sufficient time to harden.
5. Piles shall be grouted as soon as possible after drilling is completed.
6. For piles designed with ~~casing~~ a full length casing, the casing ~~must~~ shall be pulled back to the top of the bond zone and reinserted or some by other suitable means employed to assure grout coverage outside the casing.

Reason: Substitute revised material for current provision of the Code.

The purpose of this proposal is to make editorial improvements to the language, which was approved by code change proposal S121-04/05(AM). In Section 1810.8.2, compliance with Section 1808.2.7 is specified for the splices of the steel pipe, which is the subject of Section 1808.2.7. The current language requires the steel pipe, not the splices of the steel pipe, to comply with Section 1808.2.7.

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

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