INTERNATIONAL BUILDING CODE – MEANS OF EGRESS

E1-09/10
1001.4 (New) (IFC [B] 1001.4 (New))

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

Add new text as follows:

1001.4 Fire safety and evacuation plans: Fire safety and evacuation plans shall be provided for all occupancies and buildings where required by the *International Fire Code*. Such fire safety and evacuation plans shall comply with the applicable provisions of Sections 401.2 and 404 of the *International Fire Code*.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "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. To evaluate the necessity of developing code changes in response to the NIST report.

This proposal is similar to E3-07/08 last cycle. However, based on fire service input, it has been expanded to include the reference to Section 401.2 of the IFC, which states:

> 401.2 Approval. Where required by this code, fire safety plans, emergency procedures and employee training programs shall be approved by the fire code official.

This added reference identifies the scope of responsibility of the evaluation of the plans.

The purpose of this code change proposal is to provide consistent requirements for jurisdictions regarding requirements for fire safety and evacuation plans. We feel fire safety and evacuation plans are important issues that impact occupant egress during an emergency and therefore meets the intent of the IBC and needs to be addressed. In addition, many jurisdictions across the country currently have adopted the IBC, however many of these same jurisdictions have not adopted the IFC. This reference will ensure that at least the fire safety and evacuation plans of the IFC are adopted by reference. Enforcement of the provisions is not an issue based on the reference to Section 401.2. The provisions are clearly within the scope of the IFC.

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

ICCFILENAME:Heilstedt-E2-1001.4

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal would provide uniformity throughout the codes. This will assure that all means of egress issues in the IFC and IBC are addressed before the certificate of occupancies is issued. This will assist the fire department when they perform means of egress maintenance reviews.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

George Kellogg, Rocklin, CA, representing Sacramento Valley Association of Building Officials, requests Disapproval.

Commenter's Reason: Fire Safety and Evacuation plans are documents that require annual maintenance and are required to include a number of provisions not a part of the building codes. Minor changes in building use or changes in business procedures can trigger a modification to the Fire

Safety and Evacuation Plan that would not trigger a building permit. Additionally, building department personnel typically are only trained to apply Chapter 10 means of egress requirements and do not have the training or expertise to evaluate all of the other important aspects of an adequate Fire Safety and Evacuation Plan—putting the review of the plan in the building code would in fact create the false impression that building department approval of plans would indicate that the required Fire Safety and Evacuation Plan is completely adequate and correct. This is clearly within the purview of the Fire official. While there needs to be communication between Building and Fire officials for new construction activity, there is no need for revised fire and evacuation plans required by the Fire Code to be reviewed by the Building official. As stated by the proponent, this proposal is essentially the same as E3-07/08 (that was overturned and soundly defeated by code officials at the Final Action Hearings in Minnesota) excepting the addition of a reference to section 401.2 of the IFC. As also stated by the proponent, this added code reference was intended to clarify the enforcement responsibility for the Fire Safety and evacuation plan. However it appears to add a new level of confusion. IFC section 401.2 states: "Approval. Where required by this code," [the IFC or IBC?] "fire safety and evacuation plans, emergency procedures, and employee training programs shall be approved by the fire code official." Clearly, IBC section 1001.4 is the enforcement responsibility of the Building Code official. Will this change now require the Building official to be responsible for the fire official's actions???

This change adds confusion for enforcement authority and responsibility, and does not improve the IBC or the IFC. Current IFC code contains all of the provisions necessary for requiring and enforcing Fire Safety and Evacuation plans and clearly requires enforcement authority and responsibility with the Fire Code official. No changes to either code are necessary to provide the level of egress safety and planning provided by the Fire Safety and Evacuation Plan.

Public Comment 2:

John E. Rosenquist, representing United Conveyor Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1001.4 Fire safety and evacuation plans: Fire safety and evacuation plans shall be provided for all occupancies and buildings where required by the *International Fire Code*. Such fire safety and evacuation plans shall comply with the applicable provisions of Sections 401.2 and 404 of the *International Fire Code*. <u>All industrial occupancies shall comply with OSHA 2008, CFR 29, part 1910 Subpart E, and to the requirements of NFPA 101, Chapter 40, Industrial Occupancies.</u>

Add new standard to Chapter 35 as follows:

<u>Occupational Safety and Health Administration</u>
<u>OSHA 2008, CFR 29, part 1910, Occupational Safety and Health Standards, Subpart E, Means of Egress</u>

Commenter's Reason: Industrial facilities are designed to conform to the safety and egress requirements of OSHA 2008, CFR 29, part 1910 Subpart E, and to the requirements of NFPA 101, Chapter 40, Industrial Occupancies.

The IBC Building Code cannot override the requirements of Federal work place safety and egress rules. It would be better if IBC referenced NFPA 101 for all egress requirements as does OSHA. NFPA 101 encompasses everything covered by IBC with far more clarity and breadth of scope.

Analysis: The standard, OSHA 2008, CFR 29, was not reviewed or considered by the IBC Code Development committee and it was not considered by the hearing attendees at the time of the code development hearings. Section 3.6.3.1 of Council Policy #28, *Code Development,* requires that new standards be introduced in the original code change proposal, therefore, the introduction of a new standard via a public comment is not in accordance with the process required by CP# 28 for adding new standards to the code.

Final Action: AS AM AMPC____ D

E2-09/10
1002.1 (IFC [B] 1002.1)

<u>Proposed Change as Submitted</u>

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

CORRIDOR. An enclosed exit access component that defines and provides a path of egress travel ~~to an exit~~.

Reason: The current definition of "CORRIDOR" is somewhat misleading. Obviously, there are two types of corridors: Fire-resistance rated and non-fire-resistance rated. Section 1018.6 states, "<u>Fire-resistance-rated</u> corridors shall be continuous from the point of entry to an exit…" This provision supports the philosophy that once a given level of protection is achieved, such level of protection shall not be reduced until arrival at the exit discharge. With the non-fire-resistance rated corridor, however, there is no inherent level of protection. It is not uncommon in building design for non-rated corridors to connect open office areas without leading to an exit. The proposed language will correlate with the definition of 'aisle" in declaring that unprotected exit access components provide a path of egress travel, but not necessarily directly to an exit. This proposal eliminates

potential confusion created by the current definition and lets the technical requirements of Section 1018.6 stand on their own merit. Approval of this proposal will resolve a potential conflict in stated intent for commonly used corridor provisions.

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

ICCFILENAME:Keith-E2-1002.1-Corridor

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The change in the definition could cause confusion for applications for fire-resistance-rated corridors. The entire chapter should be investigated for possible consequences.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gregory Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Submitted.

Commenter's Reason: Disapproval of Item E2-09/10 by the ICC Means of Egress Code Committee demonstrates the need for clarification of this very subtle provision. A "corridor" is defined in Section 1002.1 as, "An enclosed exit access component that defines and provides a path of egress travel to an exit." Essentially, there are two types of corridors. Based on a number of variables shown at Table 1018.1, a corridor may be of either fire-resistance rated or nonfire-resistance rated construction.

Corridors and aisles are the two most commonly used exit access components. An "aisle" is defined in Section 1002.1 as, "An unenclosed exit access component that defines and provides a path of egress travel." Aisles are obviously a non-rated means of egress component and may or may not lead directly to an exit. Accordingly, that requirement is not stated in the definition of "aisle."

The continuity requirements for corridors are specified in Section 1018.6. That section states, "Fire-resistance-rated corridors shall be continuous from the point of entry to an exit, and shall not be interrupted by intervening rooms." If all corridors were required to be of fire-resistance rated construction, the definition of corridor would be accurate. Section 1018.6 implies, however, that non-fire-resistance rated corridors need not lead to an exit and may be interrupted by intervening rooms. This is consistent with the usage and requirements for aisles. There is no technical or philosophical reason for a non-rated corridor with unprotected openings to be held to the same design standard as a fire-resistance rated corridor. Section 1018.6 properly makes that distinction; however, the definition of corridor at Section 1002.1 does not.

Section 1018 contains no requirement for non-fire-resistance rated corridors to be continuous to an exit. Although definitions are not intended to include technical requirements, the current reference to an "exit" in the definition could be regarded as an implied or de facto requirement. The proposed language will correlate with the definition of "aisle" in declaring that unprotected exit access components shall provide a path of egress travel, but not necessarily directly to an exit. This proposal eliminates potential confusion created by the current definition and lets the technical requirements of Section 1018.6 stand on their own merit. Approval of this proposal will resolve a potential conflict in stated intent for a commonly used means of egress component.

Final Action: AS AM AMPC____ D

E4-09/10
1002.1 (IFC [B] 1002.1)

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXIT. That portion of a means of egress system ~~which is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel~~ between the exit access and the exit discharge or public way. Exit~~s~~ components include exterior exit doors at the level of exit discharge, ~~vertical~~ exit enclosures, exit passageways, horizontal exits, exterior exit stairways~~,~~ and exterior exit ramps ~~and horizontal exits~~.

Reason: The current definition of "EXIT" contains several technical inaccuracies. It contains some absolute information that is not necessarily applicable to all exit components. Obviously, exterior exit stairways and exterior exit ramps are not interior spaces nor are they necessarily constructed of fire-resistance rated construction and opening protectives. Accordingly, this specific language has been removed from the definition. This proposal also acknowledges that some exit components (i.e. an exterior exit door at the level of discharge) may lead directly to the public way. The term exit "component" was added to the definition of exit so as to be consistent with numerous other means of egress provisions. (Please see the definition of "EXIT ENCLOSURE" and "EXIT PASSAGEWAY.") Additionally, the title of Section 1022 was changed from "vertical exit enclosures" to "exit enclosures" in the 2009 Edition of the IBC. The term "vertical" has been removed from the proposed definition so as to be consistent with current terminology. The definition of "EXIT" is fundamental to proper means of egress system design. It is imperative that it be informative and precise. The proposed language will eliminate confusion and misunderstanding as to what the IBC intends.

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

ICCFILENAME:Keith-E1-1001.1-Exit

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Adding the "or public way" is confusing when the exit is not directly on a street or public sidewalk. It appears to eliminate the 'exit discharge' component of the means of egress system.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

EXIT. That portion of a means of egress system between the exit access and the exit discharge or public way. Exit components include exterior exit doors at the level of exit discharge, ~~exit enclosures~~ interior exit stairways, interior exit ramps, exit passageways, horizontal exits, exterior exit stairways and exterior exit ramps.

Commenter's Reason: The CTC agrees with the intent of E4 that the reference to public way is a correct reference for exits that discharge directly to a public way and that when the exit discharges directly to a public way there does not need to be an exit discharge component in the means of egress system. The modification is to coordinate E4-09/10 with change E5-09/10. Since the intent of the proposed modification to E4-09/10 is to coordinate with E5-09/10, if E5-09/10 is approved we would urge ICC staff to place E-4 after E-5 in the hearing order.

Final Action: AS AM AMPC____ D

E5-09/10, Part I

403, 408, 410, 414, 415, 705, 707, 708, 709, 712, 715, 716, 803, 804, [F]909, 1002, 1006, 1007, 1009, 1010, 1015, 1016, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1110, 2606, 3007, 3008; (IFC 909, 914.3.1.1, [B]1002, [B]1006, [B]1007, [B]1009, [B]1010, [B]1015, [B]1016, [B]1021, [B]1022, [B]1023, [B]1024, [B]1025, [B]1026, [B]1027, [B]1028, 1803.12.1.2, 2705.4.4); (IMC [F] 513.5)

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

PART I – IBC MEANS OF EGRESS

Revise as follows:

SECTION 1002 (IFC [B] 1002)
DEFINITIONS

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.**EXIT.** That portion of a means of egress system ~~which is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel~~ between the exit access and the exit discharge. Exit~~s~~ components include exterior exit doors at the level of exit discharge, ~~vertical exit enclosures~~ interior exit stairways, interior exit ramps, exit passageways, horizontal exits, exterior exit stairways~~,~~ and exterior exit ramps ~~and horizontal exits~~.

EXIT ACCESS DOORWAY. A door or access point along the path of egress travel from an occupied room, area or space where the path of egress enters an intervening room, corridor, ~~unenclosed~~ exit access stair or ~~unenclosed~~ exit access ramp.

EXIT ACCESS RAMP. An interior ramp that is not a required interior exit ramp.

EXIT ACCESS STAIRWAY. An interior stairway that is not a required interior exit stairway.

~~**EXIT ENCLOSURE.** An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a vertical or horizontal direction to the exit discharge or the public way.~~

INTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

INTERIOR EXIT STAIRWAY. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

SECTION 1009 (IFC [B] 1009)
STAIRWAYS

1009.1 (IFC [B] 1009.1)General. Stairways serving occupied portions of a building shall comply with the requirements of this section.

1009.2 (IFC [B] 1009.2) Interior exit stairways. Interior exit stairways shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1.

1009.2.1 (IFC [B] 1009.2.1) Where required. Interior exit stairways shall be included, as necessary, to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance.

1009.2.2 (IFC [B] 1009.2.2) Enclosure. All interior exit stairways shall be enclosed in accordance with the provisions of Section 1022.

1009.3 (IFC [B] 1009.3) Exit access stairways. Floor openings between stories created by exit access stairways shall be enclosed.

Exceptions:

1. In other than Group I-2 and I-3 occupancies, exit access stairways that serve, or atmospherically communicate between, only two stories, are not required to be enclosed.
2. Exit access stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
3. In buildings with only Group B or M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.
4. In other than Groups B and M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the floor opening does not connect more than four stories, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. 5. Exit access stairways within an atrium complying with the provisions of Section 404 are not required to be enclosed.
6. Exit access stairways and ramps in open parking garages that serve only the parking garage are not required to be enclosed.
7. Stairways serving outdoor facilities where all portions of the means of egress are essentially open to the outside are not required to be enclosed.
8. Exit access stairways serving stages complying with Section 410.5.3.1 and 1015.6 are not required to be enclosed.
9. Stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.
10. In Group I-3 occupancies, exit access stairways constructed in accordance with Section 408.5 are not required to be enclosed.

1009.3.1 (IFC [B] 1009.3.1) Construction. Where required, enclosures for exit access stairways shall be constructed in accordance with this section. Exit access stairway enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.

1009.3.1.1 (IFC [B] 1009.3.1.1) Materials. Exit access stairway enclosures shall be of materials permitted by the building type of construction.

1009.3.1.2 (IFC [B] 1009.3.1.2) Fire-resistance rating. Exit access stairway enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more, and not less than 1 hour where connecting less than four stories. The number of stories connected by the exit access stairway enclosures shall include any basements, but not any mezzanines. Exit access stairway enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.

1009.3.1.3 (IFC [B] 1009.3.1.3) Continuity. Exit access stairway enclosures shall have continuity in accordance with Section 707.5 for fire barriers or Section 712.4 for horizontal assemblies as applicable.

1009.3.1.4 (IFC [B] 1009.3.1.4) Openings. Openings in an exit access stairway enclosure shall be protected in accordance with Section 715 as required for fire barriers. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 715.4.8.3.

1009.3.1.4.1 (IFC [B] 1009.3.1.4.1) Prohibited openings. Openings other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.

1009.3.1.5 (IFC [B] 1009.3.1.5) Penetrations. Penetrations in an exit access stairway enclosure shall be protected in accordance with Section 713 as required for fire barriers.

1009.3.1.5.1 (IFC [B] 1009.3.1.5.1) Prohibited penetrations. Penetrations other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.

1009.3.1.6 (IFC [B] 1009.3.1.6) Joints. Joints in an exit access stairway enclosure shall comply with Section 714.

1009.3.1.7 (IFC [B] 1009.3.1.7) Ducts and air transfer openings. Penetrations of an exit access stairway enclosure by ducts and air transfer openings shall comply with Section 716.

1009.3.1.8 (IFC [B] 1009.3.1.8) Exterior walls. Where exterior walls serve as a part of an exit access stairway enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply.

1009.4 ~~1009.1~~ (IFC [B] 1009.4 ~~1009.1~~) Stairway width. *(No change to text)*

(Renumber subsequent sections)

SECTION 1010
RAMPS

1010.2 (IFC [B] 1010.2) Enclosure. All interior exit ramps shall be enclosed in accordance with the applicable provisions of Section 1022. Exit access ramps shall be enclosed in accordance with the provisions of Section 1009.3 for enclosure of stairways.

(Renumber subsequent sections)

~~1010.7~~ 1010.8 (IFC [B] ~~1010.7~~ 1010.8) Ramp construction. All ramps shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood handrails shall be permitted for all types of construction. ~~Ramps used as an exit shall conform to the applicable requirements of Sections 1022.1 through 1022.6 for exit enclosures.~~

SECTION 1016 (IFC [B] 1016)
EXIT ACCESS TRAVEL DISTANCE

1016.1 (IFC [B] 1016.1) General ~~Travel distance limitations~~. Travel distance within the exit access portion of the means of egress system shall be in accordance with this section. ~~Exits shall be so located on each story such that the maximum length of exit access travel, measured from the most remote point within a story along the natural and unobstructed path of egress travel to an exterior exit door at the level of exit discharge, an entrance to a vertical exit enclosure, an exit passageway, a horizontal exit, an exterior exit stairway or an exterior exit ramp shall not exceed the distances given in Table 1016.1.~~

~~**Exceptions:**~~

1. ~~Travel distance in open parking garages is permitted to be measured to the closest riser of open exit stairways.~~
2. ~~In outdoor facilities with open exit access components and open exterior exit stairways or exit ramps, travel distance is permitted to be measured to the closest riser of an exit stairway or the closest slope of the exit ramp.~~
3. ~~In other than occupancy Groups H and I, the exit access travel distance to a maximum of 50 percent of the exits is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps when connecting a maximum of two stories. The two connected stories shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.~~
4. ~~In other than occupancy Groups H and I, exit access travel distance is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps in the first and second stories above grade plane in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. The first and second stories above grade plane shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.~~

5. ~~Where applicable, travel distance on unenclosed exit access stairways or ramps and on connecting stories shall also be included in the travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stairway.~~

1016.2 (IFC [B] 1016.2) Limitations. Exit access travel distance shall not exceed the values given in Table 1016.2.

TABLE ~~1016.1~~ 1016.2 (IFC [B] TABLE ~~1016.1~~ 1016.2)
EXIT ACCESS TRAVEL DISTANCE[a]
(Portions of table not shown remain unchanged)

~~1016.2~~ 1016.2.1 (IFC [B] ~~1016.2~~ 1016.2.1) Exterior egress balcony increase. Exit access travel distances specified in ~~Section 1016.1~~ Table 1016.2 shall be increased up to an additional 100 feet (30 480 mm) provided the last portion of the exit access leading to the exit occurs on an exterior egress balcony constructed in accordance with Section 1019. The length of such balcony shall not be less than the amount of the increase taken.

1016.3 (IFC [B] 1016.3) Measurement. Exit access travel distance shall be measured from the most remote point within a story along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an exit.

Exceptions:

1. In open parking garages, exit access travel distance is permitted to be measured to the closest riser of an exit access stairway or the closest slope of an exit access ramp.
2. In outdoor facilities with open exit access components, exit access travel distance is permitted to be measured to the closest riser of an exit access stairway or the closest slope of an exit access ramp.

1016.3.1 (IFC [B] 1016.3.1) Exit access stairways and ramps. Travel distance on exit access stairways or ramps shall be included in the exit access travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stair and landings. The measurement along ramps shall be made on the walking surface in the center of the ramp and landings.

SECTION 1021(IFC [B] 1021)
NUMBER OF EXITS AND ~~CONTINUITY~~ EXIT CONFIGURATION

1021.1 (IFC [B] 1021.1) General. Each story and occupied roof shall have the minimum number of exits, or access to exits, as specified in this section. The required number of exits, or exit access stairways or ramps providing access to exits, from any story shall be maintained until arrival at grade or a public way. Exits or access to exits from any story shall be configured in accordance with this section. Each story above the second story of a building shall have a minimum of one interior or exterior exit stairway, or interior or exterior exit ramp. At each story above the second story that requires a minimum of three or more exits, or access to exits, a minimum of 50% of the required exits shall be interior or exterior exit stairways, or interior or exterior exit ramps.

Exceptions:

1. Interior exit stairways and interior exit ramps are not required in open parking garages where the means of egress serves only the open parking garage.
2. Interior exit stairways and interior exit ramps are not required in outdoor facilities where all portions of the means of egress are essentially open to the outside.

~~**1021.1 (IFC [B] 1021.1) Exits from stories.** All spaces within each story shall have access to the minimum number of approved independent exits as specified in Table 1021.1 based on the occupant load of the story. For the purposes of this chapter, occupied roofs shall be provided with exits as required for stories.~~

~~**Exceptions:**~~

1. ~~As modified by Section 403.15 (Additional exit stairway).~~
2. ~~As modified by Section 1021.2.~~
3. ~~Exit access stairways and ramps that comply with Exception 3 or 4 of Section 1016.1 shall be permitted to provide the minimum number of approved independent exits required by Table 1021 on each story.~~
4. ~~In Groups R-2 and R-3 occupancies, one means of egress is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.~~
5. ~~Within a story, rooms and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.~~

~~The required number of exits from any story shall be maintained until arrival at grade or the public way.~~

~~TABLE 1021.1 (IFC [B] TABLE 1021.1)~~
~~MINIMUM NUMBER OF EXITS FOR OCCUPANT LOAD~~

~~OCCUPANT LOAD (persons per story)~~	~~MINIMUM NUMBER OF EXITS (per story)~~
~~1-500~~	~~2~~
~~501-1,000~~	~~3~~
~~More than 1,000~~	~~4~~

~~**1021.1.2 (IFC [B] 1021.1.2) Parking structures.** Parking structures shall not have less than two exits from each parking tier, except that only one exit is required where vehicles are mechanically parked. Unenclosed vehicle ramps shall not be considered as required exits unless pedestrian facilities are provided.~~

~~**1021.1.3 (IFC [B] 1021.1.3) Helistops.** The means of egress from helistops shall comply with the provisions of this chapter, provided that landing areas located on buildings or structures shall have two or more exits. For landing platforms or roof areas less than 60 feet (18 288 mm) long, or less than 2,000 square feet (186 m^2) in area, the second means of egress is permitted to be a fire escape, alternating tread device or ladder leading to the floor below.~~

1021.2 (IFC [B] 1021.2) Number of exits ~~Single exits.~~ ~~Only one exit shall be required from Group R-3 occupancy buildings or from stories of other buildings as indicated in Table 1021.2. Occupancies shall be permitted to have a single exit in buildings otherwise required to have more than one exit if the areas served by the single exit do not exceed the limitations of Table 1021.2. Mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with a single exit shall not be located more than one story below grade plane.~~ Two exits, or exit access stairways or ramps providing access to exits, from any story or occupied roof shall be provided where one of the following conditions exists:

1. The occupant load exceeds one of the values in Table 1021.2.
2. The exit access travel distance exceeds that specified in Table 1021.2 as determined in accordance with the provisions of Section 1016.1.
3. Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.

Exceptions:

1. Rooms, areas and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.
2. Group R-3 occupancy buildings shall be permitted to have a one exit.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one exit,
4. Air traffic control towers shall be provided with the minimum number of exits specified in Section 412.3.
5. Individual dwelling units with a maximum occupant load of 20 in Group R-2 and R-3 occupancies shall be permitted to one exit.
6. Group R-3 and R-4 congregate residences shall be permitted to have one exit.

Where one exit, or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with one exit shall not be located more than one story below grade plane.

TABLE 1021.2 (IFC [B] TABLE 1021.2)
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT

STORY	OCCUPANCY	MAXIMUM OCCUPANTS (OR DWELLING UNITS) PER ~~FLOOR~~ STORY	~~AND~~ MAXIMUM EXIT ACCESS TRAVEL DISTANCE
First story or basement	A, B[b,d], E[c,e], F[b,d], M, U, S[b,d]	49 occupants ~~and~~	75 feet
	H-2, H-3	3 occupants ~~and~~	25 feet
	H-4, H-5, I, R	10 occupants ~~and~~	75 feet
	S	29 occupants ~~and~~	100 feet
Second story	B[b], F, M, S[a]	29 occupants ~~and~~	75 feet
	R-2	4 dwelling units ~~and~~	50 feet
Third story	R-2[a,e]	4 dwelling units ~~and~~	50 feet
Fourth story and above	NP	NA	NA

For SI: 1 foot = 3048.mm

NP – Not Permitted

NA – Not Applicable

~~a. For the required number of exits for parking structures, see Section 1021.1.2.~~

~~b. For the required number of exits for air traffic control towers, see Section 412.3.~~

~~c.~~ a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1026.

~~d.~~ b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.

~~e.~~ c. Day care occupancies shall have a maximum occupant load of 10.

1021.2.1 (IFC [B] 1021.2.1) Three or more exits. Three exits, or exit access stairways or ramps providing access to exits at other stories, shall be provided from any story or occupied roof with an occupant load of 501-1,000. Four exits, or exit access stairways or ramps providing access to exits at other stories, shall be provided from any story or occupied roof with an occupant load greater than 1,000.

1021.2.2 (IFC [B] 1021.2.2) Additional exits. In buildings over 420 feet in height, additional exits shall be provided in accordance with Section 403.5.2.

1021.3 (IFC [B] 1021.3) Exit configuration ~~continuity~~. Exits, or exit access stairways or ramps providing access to exits at other stories, shall be arranged in accordance with the provisions of Section 1015.2 through 1015.2.2. Exits shall be continuous from the point of entry into the exit to the exit discharge.

1021.3.1 (IFC [B] 1021.3.1) Access to exits at adjacent levels. Access to exits at other levels shall be by stairways or ramps. Where access to exits occurs from adjacent building levels, the horizontal and vertical exit access travel distance to the closest exit shall not exceed that specified in Section 1016.1. Access to exits at other levels shall be from an adjacent story.

> **Exception:** Landing platforms or roof areas for helistops that are less than 60 feet (18 288 mm) long, or less than 2,000 square feet (186 m^2) in area, shall be permitted to access the second exit by a fire escape, alternating tread device or ladder leading to the story or level below.

1021.4 (IFC [B] 1021.4) Vehicular ramps. Vehicular ramps shall not be considered as an exit access ramp unless pedestrian facilities are provided.

~~**1021.4 (IFC [B] 1021.4) Exit door arrangement.** Exit door arrangement shall meet the requirements of Sections 1015.2 through 1015.2.2.~~

SECTION 1022 (IFC [B] 1022)
~~EXIT ENCLOSURES~~ INTERIOR EXIT STAIRWAYS AND RAMPS

1022.1 (IFC [B] 1022.1) General. Interior exit stairways and interior exit ramps serving as an exit component in a means of egress system shall comply with the requirements of this section. Interior exit stairways and ramps shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An interior exit stairway or ramp shall not be used for any purpose other than as a means of egress.

~~1022.1~~ **1022.2 (IFC [B] ~~1022.1~~ 1022.2) ~~Enclosures required~~ Construction.** Enclosures for interior exit stairways and ~~interior exit~~ ramps shall be ~~enclosed with~~ constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. Interior exit stairway and ramp ~~Exit~~ enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps ~~exit enclosure~~ shall include any basements, but not any mezzanines. Interior exit stairways and ramps ~~exit enclosures~~ shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. ~~Exit enclosures shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An exit enclosure shall not be used for any purpose other than means of egress.~~

~~Exceptions~~ **Exception:** Interior exit stairways and ramps in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.

1. ~~In all occupancies, other than Groups H and I occupancies, a stairway is not required to be enclosed when the stairway serves an occupant load of less than 10 and the stairway complies with either Item 1.1 or 1.2. In all cases, the maximum number of connecting open stories shall not exceed two.~~
   - ~~1.1 The stairway is open to not more than one story above its level of exit discharge; or~~
   - ~~1.2 The stairway is open to not more than one story below its level of exit discharge.~~
2. ~~Exits in buildings of Group A-5 where all portions of the means of egress are essentially open to the outside need not be enclosed.~~
3. ~~Stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.~~
4. ~~Stairways in open parking structures that serve only the parking structure are not required to be enclosed.~~
5. ~~Stairways in Group I-3 occupancies, as provided for in Section 408.3.8, are not required to be enclosed.~~
6. ~~Means of egress stairways as required by Sections 410.5.3 and 1015.6.1 are not required to be enclosed.~~
7. ~~Means of egress stairways from balconies, galleries and press boxes as provided for in Section 1028.5.1, are not required to be enclosed.~~

~~1022.2~~ **1022.3 (IFC [B] ~~1022.2~~ 1022.3) Termination.** ~~Exit enclosures~~ Interior exit stairways and ramps shall terminate at an exit discharge or a public way.

Exception: ~~An exit enclosures~~ Interior exit stairways and ramps shall be permitted to terminate at an exit passageway complying with Section 1023, provided the exit passageway terminates at an exit discharge or a public way.

~~1022.2.1~~ **1022.3.1 (IFC [B] ~~1022.2.1~~ 1022.3.1) Extension.** Where ~~an exit enclosures~~ interior exit stairways and ramps are ~~is~~ extended to an exit discharge or a public way by an exit passageway, the ~~exit enclosure~~ interior exit stairway and ramp shall be separated from the exit passageway by a fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 712, or both. The fire-resistance rating shall be at least equal to that required for the ~~exit enclosure~~ interior exit stairway and ramp. A fire door assembly complying with Section 715.4 shall be installed in the fire barrier to provide a means of egress from the ~~exit enclosure~~ interior exit stairway and ramp to the exit passageway. Openings in the fire barrier other than the fire door assembly are prohibited. Penetrations of the fire barrier are prohibited.

Exception: Penetrations of the fire barrier in accordance with Section 1022.4 shall be permitted.

~~1022.3~~ **1022.4 (IFC [B] ~~1022.3~~ 1022.4) Openings and penetrations**. ~~Exit enclosure~~ Interior exit stairway and ramp opening protectives shall be in accordance with the requirements of Section 715.

Openings ~~in exit enclosures~~ interior exit stairways and ramps other than unprotected exterior openings shall be limited to those necessary for exit access to the enclosure from normally occupied spaces and for egress from the enclosure.

Elevators shall not open into ~~an exit enclosures~~ Interior exit stairways and ramps.

~~1022.4~~ **1022.5 (IFC [B] ~~1022.4~~ 1022.5) Penetrations.** Penetrations into and openings through ~~an exit enclosure~~ Interior exit stairways and ramps are prohibited except for required exit doors, equipment and ductwork necessary for independent ventilation or pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication systems and electrical raceway serving the ~~exit enclosure~~ interior exit stairway and ramp and terminating at a steel box not exceeding 16 square inches (0.010 m^2). Such penetrations shall be protected in

accordance with Section 713. There shall be no penetrations or communication openings, whether protected or not, between adjacent ~~exit enclosures~~ interior exit stairways and ramps.

~~1022.5~~ 1022.6 (IFC [B] ~~1022.5~~ 1022.6) Ventilation. Equipment and ductwork for ~~exit enclosure~~ interior exit stairway and ramp ventilation as permitted by Section 1022.4 shall comply with one of the following items:

1. Such equipment and ductwork shall be located exterior to the building and shall be directly connected to the ~~exit enclosure~~ interior exit stairway and ramp by ductwork enclosed in construction as required for shafts.
2. Where such equipment and ductwork is located within the ~~exit enclosure~~ interior exit stairway and ramp, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or such air shall be conveyed through ducts enclosed in construction as required for shafts.
3. Where located within the building, such equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the fire-resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 715 for shaft enclosures.

The ~~Exit enclosure~~ interior exit stairway and ramp ventilation systems shall be independent of other building ventilation systems.

~~1022.6~~ 1022.7 (IFC [B] ~~1022.6~~ 1022.7) ~~Exit enclosure~~ Interior exit stairway and ramp exterior walls. Exterior walls of the ~~an exit enclosure~~ interior exit stairway and ramp shall comply with the requirements of Section 705 for exterior walls. Where nonrated walls or unprotected openings enclose the exterior of the stairway and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than ¾ hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or to the roof line, whichever is lower.

~~1022.7~~ 1022.8 (IFC [B] ~~1022.7~~ 1022.8) Discharge identification. ~~A stairway in an exit enclosure An~~ interior exit stairway and ramp shall not continue below its level of exit discharge unless an approved barrier is provided at the level of exit discharge to prevent persons from unintentionally continuing into levels below. Directional exit signs shall be provided as specified in Section 1011.

~~1022.8~~ 1022.9 (IFC [B] ~~1022.8~~ 1022.9) Floor identification signs. A sign shall be provided at each floor landing in ~~exit enclosures~~ an interior exit stairway and ramp connecting more than three stories designating the floor level, the terminus of the top and bottom of the ~~exit enclosure~~ interior exit stairway and ramp and the identification of the stair or ramp. The signage shall also state the story of, and the direction to, the exit discharge and the availability of roof access from the ~~enclosure~~ interior exit stairway and ramp for the fire department. The sign shall be located 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions. Floor level identification signs in tactile characters complying with ICC A117.1 shall be located at each floor level landing adjacent to the door leading from the ~~enclosure~~ interior exit stairway and ramp into the corridor to identify the floor level.

~~1022.8.1~~ 1022.9.1 (IFC [B] ~~1022.8.1~~ 1022.9.1) Signage requirements. Stairway identification signs shall comply with all of the following requirements:

1. The signs shall be a minimum size of 18 inches (457 mm) by 12 inches (305 mm).
2. The letters designating the identification of the ~~stair enclosure~~ interior exit stairway and ramp shall be a minimum of 11/2 inches (38 mm) in height.
3. The number designating the floor level shall be a minimum of 5 inches (127 mm) in height and located in the center of the sign.
4. All other lettering and numbers shall be a minimum of 1 inch (25 mm) in height.
5. Characters and their background shall have a nonglare finish. Characters shall contrast with their background, with either light characters on a dark background or dark characters on a light background.
6. When signs required by Section 1022.8 are installed in ~~interior exit enclosures~~ the interior exit stairways and ramps of buildings subject to Section 1024, the signs shall be made of the same materials as required by Section 1024.4.

~~1022.9~~ 1022.10 (IFC [B] ~~1022.9~~ 1022.10) Smokeproof enclosures and pressurized stairways and ramps. In buildings required to comply with Section 403 or 405, each of the ~~exit enclosures~~ interior exit stairways and ramps

serving a story with a floor surface located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access or more than 30 feet (9144 mm) below the finished floor of a level of exit discharge serving such stories shall be a smokeproof enclosure or pressurized stairway or ramp in accordance with Section 909.20.

SECTION 403
HIGH-RISE BUILDINGS

403.2.3 Structural integrity of interior exit stairways ~~exit enclosures~~ and elevator hoistway enclosures. For high-rise buildings of occupancy category III or IV in accordance with Section 1604.5, and for all buildings that are more than 420 feet (128 000 mm) in building height, enclosures for interior exit stairways ~~exit enclosures~~ and elevator hoistway enclosures shall comply with Sections 403.2.3.1 through 403.2.3.4.

403.2.3.1 Wall assembly. The wall assemblies making up the enclosures for interior exit stairways ~~exit enclosures~~ and elevator hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C 1629/C 1629M.

403.2.3.2 Wall assembly materials. The face of the wall assemblies making up the enclosures for interior exit stairways ~~exit enclosures~~ and elevator hoistway enclosures that are not exposed to the interior of the enclosures for interior exit stairways ~~exit enclosures~~ or elevator hoistway enclosure shall be constructed in accordance with one of the following methods:

1. The wall assembly shall incorporate not less than two layers of impact-resistant construction board each of which meets or exceeds Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C 1629/C 1629M.
2. The wall assembly shall incorporate not less than one layer of impact-resistant construction material that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C 1629/C 1629M.
3. The wall assembly incorporates multiple layers of any material, tested in tandem, that meet or exceed Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C 1629/C 1629M.

403.5.1 Remoteness of interior exit stairways ~~enclosures~~. ~~The~~ Required interior exit ~~stairway~~ stairways ~~enclosures~~ shall be separated by a distance not less than 30 feet (9144 mm) or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the ~~exit stairway enclosures~~ interior exit stairways. In buildings with three or more interior exit stairway ~~enclosures~~, at least two of the interior exit stairway ~~enclosures~~ shall comply with this section. Interlocking or scissor stairs shall be counted as one interior exit stairway.

403.5.4 Smokeproof ~~exit~~ enclosures. Every required exit stairway serving floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall comply with Sections 909.20 and 1022.9.

SECTION 408
GROUP I-3

408.3.8 Interior exit stairway and ramp construction ~~enclosures~~. One ~~of the required~~ interior exit stairway or ramp ~~exit enclosures~~ in each building shall be permitted to have glazing installed in doors and interior walls at each landing level providing access to the ~~enclosure~~ interior exit stairway or ramp, provided that the following conditions are met:

1. The interior exit stairway or ramp ~~exit enclosures~~ shall not serve more than four floor levels.
2. Exit doors shall not be less than 3/4-hour fire door assemblies complying with Section 715.4
3. The total area of glazing at each floor level shall not exceed 5,000 square inches ($3m^2$) and individual panels of glazing shall not exceed 1,296 square inches ($0.84\ m^2$).
4. The glazing shall be protected on both sides by an automatic sprinkler system. The sprinkler system shall be designed to wet completely the entire surface of any glazing affected by fire when actuated.
5. The glazing shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler system operates.
6. Obstructions, such as curtain rods, drapery traverse rods, curtains, drapes or similar materials shall not be installed between the automatic sprinklers and the glazing.

SECTION 410
STAGES AND PLATFORMS

410.5.3.1 Stairway and ramp enclosure. Exit access stairways and ramps serving the stage are not required to be enclosed. Exit access stairways serving the lighting and access catwalks, galleries and gridirons are not required to be enclosed.

SECTION 705
EXTERIOR WALLS

705.2 Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways and ramps shall also comply with Sections 1019 and 1026, respectively. Projections shall not extend beyond the distance determined by the following three methods, whichever results in the lesser projection:

1. A point one-third the distance from the exterior face of the wall to the lot line where protected openings or a combination of protected and unprotected openings are required in the exterior wall.
2. A point one-half the distance from the exterior face of the wall to the lot line where all openings in the exterior wall are permitted to be unprotected or the building is equipped throughout with an automatic sprinkler system installed under the provisions of Section 705.8.2.
3. More than 12 inches (305 mm) into areas where openings are prohibited.

Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section.

SECTION 707
FIRE BARRIERS

707.3.2 Interior exit stairway and ramp construction ~~enclosures~~. The fire-resistance rating of the fire barrier separating building areas from an interior exit stairway or ramp shall comply with Section 1022.1.

707.3.3 Enclosures for exit access stairways. The fire-resistance rating of the fire barrier separating building areas from an exit access stairway or ramp shall comply with Section 1009.3.1.2.

707.4 Exterior walls. Where exterior walls serve as a part of a required fire-resistance-rated shaft or stairway or ramp ~~exit~~ enclosure, or separation, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure or separation requirements shall not apply.

Exception: Exterior walls required to be fire-resistance rated in accordance with Section 1019 for exterior egress balconies, Section ~~1022.6~~ 1022.7 for interior exit stairways and ramps ~~enclosures~~ and Section 1026.6 for exterior exit stairways and ramps ~~and stairways~~.

707.5.1 Supporting construction. The supporting construction for fire barriers shall be protected to afford the required fire-resistance rating of the fire barrier supported. Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 717.2 at every floor level.

Exceptions:

1. The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided in Section 415.6.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type.
2. Shaft enclosures shall be permitted to terminate at a top enclosure complying with Section 707.12.
3. Supporting construction for 1-hour fire barriers required by Table 508.2.5 in buildings of Type IIB, IIIB and VB construction is not required to be fire-resistance rated unless required by other sections of this code.
4. Interior exit stairway and ramp enclosures required by Section 1022.2 and exit access stairway and ramp enclosures required by Section 1009.3 shall be permitted to terminate at a top enclosure complying with Section 707.12.

707.6 Openings. Openings in a fire barrier shall be protected in accordance with Section 715. Openings shall be limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single

opening shall not exceed 156 square feet (15 m^2). Openings in enclosures for exit access stairways and ramps, interior exit stairways and ramps ~~exit enclosures~~ and exit passageways shall also comply with Sections 1022.3 and 1023.5, respectively.

Exceptions:

1. Openings shall not be limited to 156 square feet (15 m^2) where adjoining floor areas are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a fire door serving ~~an~~ enclosures for exit access stairways, exit access ramps, interior exit stairways and interior exit ramps ~~exit enclosures~~.
3. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective has been tested in accordance with ASTME 119 orUL263 and has a minimum fire-resistance rating not less than the fire-resistance rating of the wall.
4. Fire window assemblies permitted in atrium separation walls shall not be limited to a maximum aggregate width of 25 percent of the length of the wall.
5. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a fire door assembly in a fire barrier separating an enclosures for exit access stairways, exit access ramps, interior exit stairways and interior exit ramps ~~exit enclosures~~ from an exit passageway in accordance with Section 1022.2.1.

707.7.1 Prohibited penetrations. Penetrations into ~~an~~ enclosures for exit access stairways, exit access ramps, interior exit stairways, interior exit ramps ~~exit enclosures~~ or an exit passageway shall be allowed only when permitted by Section 1009.3.1.5, ~~1022.4~~ 1022.5 or 1023.6, respectively.

SECTION 708
SHAFT ENCLOSURES

708.1 General. The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Exit access stairways and exit access ramps shall be protected in accordance with the applicable provisions of Section 1009. Interior exit stairways and interior exit ramps shall be protected in accordance with the requirements of Section 1022. ~~Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.~~

708.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure ~~complying with this section~~.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening ~~or stairway that is not a portion of the means of egress~~ protected according to Item 2.1 or 2.2.
   2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator ~~or stairway~~ and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. The shutters shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.
3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 713.4.
4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 716.6. Grease ducts shall be protected in accordance with the International Mechanical Code.

5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with the provisions for atriums in Section 404.
6. A shaft enclosure is not required for approved masonry chimneys where annular space is fireblocked at each floor level in accordance with Section 717.2.5.
7. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   7.1. Does not connect more than two stories.
   ~~7.2. Is not part of the required means of egress system.~~
   7.3. Is not concealed within the construction of a wall or a floor/ceiling assembly.
   7.4. Is not open to a corridor in Group I and R occupancies.
   7.5. Is not open to a corridor on nonsprinklered floors in any occupancy.
   7.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   7.7. Is limited to the same smoke compartment.
8. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.
9. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 714.
~~11. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1.~~
11~~12~~. Floor openings protected by floor fire doors in accordance with Section 712.8.
~~13. In Group I-3 occupancies, a shaft enclosure is not required for floor openings in accordance with Section 408.5.~~
12~~14~~. A shaft enclosure is not required for elevator hoistways in open or enclosed parking garages that serve only the parking garage.
13~~15~~. In open or enclosed parking garages a shaft enclosure is not required to enclose mechanical exhaust or supply duct systems when such duct system is contained within and serves only the parking garage.
14~~16~~. Where permitted by other sections of this code.

708.3 Construction. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.

~~708.3~~ 708.4 Materials. *(No change to text)*

~~708.4~~ 708.5 Fire-resistance rating. *(No change to text)*

~~708.5~~ 708.6 Continuity. *(No change to text)*

~~708.6~~ 708.7Exterior walls. Where exterior walls serve as a part of a required shaft enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply.

Exception: Exterior walls required to be fire-resistance rated in accordance with Section 1019.2 for exterior egress balconies, Section ~~1022.6~~ 1022.7 for interior exit stairways and ramps ~~exit enclosures~~ and Section 1026.6 for exterior exit stairways and ramps ~~and stairways~~.

(Renumber subsequent sections)

SECTION 709
FIRE PARTITIONS

709.5 Exterior walls. Where exterior walls serve as a part of a required fire-resistance-rated separation, such walls shall comply with the requirements of Section 705 for exterior walls, and the fire-resistance-rated separation requirements shall not apply.

Exception: Exterior walls required to be fire-resistance rated in accordance with Section 1019.2 for exterior egress balconies, Section 1022.6 for interior exit stairways and ramps ~~exit enclosures~~ and Section 1026.6 for exterior exit stairways and ramps ~~and stairways~~.

SECTION 712
HORIZONTAL ASSEMBLIES

712.4 Continuity. Assemblies shall be continuous without openings, penetrations or joints except as permitted by this section and Sections 708.2, 713.4, 714, 1009.3 and 1022.1. Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained. Unprotected skylights shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 704.10. The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.

Exception: In buildings of Type IIB, IIIB or VB construction, the construction supporting the horizontal assembly is not required to be fire-resistance-rated at the following:

1. Horizontal assemblies at the separations of incidental uses as specified by Table 508.2.5, provided the required fire-resistance rating does not exceed 1 hour.
2. Horizontal assemblies at the separations of dwelling units and sleeping units as required by Section 420.3.
3. Horizontal assemblies at smoke barriers constructed in accordance with Section 710.

SECTION 715
OPENING PROTECTIVES

TABLE 715.4
FIRE DOOR AND FIRE SHUTTER FIRE PROTECTION RATINGS

TYPE OF ASSEMBLY	REQUIRED ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)
Fire barriers having a required fire-resistance rating of 1 hour:		
~~Shaft, exit~~ Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways, interior exit ramps and exit passageway walls	1	1
Other fire barriers	1	3/4

(Portions of table not shown remain unchanged)

715.4.4 Doors in ~~exit enclosures~~ interior exit stairways and ramps and exit passageways. Fire door assemblies in interior exit stairways and ramps ~~exit enclosures~~ and exit passageways shall have a maximum transmitted temperature end point of not more than 450ºF (250ºC) above ambient at the end of 30 minutes of standard fire test exposure.

Exception: The maximum transmitted temperature rise is not required in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

715.4.6.1 Fire door labeling requirements. Fire doors shall be labeled showing the name of the manufacturer or other identification readily traceable back to the manufacturer, the name or trademark of the third-party inspection agency, the fire protection rating and, where required for fire doors in interior exit stairways and ramps ~~exit enclosures~~ and exit passageways by Section 715.4.4, the maximum transmitted temperature end point. Smoke and draft control doors complying with UL 1784 shall be labeled as such and shall also comply with Section 715.4.6.3. Labels shall be approved and permanently affixed. The label shall be applied at the factory or location where fabrication and assembly are performed.

715.4.7.2 ~~Exit and~~ Elevator, stairway and ramp protectives. Approved fire-protection-rated glazing used in fire door assemblies in elevator, stairways and ramps ~~exit~~ enclosures shall be so located as to furnish clear vision of the passageway or approach to the elevator, ~~ramp or~~ stairway or ramp.

SECTION 716
DUCT AND TRANSFER OPENINGS

716.5.2 Fire barriers. Ducts and air transfer openings of fire barriers shall be protected with approved fire dampers installed in accordance with their listing. Ducts and air transfer openings shall not penetrate enclosures for stairways ramps ~~exit enclosures~~ and exit passageways except as permitted by Sections 1022.4 and 1023.6, respectively.

Exception: Fire dampers are not required at penetrations of fire barriers where any of the following apply:

1. Penetrations are tested in accordance with ASTM E119 or UL 263 as part of the fire-resistance-rated assembly.
2. Ducts are used as part of an approved smoke control system in accordance with Section 909 and where the use of a fire damper would interfere with the operation of a smoke control system.
3. Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, are in areas of other than Group Hand are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than No. 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

SECTION 803
WALL AND CEILING FINISHES

TABLE 803.9
INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

GROUP	SPRINKLERED[l]			NONSPRINKLERED		
	Interior exit stairways, interior exit ramps ~~exit enclosures~~ and exit passageways [a, b]	Corridors and enclosure for exit access stairways and exit access ramps	Rooms and enclosed spaces[c]	Interior exit stairways, interior exit ramps ~~exit enclosures~~ and exit passageways [a, b]	Corridors and enclosure for exit access stairways and exit access ramps	Rooms and enclosed spaces[c]

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929m^2.

a. Class C interior finish materials shall be permitted for wainscotting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.11.1.

b. In other than Group I-3 occupancies ,~~exit enclosures of~~ in buildings less than three stories above grade plane ~~of other than Group I-3~~, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.

c. Requirements for rooms and enclosed spaces shall be based upon spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered enclosing spaces and the rooms or spaces on both sides shall be considered one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall not be less than Class B materials.

e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.

f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

g. Class B material is required where the building exceeds two stories.

h. Class C interior finish materials shall be permitted in administrative spaces.

i. Class C interior finish materials shall be permitted in rooms with a capacity of four persons or less.

j. Class B materials shall be permitted as wainscotting extending not more than 48 inches above the finished floor in corridors and exit access stairways and ramps.

k. Finish materials as provided for in other sections of this code.

l. Applies when ~~the exit enclosures, exit passageways, corridors or rooms and enclosed spaces are~~ protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

SECTION 804
INTERIOR FLOOR FINISH

804.4 Interior floor finish requirements. In all occupancies, interior floor finish and floor covering materials for interior exit stairways and ramps ~~exit enclosures~~, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux as specified in Section 804.4.1.

804.4.1 Minimum critical radiant flux. Interior floor finish and floor covering materials in enclosures for stairways and ramp ~~exit enclosures~~, exit passageways and corridors shall not be less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I-4, M, R-1, R-2 and S. In all areas, floor covering materials shall comply with the DOCFF-1 "pill test" (CPSC 16 CFR, Part 1630).

Exception: Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required, and materials complying with the DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630) are permitted in any area where Class II Materials are required.

SECTION 1006 (IFC [B] 1006)
MEANS OF EGRESS ILLUMINATION

1006.3 (IFC [B] 1006.3) Illumination emergency power. The power supply for means of egress illumination shall normally be provided by the premises' electrical supply.

In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Aisles and unenclosed egress stairways in rooms and spaces that require two or more means of egress.
2. Corridors, interior exit stairways and ramps ~~exit enclosures~~ and exit passageways in buildings required to have two or more exits.
3. Exterior egress components at other than their levels of exit discharge until exit discharge is accomplished for buildings required to have two or more exits.
4. Interior exit discharge elements, as permitted in Section 1027.1, in buildings required to have two or more exits.
5. Exterior landings as required by Section 1008.1.6 for exit discharge doorways in buildings required to have two or more exits.

The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Chapter 27.

SECTION 1007 (IFC [B] 1007)
ACCESSIBLE MEANS OF EGRESS

1007.2 (IFC [B] 1007.2) Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with Section 1104.
2. Interior exit stairways complying with Sections 1007.3 and 1022.
3. Interior exit access stairways between two stories complying with Sections 1007.3 and 1009.3.

~~3.~~4 Exterior exit stairways complying with Sections 1007.3 and 1026.
~~4.~~5. Elevators complying with Section 1007.4.
~~5.~~6. Platform lifts complying with Section 1007.5.
~~6.~~7. Horizontal exits complying with Section 1025.
~~7.~~8. Ramps complying with Section 1010.
~~8.~~9. Areas of refuge complying with Section 1007.6.

Exceptions:

1. Where the exit discharge is not accessible, an exterior area for assisted rescue shall be provided in accordance with Section 1007.7.
2. Where the exit stairway is open to the exterior, the accessible means of egress shall include either an area of refuge in accordance with Section 1007.6 or an exterior area for assisted rescue in accordance with Section 1007.7.

1007.3 (IFC [B] 1007.3) Stairways. In order to be considered part of an accessible means of egress, ~~an exit access stairway as permitted by Section 1016.1 or exit~~ a stairway between stories shall have a clear width of 48 inches (1219 mm) minimum between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or shall be accessed from either an area of refuge complying with Section 1007.6 or a horizontal exit. Exit access stairways that connect levels in the same story are not permitted as part an accessible means of egress.

Exceptions:

~~1. The area of refuge is not required at open exit access or exit stairways as permitted by Sections 1016.1 and 1022.1 in buildings that are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

1.~~2.~~ The clear width of 48 inches (1219 mm) between handrails is not required ~~at exit access stairways as permitted by Section 1016.1or exit stairways~~ in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

2.~~3.~~ Areas of refuge are not required at ~~exit~~ stairways in buildings equipped throughout by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

3.~~4.~~ The clear width of 48 inches (1219 mm) between handrails is not required for ~~exit~~ stairways accessed from a horizontal exit.

4.~~5.~~ Areas of refuge are not required at ~~exit~~ stairways serving open parking garages.

5.~~6.~~ Areas of refuge are not required for smoke protected seating areas complying with Section 1028.6.2.

6.~~7.~~ The areas of refuge are not required in Group R-2 occupancies.

1007.6 (IFC [B] 1007.6) Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1. Every required area of refuge shall have direct access to a stairway ~~within an exit enclosure~~ complying with Sections 1007.3 ~~and 1022~~ or an elevator complying with Section 1007.4. Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier.

~~**Exceptions:**~~

~~1. A stairway serving an area of refuge is not required to be enclosed where permitted in Sections 1016.1 and 1022.1.~~

~~2. A smokeproof enclosure is not required for an elevator lobby used as an area of refuge where the elevator is not required to be enclosed.~~

1007.6.2 (IFC [B] 1007.6.2) Separation. Each area of refuge shall be separated from the remainder of the story by a smoke barrier complying with Section 710 or a horizontal exit complying with Section 1025. Each area of refuge shall be designed to minimize the intrusion of smoke.

Exception: Areas of refuge located within an ~~exit~~ enclosure for exit access stairways or interior exit stairways.

1007.7.2 (IFC [B] 1007.7.2) Exterior ~~exit~~ stairway. Exterior ~~exit~~ stairways that are part of the means of egress for the exterior area for assisted rescue shall provide a clear width of 48 inches (1219 mm) between handrails.

1007.8 (IFC [B] 1007.8) Two-way communication. A two-way communication system shall be provided at the elevator landing on each accessible floor that is one or more stories above or below the story of exit discharge complying with Sections 1007.8.1 and 1007.8.2.

Exceptions:

1. Two-way communication systems are not required at the elevator landing where the two-way communication system is provided within areas of refuge in accordance with Section 1007.6.3.
2. Two-way communication systems are not required on floors provided with ~~exit~~ ramps conforming to the provisions of Section 1010.

SECTION 1015 (IFC [B] 1015)
EXIT AND EXIT ACCESS DOORWAYS

1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access doorways. Where two exits or exit access doorways are required from any portion of the exit access, the exit doors or exit access doorways shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access doorways. Interlocking or scissor stairs shall be counted as one ~~exit~~ stairway.

Exceptions:

1. Where ~~exit enclosures~~ interior exit stairways are ~~provided as a portion of the required exit and are~~ interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the exit doors or exit access doorways shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

SECTION 1023 (IFC [B] 1023)
EXIT PASSAGEWAYS

1023.3 (IFC [B] 1023.3) Construction. Exit passageway enclosures shall have walls, floors and ceilings of not less than 1-hour fire-resistance rating, and not less than that required for any connecting ~~exit enclosure~~ interior exit stairway or ramp. Exit passageways shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both.

1023.5 (IFC [B] 1023.5) Openings and penetrations. Exit passageway opening protectives shall be in accordance with the requirements of Section 715.

Except as permitted in Section 402.4.6, openings in exit passageways other than exterior openings shall be limited to those necessary for exit access to the exit passageway from normally occupied spaces and for egress from the exit passageway.

Where an ~~exit enclosure~~ interior exit stairway or ramp is extended to an exit discharge or a public way by an exit passageway, the exit passageway shall also comply with Section 1022.2.1.

Elevators shall not open into an exit passageway.

SECTION 1024 (IFC [B] 1024)
LUMINOUS EGRESS PATH MARKINGS

1024.2 (IFC [B] 1024.2) Markings within exit components ~~enclosures~~. Egress path markings shall be provided in ~~exit enclosures, including vertical exit enclosures~~ interior exit stairways, interior exit ramps and exit passageways, in accordance with Sections 1024.2.1 through 1024.2.6.

1024.2.4 (IFC [B] 1024.2.4) Perimeter demarcation lines. Stair landings and other floor areas within ~~exit enclosures~~ interior exit stairways, interior exit ramps and exit passageways, with the exception of the sides of steps, shall be provided with solid and continuous demarcation lines on the floor or on the walls or a combination of both. The stripes shall be 1 to 2 inches (25mm to 51 mm) wide with interruptions not exceeding 4 inches (102 mm).

Exception: The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

1024.2.4.1 (IFC [B] 1024.2.4.1) Floor-mounted demarcation lines. Perimeter demarcation lines shall be placed within 4 inches (102 mm) of the wall and shall extend to within 2 inches (51 mm) of the markings on the leading edge of landings. The demarcation lines shall continue across the floor in front of all doors.

Exception: Demarcation lines shall not extend in front of exit discharge doors that lead out of an exit ~~enclosure~~ and through which occupants must travel to complete the exit path.

1024.2.4.2 (IFC [B] 1024.2.4.2) Wall-mounted demarcation lines. Perimeter demarcation lines shall be placed on the wall with the bottom edge of the stripe no more than 4 inches (102 mm) above the finished floor. At the top or bottom of the stairs, demarcation lines shall drop vertically to the floor within 2 inches (51 mm) of the step or landing edge. Demarcation lines on walls shall transition vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path. Where the wall line is broken by a door, demarcation lines on walls shall continue across the face of the door or transition to the floor and extend across the floor in front of such door.

Exception: Demarcation lines shall not extend in front of exit discharge doors that lead out of an exit ~~enclosure~~ and through which occupants must travel to complete the exit path.

1024.2.6 (IFC [B] 1024.2.6) Doors within the exit path ~~from exit enclosures~~. Doors through which occupants ~~within an exit enclosure~~ must pass in order to complete the exit path shall be provided with markings complying with Sections 1024.2.6.1 through 1024.2.6.3.

1024.3 (IFC [B] 1024.3) Uniformity. Placement and dimensions of markings shall be consistent and uniform throughout the same ~~exit~~ enclosure.

1024.5 (IFC [B] 1024.5) Illumination. ~~Exit enclosures~~ Where photoluminescent exit path markings are installed shall be provided with the minimum means of egress illumination required by Section 1006 for at least 60 minutes prior to periods when the building is occupied.

SECTION 1025 (IFC [B] 1025)
HORIZONTAL EXIT

1025.4 (IFC [B] 1025.4) Capacity of refuge area. The refuge area of a horizontal exit shall be a space occupied by the same tenant or a public area and each such refuge area shall be adequate to accommodate the original occupant load of the refuge area plus the occupant load anticipated from the adjoining compartment. The anticipated occupant load from the adjoining compartment shall be based on the capacity of the horizontal exit doors entering the refuge area. The capacity of the refuge area shall be computed based on a net floor area allowance of 3 square feet (0.2787 m^2) for each occupant to be accommodated therein.

Exception: The net floor area allowable per occupant shall be as follows for the indicated occupancies:

1. Six square feet (0.6 m^2) per occupant for occupancies in Group I-3.
2. Fifteen square feet (1.4 m^2) per occupant for ambulatory occupancies in Group I-2.
3. Thirty square feet (2.8 m^2) per occupant for nonambulatory occupancies in Group I-2.

The refuge area into which a horizontal exit leads shall be provided with exits adequate to meet the occupant requirements of this chapter, but not including the added occupant load imposed by persons entering it through horizontal exits from other areas. At least one refuge area exit shall lead directly to the exterior or to an interior exit stairway or ramp ~~exit enclosure~~.

Exception: The adjoining compartment shall not be required to have a stairway or door leading directly outside, provided the refuge area into which a horizontal exit leads as stairways or doors leading directly outside and are so arranged that egress shall not require the occupants to return through the compartment from which egress originates.

SECTION 1026 (IFC [B] 1026)
EXTERIOR EXIT ~~RAMPS AND~~ STAIRWAYS AND RAMPS

1026.6 (IFC [B] 1026.6) Exterior ~~ramps and~~ stairway and ramp protection. Exterior exit ~~ramps and~~ stairways and ramps shall be separated from the interior of the building as required in Section 1022.1. Openings shall be limited to those necessary for egress from normally occupied spaces.

Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are no more than two stories above grade plane where a level of exit discharge serving such occupancies is the first story above grade plane.
2. Separation from the interior of the building is not required where the exterior ~~ramp or~~ stairway or ramp is served by an exterior ramp or balcony that connects two remote exterior stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be a minimum of 50 percent of the height of the enclosing wall, with the top of the openings no less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the interior of the building is not required for an exterior ~~ramp or~~ stairway or ramp located in a building or structure that is permitted to have unenclosed ~~interior~~ exit access stairways in accordance with Section 1009.3 ~~1022.1~~.
4. Separation from the interior of the building is not required for exterior ~~ramps or~~ stairways or ramps connected to open-ended corridors, provided that Items 4.1 through 4.4 are met:
   4.1 The building, including corridors, ~~ramps or~~ stairways or ramps, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   4.2 The open-ended corridors comply with Section 1018.
   4.3 The open-ended corridors are connected on each end to an exterior exit ~~ramp or~~ stairway or ramp complying with Section 1026.
5. At any location in an open-ended corridor where a change of direction exceeding 45 degrees 0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior ~~ramp or~~ stairway or ramp shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

SECTION 1027 (IFC [B] 1027)
EXIT DISCHARGE

1027.1 (IFC [B] 1027.1) General. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide direct access to grade. The exit discharge shall not reenter a building. The combined use of Exceptions 1 and 2 below shall not exceed 50 percent of the number and capacity of the required exits.

Exceptions:

1. A maximum of 50 percent of the number and capacity of ~~the exit enclosures~~ interior exit stairways and ramps is permitted to egress through areas on the level of discharge provided all of the following are met:
   1.1 Such ~~exit~~ enclosures egress to a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the ~~exit~~ enclosure.
   1.2 The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the ~~exit~~ enclosure.
   1.3 The egress path from the ~~exit enclosure~~ interior exit stairway and ramp on the level of exit discharge is protected throughout by an approved automatic sprinkler system. All portions of the level of exit discharge with access to the egress path shall either be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of ~~exits~~ interior exit stairways or ramps.
2. A maximum of 50 percent of the number and capacity of the ~~exit enclosures for~~ interior exit stairways and ramps is permitted to egress through a vestibule provided all of the following are met:
   2.1 The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating for the ~~exit~~ enclosure.
   2.2 The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3 The area is separated from the remainder of the level of exit discharge by construction providing protection at least the equivalent of approved wired glass in steel frames.
   2.4 The area is used only for means of egress and exits directly to the outside.
3. ~~Stairways in open parking garages complying with Section 1022.1, Exception 4, are permitted to egress through the open parking garage at their levels of exit discharge.~~

4. Horizontal exits complying with Section 1025 shall not be required to discharge directly to the exterior of the building.

SECTION 1028 (IFC [B] 1028)
ASSEMBLY

~~**1028.5.1 (IFC [B] 1028.5.1) Enclosure of openings.** Interior stairways and other vertical openings shall be enclosed in an exit enclosure in accordance with Section 1009, as provided in Section 1022.1, except that stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities. At least one accessible means of egress is required from a balcony, gallery or press box level containing accessible seating locations in accordance with Section 1007.3 or 1007.4.~~

SECTION 1110
SIGNAGE

1110.3 Other signs. Signage indicating special accessibility provisions shall be provided as shown:

1. Each assembly area required to comply with Section 1108.2.7 shall provide a sign notifying patrons of the availability of assistive listening systems.

   Exception: Where ticket offices or windows are provided, signs are not required at each assembly area provided that signs are displayed at each ticket office or window informing patrons of the availability of assistive listening systems.

2. At each door to an area of refuge, an exterior area for assisted rescue, an egress stairway, exit passageway and exit discharge, signage shall be provided in accordance with Section 1011.3.
3. At areas of refuge, signage shall be provided in accordance with Section 1007.11.
4. At exterior areas for assisted rescue, signage shall be provided in accordance with Section 1007.11.
5. At two-way communication systems, signage shall be provided in accordance with Section 1007.8.2.
6. Within ~~exit enclosures~~ interior exit stairways and ramps, signage shall be provided in accordance with Section 1022.8.

SECTION 2606
LIGHT-TRANSMITTING PLASTICS

2606.7 Light-diffusing systems. Unless the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, light-diffusing systems shall not be installed in the following occupancies and locations:

1. Group A with an occupant load of 1,000 or more.
2. Theaters with a stage and proscenium opening and an occupant load of 700 or more.
3. Group I-2.
4. Group I-3.
5. ~~Vertical exit enclosures~~ Interior exit stairways and ramps and exit passageways.

SECTION 3007
FIRE SERVICE ACCESS ELEVATOR

3007.4.1 Access. The fire service access elevator lobby shall have direct access to an ~~exit~~ enclosure for an interior exit stairway.

3007.5 Standpipe hose connection. A Class I standpipe hose connection in accordance with Section 905 shall be provided in the ~~exit enclosure~~ interior exit stairway and ramp having direct access from the fire service access elevator lobby.

SECTION 3008
OCCUPANT EVACUATION ELEVATORS

3008.11.1 Access. The occupant evacuation elevator lobby shall have direct access to an ~~exit enclosure~~ interior exit stairway or ramp.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned

to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held seventeen meetings - all open to the public.

This proposed change is a result of the CTC’s investigation of the area of study entitled “Unenclosed Interior Stairways”. The scope of the activity is noted as:

Scope: The current code allows limited use of unenclosed exit stairs. During the previous code development cycles, numerous code changes have been submitted to clarify the intent and application of the code provisions relative to issues such as: exit versus exit access; travel distance measurements; contribution to the minimum number of required exits; etc. Due to the inter-relationship of code provisions, this requires a comprehensive analysis in order to clarify the code requirements.

Objectives:

A. The Unenclosed Interior Stairway Work Group will answer the following questions based on the current Means of Egress system that is composed of exit, exit access and exit discharge components:
   1. Can an unenclosed interior stairway qualify as an exit?
   2. If an un-enclosed interior stairway can qualify as an exit what is the entrance to the exit (where does the exit begin)?
   3. If an un-enclosed interior stairway can qualify as an exit where does the exit discharge begin (where does the exit end)?
   4. How is travel distance measured when an un-enclosed interior stairway is used as an element in a means of egress?
   5. Does the Minimum Number of Exits Section (1019.1 in the 2006 IBC) require entry to the required exits on each story?

B. The Unenclosed Interior Stairway Work Group will draft recommend code changes, as determined necessary, to effectively communicate the code requirements based on the answers to the above questions.

(Note that all references to stairs in this reason statement are inclusive of ramps)

Preface: Over that last several code development cycles, there have been numerous proposals intended to address the technical relationships between unenclosed interior stairways, travel distance and the required numbers and location of exits. Through these various proposals, it became evident that there was considerable confusion and disagreement as to what the IBC actually requires or implies. Although some minor changes were approved over time, cumulatively, they did little to resolve the underlying technical question being what part of the three part means of egress system is an unenclosed stair between stories. More specifically: Are stairs that are required to meet means of egress design requirements such as number of exits or exit access travel distance but allowed to be unenclosed an exit or an exit access? Are stairs that are not required for means of egress and supplemental but required to be enclosed do to the number of stories connected required to be protected as a shaft or as an exit enclosure? How should travel distance be measured when unenclosed stairs are part of the path of travel? Can required exits per floor be on an adjacent floor and accessed through an open stair?

At the hearings in Palm Springs the ICC Means of Egress Code Development Committee determined that proper attention could not be provided to the issues in that forum and referred the dilemma to the ICC Code Technology Committee. The CTC agreed that the issue should be researched and assigned a study group to investigate the matter and develop a code change proposal to resolve the issues.

This proposal is based on the following concepts:

All stairs within a building are elements of the means of egress system and must comply with chapter 10

Unenclosed stairways are not exits

All Exit Stairways, to qualify as an exit, must be enclosed with a fire rated enclosure consisting of exit stair shafts and passageways based on current exit enclosure provisions

All stairways that are permitted to be open or are not required stairways for egress purposes are Exit Access Stairways

Exit access stairways must be enclosed with fire rated enclosures based on shaft provisions or may be open in accordance exceptions based on the current exceptions;

Exit access travel distance is measured to an entrance to an exit

Exit access travel distance includes the travel distance on Exit access stairways

Entrances to exits on each story are not mandatory and access to exits on other stories is permissible within certain limitations

The code change in general: All of the current exceptions that will allow for an unenclosed opening to accommodate a stairway in chapter 7 and 10 are being relocated to proposed section 1009.3 including current exceptions to sections 708,1016, and 1022. Section 708 for shaft enclosures is being modified to only address floor openings that do not contain a stairway. All enclosure requirements for stairways, exit or exit access, will originate in section 1009. All fire rated enclosure requirements for exit stairs will remain in chapter 10 and exit access stair enclosure requirements will be placed in proposed section 1009.3 based on current section 708 construction requirements. Ramps will be treated the same as stairways. The new formalized concept of Exit Access Stairway is codified in proposed section 1009.3. New definitions are proposed for Exit Access Stairway(ramp) and Interior Exit Stairway(Ramp).

Specific section change explanations:

Modifications to current section 1002- The definition of Exit is proposed to be modified to remove the fire rated construction provisions from the definition because the construction requirements belong in the code text of section 1022. The definition should be focused on what the exit is, which is simply the component that is between the exit access and the exit discharge. The list of components that qualify as exits has been retained. Additionally “Exit Enclosure” is proposed to be replaced with new terms “Interior Exit Stairway” and “Interior Exit Ramp”. This concept is that the exit stairway or ramp in its entirety comprises the exit component, not just the enclosure. New definitions are proposed for Exit Access Ramp and Stairway to support the new concept of their use in proposed section 1009.3. The concept is that all interior stairways and ramps that are not formal exits, whether they are required means of egress components or not, are exit access components.

Modifications to current section 1009-In general, the concept with the changes to 1009 and companion changes to other sections is that 1009 is the point source for all requirements relating to interior stair code requirements including opening protection requirements. Figuratively speaking all stairs lead to section 1009. New sections 1009.1 through 1009.4 have been proposed for addition to current section 1009. 1009.1 establishes that all stairways serving occupied portions of a building must comply with section 1009, whether the stairs are required or not. 1009.2 establishes that exit stairs must lead out of the building directly or through an exit passageway or exit discharge component as is currently required. Section 1009.2.1 establishes the general requirement for when an exit stairway is required. Section 1009.2.2 directs the code user to section 1022 for detailed requirements for construction of the exit stairway including the current enclosure requirements. Proposed section 1009.3 is the new section established to regulate enclosure of exit access stairs. The base line is that all exit access stairs must be enclosed with exceptions to follow. All of the current exceptions in sections 708,1016, and 1022 have been moved to this section, as exceptions to the baseline requirement for enclosure because all open stairs are exit access stairs

per this proposal. The exceptions either in text or concept are in 1009.3 with every attempt made to keep them as they are currently applied. New section 1009.3.1 and sub-sections are the construction requirements for enclosure of exit access stairs with the exit access stair would not qualify for one of the exceptions that would allow the stairway to be unenclosed. These requirements have been copied from section 708 Shaft enclosures because current code allows stairways that are not used as exits to meet shaft enclosure requirements of current section 708; current exit enclosure requirements of 1022 are only applicable to required exit stairs.
New section 1010.2-This section is proposed as simply a cross reference for ramps so that they are designed for enclosure no differently than stairways.
Modifications to current section 1016.1-The section is proposed for re-organization based on separation general provisions from specific design provisions. Exceptions 1 and 2 to 1016.1 were moved to proposed section 1016.3 due to conversion of existing section 1016.1 into a general section. Exceptions 3 and 4 to 1016.1 were deleted because the intended use of those exceptions is now captured in proposed modifications to current section 1021.1 and 1021.3.1.
Modifications to current section 1016.1- Exit access added for consistency and the table reference was changed to 1016.2 because this proposal includes changing the table number and reference section.
New section 1016.3- New section 1016.3 is proposed to separate the measurement requirements of exit access travel distance into a standalone section for better clarity and order.
Modifications to current section 1021.1-Changed the section to a general section. The first sentence proposed replacement is a mix of language clean and addition of the proposed new terms "exit and exit access stairways or ramps". The added second underlined text that proposes to require at least one exit stairway serving each story above the section is the relocation of the concept intended by current exceptions 3 and 4 to 1016.1 that have been proposed for deletion. Exceptions for open parking garages and outdoor facilities were relocated to this section. All of the specific provisions regarding required number of exits were moved from the proposed general section 1021.1 to a new section 1021.2.
Modifications to current section 1021.2-The bulk of this sections changes are to improve the format and flow of the section in keeping with moving specific requirements out of the beginning General section and laying out the requirements for number of exits and configuration in a more logical format. Proposed section 1021.3.1 has a provision that limits the access of exits on another floor to an adjacent level.
Modifications to current section 1022-The section title is proposed to be changed to the new term Interior Exit Stairways and Ramps. Some minor editorial changes have been made to the section and the new terms have been inserted into the text. The deleted last two sentences of 1022.1 (proposed 1022.2) were relocated to proposed section 1009.2.
New Section 410.5.3.1- Based on deletion of current exception #6 to 1022.1 the allowance for open stairs serving stages and support areas has been relocated to chapter 4 under the current stage exit provisions in chapter 4. This is cross referenced in proposed 1009.3 Exception #7.
New exception #3 to Section 706-Added cross-reference to top of shaft enclosure allowance in current section 707.12 to allow use for exit and exit access stair termination. This was done in conjunction with adding exit access stair enclosure requirements, modeled after shaft enclosure requirements, into section 1009.
Modifications to current section 708-Added the sentence in general section 708.1 that removes stair openings from regulation by section 708 and directs the code user to section 1009 for all stair opening protection requirements. As a companion to the intent of that change current exceptions numbers 2 (stair part), 7.2, 11 and 13 that address permissible unenclosed floor openings for stairs have been proposed for deletion and to be moved to section 1009.3: current #2 to proposed 1009.3 Exception #3; current #7.2 and #11 to proposed 1009.3 Exception #1; current #13 to proposed 1009.3 Exception #9. See below for a comparison of the suggested revisions between the Open Stairway study group recommendations and the Vertical Openings committee.
Proposed new section 708.3-Shaft enclosure construction provisions were moved out of the general section in 708.1 and into a new section titled Construction.
Modifications to current section 708.3-In current sections 1002 and 1022 the term "Exit Enclosure" is proposed to be replaced with new terms "Interior Exit Stairway" and "Interior Exit Ramp". This change is companion to that change in term.
Modification to Sections following the main proposal are correlative items to match the proposed revisions to terminology and are not intended to change the scope of the code. Sections that were also reviewed for correlation, but are not proposed to be revised include 403, 408, 410, 414, 415, 705, 707, 708, 709, 712, 715, 716. 803, 804, 909, 1006, 1007, 1015, 1023, 1024, 1025, 1026, 1027, 1028, 1110, 2606, 3007, 3008.

Comparison of CTC proposals for open stairway and vertical openings:
This is a comparison between the overlapping portions of the proposals from the Vertical opening study group and the Open stairway study group. The text in the columns is to compare requirements that may be addressing the same type of provisions. The CTC committee did not feel that there were conflicts in these two proposals, however, in the interest of providing complete information to those participating in the code change process, this matrices should make reviewing for potential conflicts much easier. The first half is the exceptions currently in 708.2 and Section 1022 (exit access stairways). The 2nd half is the construction requirements.

Open Stairway Proposals	Vertical opening Proposals
	~~Section 708~~ Section 712
	~~Shaft Enclosures~~ Vertical Openings
For Stairways – **1009.3 Exit access stairways.** Floor openings between stories created by exit access stairways shall be enclosed. **Exceptions:** (See below) *For Ramps –* **1010.2 Enclosure.** All interior exit ramps shall be enclosed in accordance with the applicable provisions of Section 1022. Exit access ramps shall be enclosed in accordance with the applicable provisions of Section 1009.3. **708.1 General.** The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Exit access stairways and ramps shall be protected in accordance with the applicable provisions of Section 1009. Interior exit stairways and ramps shall be protected in	~~**708.1**~~ **712.1 General.** The provisions of this section shall apply to the vertical opening applications listed in Sections 712.1.1 through 712.1.18. ~~shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.~~

Open Stairway Proposals	Vertical opening Proposals
accordance with the requirements of Section 1022. ~~Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.~~	
	~~**708.2 Shaft enclosure required.** Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.~~ ~~**Exceptions:**~~
	712.1.1 Smoke compartments. Vertical openings contained entirely within a shaft enclosure complying with Section 709 shall be permitted.
1009.3 - 2. Exit access stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.	~~**708.2 - 1.**~~ **712.1.2 Individual dwelling unit.** ~~A shaft enclosure is not required for~~ Unconcealed vertical openings totally within an individual residential dwelling unit and connecting four stories or less shall be permitted.
708.2 – 2. A shaft enclosure is not required in a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening ~~or stairway that is not a portion of the means of egress~~ protected according to Item 2.1 or 2.2;	~~**708.2 - 2.**~~ **712.1.3 Escalator and Stairway Openings.** ~~A shaft enclosure is not required in~~ Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~for~~ an escalator opening or stairway that is not a portion of the means of egress shall be protected according to Item ~~2.1 or 2.2~~ 712.1.3.1 or 712.1.3.2:
708.2 - 2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator ~~or stairway~~ and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.	~~**708.2 - 2.1.**~~ **712.1.3.1 Opening size.** Where the area of the ~~floor~~ vertical opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
	~~**708.2 - 2.2.**~~ **712.1.3.2 Automatic shutters**. Where the vertical opening is protected by approved power-operated automatic shutters at every penetrated floor. The shutters shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.11 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.
	~~**708.2 - 3.**~~ **712.1.4 Penetrations.** ~~A shaft enclosure is not required for p~~Penetrations by pipe, tube, conduit, wire, cable and vents shall be protected in accordance with Section ~~713.4~~ 712.4.
	~~**708.2 - 4.**~~ **712.1.5 Ducts.** ~~A shaft enclosure is not required for~~ Penetrations by ducts shall be protected in accordance with Section 716.6. Grease ducts shall be protected in accordance with the *International Mechanical Code*.
1009.3 - 4. Exit access stairways within an atrium complying with the provisions of Section 404 need not be enclosed.	~~**708.2 - 5.**~~ **712.1.6 Atriums.** In other than Group H occupancies, ~~a shaft enclosure is not required for floor openings complying with the provisions for~~ atriums ~~in~~ complying with Section 404 shall be permitted.
	~~**708.2 - 6.**~~ **712.1.7 Masonry chimney.** ~~A shaft enclosure is not required for a~~Approved masonry chimneys shall be permitted where the annular space is fireblocked at each floor level in accordance with Section 717.2.5.
1009.3 - 1. In other than Group I-2 and I-3 occupancies, exit access stairways that serve, or atmospherically communicate between, only two stories, need not be enclosed. **708.2 - 7.** In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following: 7.1. Does not connect more than two stories. ~~7.2. Is not part of the required means of egress system.~~ 7.3. Is not concealed within the construction of a wall or a floor/ceiling assembly. 7.4. Is not open to a corridor in Group I and R occupancies. 7.5. Is not open to a corridor on nonsprinklered floors in any occupancy. 7.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures. 7.7. Is limited to the same smoke compartment.	~~**708.2 - 7.**~~ **712.1.8 Two story openings**. In other than Groups I-2 and I-3~~,~~ ~~a shaft enclosure is not required for~~ a floor opening that is not used as one of the applications listed in this section shall be permitted if it complies with all the items below ~~or an air transfer opening that complies with the following:~~ ~~7.1~~ 1. Does not connect more than two stories. ~~7.2~~ 2. Does not contain a stairway or ramp required by Chapter 10. ~~Is not part of the required means of egress system~~. 3 Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments. ~~7.3~~ 4. Is not concealed within the construction of a wall or a floor/ceiling assembly. ~~7.4~~ 5. Is not open to a corridor in Group I and R occupancies. ~~7.5~~ 6. Is not open to a corridor on nonsprinklered floors ~~in any occupancy~~. ~~7.6~~ 7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures. ~~7.7. Is limited to the same smoke compartment~~.
1009.3 - 5. Exit access stairways and ramps in open parking garages that serve only the parking garage are not required to be enclosed.	~~**708.2 - 8.**~~ **712.1.9 Parking garages**. ~~A shaft enclosure is not required for~~ Automobile ramps in open and enclosed parking garages shall be permitted where constructed in accordance with Sections 406.3 and

Open Stairway Proposals	Vertical opening Proposals
	406.4, respectively.
	~~708.2 - 9.~~ 712.1.10 Mezzanine. ~~A shaft enclosure is not required for~~ vertical ~~floor~~ openings between a mezzanine complying with Section 505 and the floor below shall be permitted. ~~and the floor below.~~
	~~708.2 - 10.~~ 712.1.11 Joints. ~~A shaft enclosure is not required for~~ Joints shall be permitted where complying ~~protected by a fire-resistant joint system in accordance~~ with Section ~~714~~ 715.
1009.2 - 3. In buildings with only group B or M occupancies , exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. ~~**708.2 - 11.** A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1.~~	**~~708.2 - 11.~~ 712.1.12 Unenclosed stairs and ramps.** A ~~shaft enclosure shall not be required for~~ vertical floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1 shall be permitted.
	~~708.2 - 12.~~ 712.1.13 Floor Fire Doors. ~~Floor~~ Vertical openings shall be permitted where protected by floor fire doors in accordance with Section ~~712.8~~ 711.8.
1009.3 - 9. In Group I-3 occupancies, an exit access enclosure is not required for floor openings in accordance with Section 408.5. ~~**708.2 - 13.** In Group I-3 occupancies, a shaft enclosure is not required for floor openings in accordance with Section 408.5.~~	**~~708.2 - 13.~~ 712. 1.14. Group I-3.** In Group I-3 occupancies, ~~a shaft enclosure is not required for floor~~ vertical openings shall be permitted in accordance with Section 408.5.
	~~708.2 - 14.~~ 712.1.15 Elevators in parking garages. ~~A shaft enclosure is not required for e-~~vertical openings for elevator hoistways in open or enclosed parking garages that serve only the parking garage, and complying with 406.3 and 406.4 respectively, shall be permitted..
	~~708.2 - 15.~~ 712.1.16 Duct systems in parking garages. Vertical openings for mechanical exhaust or supply duct systems in open or enclosed parking garages~~ a shaft enclosure is not required to enclose mechanical exhaust or supply duct systems~~ complying with 406.3 and 406.4 respectively, shall be permitted to be unenclosed where ~~when~~ such duct system is contained within and serves only the parking garage.
	712.1.17 Nonfire-resistance-rated joints. Joints in or between floors without a required fire-resistance rating shall be permitted in accordance with section 711.4.1.
	~~708.2 - 16.~~ 712.1.18 Openings otherwise permitted. Vertical openings shall be ~~Where~~ permitted where allowed by other sections of this code
1009.3 - 6. Stairways serving outdoor facilities where all portions of the means of egress are essentially open to the outside.	
1009.3 - 7. Exit access stairways serving stages shall comply with Section 410.5.3.1 and 1015.6.	
1009.3 - 8. Exit access stairways serving balconies, galleries and press boxes shall comply with Section 1028.5.1.	
	SECTION 713
	SHAFT ENCLOSURES
1009.3.1 Construction. Where required, enclosures for exit access stairways shall be constructed in accordance with this section. Exit access stairway enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.	**713.1 General.** The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 711, or both.
1009.3.1.1 Materials. Exit access stairway enclosures shall be of materials permitted by the building type of construction.	**~~708.3~~ 713.2 Materials.** The shaft enclosure shall be of materials permitted by the building type of construction.
1009.3.1.2 Fire-resistance rating. Exit access stairway enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more, and not less than 1 hour where connecting less than four stories. The number of stories connected by the exit access stairway enclosures shall include any basements, but not any mezzanines. Exit access stairway enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.	**~~708.4~~ 713.3 Fire-resistance rating.** Shaft enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four *stories* or more, and not less than 1 hour where connecting less than four *stories*. The number of *stories* connected by the shaft enclosure shall include any basements but not any *mezzanines*. Shaft enclosures shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours. Shaft enclosures shall meet the requirements of Section 703.2.1.

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1009.3.1.3 Continuity. Exit access stairway enclosures shall have continuity in accordance with Section 707.5 for fire barriers or Section 712.4 for horizontal assemblies as applicable.	**~~708.5~~ 713.4 Continuity.** Shaft enclosures shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 712, or both, and shall have continuity in accordance with Section 707.5 for *fire barriers* or Section 712.4 for *horizontal assemblies* as applicable.
1009.3.1.8 Exterior walls. Where exterior walls serve as a part of an exit access stairway enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply. **~~708.6~~ 708.7Exterior walls.** Where exterior walls serve as a part of a required shaft enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply. **Exception:** Exterior walls required to be fire-resistance rated in accordance with Section 1019.2 for exterior egress balconies, Section ~~1022.6~~ 1022.7 for enclosures for interior exit stairways and ramps ~~exit enclosures~~ and Section 1026.6 for exterior exit ramps and stairways.	**~~708.6~~ 713.5 Exterior Walls.** Where exterior walls serve as a part of a required shaft enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply. **Exception:** Exterior walls required to be fire-resistance rated in accordance with Section 1019.2 for exterior egress balconies, Section 1022.6 for exit enclosures and Section 1026.6 for exterior exit ramps and stairways.
1009.3.1.4 Openings. Openings in an exit access stairway enclosure shall be protected in accordance with Section 715 as required for fire barriers. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 715.4.8.3.	**~~708.7~~ 713.6 Openings.** Openings in a shaft enclosure shall be protected in accordance with Section 715 as required for *fire barriers*. Doors shall be self- or automatic closing by smoke detection in accordance with Section 715.4.8.3.
1009.3.1.4.1 Prohibited openings. Openings other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.	**~~708.7.1~~ 713.6.1 Prohibited openings.** Openings other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures.
1009.3.1.5 Penetrations. Penetrations in a shaft enclosure shall be protected in accordance with Section 713 as required for fire barriers.	**~~708.8~~ 713.7 Penetrations.** Penetrations in a shaft enclosure shall be protected in accordance with Section 713 as required for *fire barriers*.
1009.3.1.5.1 Prohibited penetrations. Penetrations other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.	**~~708.8.1~~ 713.7.1 Prohibited penetrations.** Penetrations other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures.
1009.3.1.6 Joints. Joints in an exit access stairway enclosure shall comply with Section 714.	**~~708.9~~ 713.8 Joints.** Joints in a shaft enclosure shall comply with Section 714.
1009.3.1.7 Ducts and air transfer openings. Penetrations of an exit access stairway enclosure by ducts and air transfer openings shall comply with Section 716.	**~~708.10~~ 713.9 Duct and air transfer openings.** Penetrations of a shaft enclosure by ducts and air transfer openings shall comply with Section 716.
	~~708.11~~ 713.10 Enclosure at the bottom. (No change to text)
706.5 Continuity. Fire barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, such as the space above a suspended ceiling. The supporting construction for fire barriers shall be protected to afford the required fire-resistance rating of the fire barrier supported, except for 1-hour fire-resistance-rated incidental use area separations as required by Table 508.2 in buildings of Type IIB, IIIB and VB construction. Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 717.2 at every floor level. **Exceptions:** 1. The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided in section 415.6.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type. 2. Shaft enclosures shall be permitted to terminate at a top enclosure complying with Section 707.12. 3. Interior exit stairway and ramp enclosures required by Section 1009.2.2 and exit access stairway and ramp enclosures required by Section 1009.3 shall be permitted to terminate at a top enclosure complying with Section 707.12.	**~~708.12~~ 713.11 Enclosure at top.** A shaft enclosure that does not extend to the underside of the roof sheathing, deck or slab of the building shall be enclosed at the top with construction of the same *fire-resistance rating* as the topmost floor penetrated by the shaft, but not less than the *fire-resistance rating* required for the shaft enclosure.
	~~708.13~~ 713.12 Refuse and laundry chutes (No change to text and

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	subsections)
	~~**708.14**~~ **713.13 Elevator, dumbwaiter and other hoistways.** (No change to text and subsections)

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

ICCFILENAME:Heilsted-G8-410.5.3.1

Public Hearing Results

PART I IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Committee Reason: The revisions for stairways will clarify when exit access stairways (i.e., monumental, convenience and mezzanines stairways) are part or the means of egress, including protection, travel distance and enclosure requirements. The proposal coordinates the issue throughout the codes for this important issue. The committee proposal also coordinates with the proposal for vertical openings, FS56-09/10.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

403.5.1 Remoteness of interior exit stairways. Required interior exit stairways shall be separated by a distance not less than 30 feet (9144 mm) or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the enclosures surrounding the interior exit stairways. In buildings with three or more interior exit stairway, at least two of the interior exit stairway shall comply with this section. Interlocking or scissor stairs shall be counted as one interior exit stairway.

~~**410.5.3.1 Stairway and ramp enclosure.** Exit access stairways and ramps serving the stage are not required to be enclosed. Exit access stairways serving the lighting and access catwalks, galleries and gridirons are not required to be enclosed.~~

1007.6.2 Separation. Each area of refuge shall be separated from the remainder of the story by a smoke barrier complying with Section 709 or a horizontal exit complying with Section 1025. Each area of refuge shall be designed to minimize the intrusion of smoke.

Exception: Areas of refuge located within an enclosure complying with Sections 1009.3.1 for exit access stairways or Section 1022.2 for interior exit stairways.

1009.3 Exit access stairways. Floor openings between stories created by exit access stairways shall be enclosed.

Exceptions:

1 – 7. *(No change to current text)*
8. Exit access stairways serving stages, platforms and technical production areas ~~complying with Section 410.5.3.1 and 1015.6~~ in accordance with Section 410.6.2 are not required to be enclosed.

9 – 10 *(No change to current text)*

(Portions of proposal not shown remain unchanged)

Commenter's Reason: 403.5.1: When Section 403.5.1 was put in, the intent was to get separation between the enclosures to prevent a catastrophic event from taking out multiple exit enclosures. This section is specific to the enclosures not the stairs themselves. This modification is intended to make it clear that the measurement for separation is to be taken from the enclosure, not the stair itself or the door into the enclosure.

410.5.1 and 1009.3: G67 revised the provisions for stages in Section 410.5.3 and 1015.6 and deleted section 410.5.3 entirely. G67 was approved as submitted without any opposition and developed with the cooperation of theater designers. In addition, G67 has deleted the definition for fly galleries and gridirons and replace them with a definition for technical production areas. G67 addressed the exit and exit access stairway questions in new Section 410.6 in a manner that works with the new format proposed in E5. G67 addresses un-enclosed stairways serving stages in new section 410.6.2 sot the revision to exception #8 to 1009.3 correlates with the new section and the new term from G67 "technical production area". Since this change was not opposed in any way it is assumed that it will be approved on the consent agenda and proposed section 410.5.1 in E5 will not be necessary. There is concern that the code correlating committee may not meet prior to the final action hearing and may not view removing 410.5.1 from the code if G67 is passed.

1007.6.2: The exception to 1007.6.2 was modified to make it clear that a stair enclosure must be fire rated in compliance with the specific code sections that specify how to fire rate an exit or exit access stair. This is being proposed to make it clear that a non-rated architectural enclosure around a stair, that is permitted to be un-enclosed, is not acceptable to be used in place of a rated enclosure wall to protect an area of refuge.

Public Comment 2:

Mike Ashley C.B.O. representing the Alliance for Fire & Smoke Containment & Control, Inc. requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXIT. That portion of a means of egress system which is separated from other interior building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel spaces of a between the exit access and the exit discharge. Exits ~~components~~ include exterior exit doors at the level of exit discharge, vertical exit enclosures ~~interior exit stairways, interior exit ramps,~~ exit passageways, horizontal exits, exterior exit stairways, and exterior exit ramps and horizontal exits.

~~**EXIT ACCESS STAIRWAY.** An interior stairway that is not a required interior exit stairway.~~

EXIT ENCLOSURE. An exit component that is separated from other interior spaces of a building or structure by fireresistance-rated construction and opening protectives, and provides for a protected path of egress travel in a vertical or horizontal direction to the exit discharge or the public way.

SECTION 1009 (IFC [B] 1009)
STAIRWAYS

1009.3 (IFC [B] 1009.3) Exit access stairways. Floor openings between stories created by exit access stairways shall be enclosed.

~~**Exceptions:**~~

1. ~~In other than Group I-2 and I-3 occupancies, exit access stairways that serve, or atmospherically communicate between, only two stories, are not required to be enclosed.~~
2. ~~Exit access stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.~~
3. ~~In buildings with only Group B or M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.~~
4. ~~In other than Groups B and M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the floor opening does not connect more than four stories, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.~~
5. ~~Exit access stairways within an atrium complying with the provisions of Section 404 are not required to be enclosed.~~
6. ~~Exit access stairways and ramps in open parking garages that serve only the parking garage are not required to be enclosed.~~
7. ~~Stairways serving outdoor facilities where all portions of the means of egress are essentially open to the outside are not required to be enclosed.~~
8. ~~Exit access stairways serving stages complying with Section 410.5.3.1 and 1015.6 are not required to be enclosed.~~
9. ~~Stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.~~
10. ~~In Group I-3 occupancies, exit access stairways constructed in accordance with Section 408.5 are not required to be enclosed.~~

SECTION 1016 (IFC [B] 1016)
EXIT ACCESS TRAVEL DISTANCE

1016.1 (IFC [B] 1016.1) General. Travel distance within the exit access portion of the means of egress system shall be in accordance with this section.

Exceptions:

1. Travel distance in open parking garages is permitted to be measured to the closest riser of open exit stairways.
2. In outdoor facilities with open exit access components and open exterior exit stairways or exit ramps, travel distance is permitted to be measured to the closest riser of an exit stairway or the closest slope of the exit ramp.
3. In other than occupancy Groups H and I, the exit access travel distance to a maximum of 50 percent of the exits is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps when connecting a maximum of two stories. The two connected stories shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.
4. In other than occupancy Groups H and I, exit access travel distance is permitted to be measured from the most remote point within a building to an exit using unenclosed exit access stairways or ramps in the first and second stories above grade plane in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. The first and second stories above grade plane shall be provided with at least two means of egress. Such interconnected stories shall not be open to other stories.
5. Where applicable, travel distance on unenclosed exit access stairways or ramps and on connecting stories shall also be included in the travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stairway.

SECTION 1022 (IFC [B] 1022)
EXIT ENCLOSURES INTERIOR EXIT STAIRWAYS AND RAMPS

1022.2 (IFC [B] 1022.2) Enclosures required Construction. Enclosures for interior exit stairways and interior exit ramps shall be enclosed with constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. Interior exit stairway and ramp Exit enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps exit enclosure shall include any basements, but not any mezzanines. Interior exit stairways and ramps exit enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. Exit enclosures shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An exit enclosure shall not be used for any purpose other than means of egress.

Exception: Interior exit stairways and ramps in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.

SECTION 708
SHAFT ENCLOSURES

708.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this section.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening protected according to Item 2.1 or 2.2.
   2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. The shutters shall be of noncombustible construction and have a fireresistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.
3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 713.4.
4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 716.6. Grease ducts shall be protected in accordance with the International Mechanical Code.
5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with he provisions for atriums in Section 404.
6. A shaft enclosure is not required for approved masonry chimneys where annular space is fireblocked at each floor level in accordance with Section 717.2.5.
7. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   7.1. Does not connect more than two stories.
   7.2. Is not concealed within the construction of a wall or a floor/ceiling assembly.
   7.3. Is not open to a corridor in Group I and R occupancies.
   7.4. Is not open to a corridor on nonsprinklered floors in any occupancy.
   7.5. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   7.6. Is limited to the same smoke compartment.
8. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.
9. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 714.
11. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 3 or 4 in Section 1016.1.

~~11~~12. Floor openings protected by floor fire doors in accordance with Section 712.8.

13. In Group I-3 occupancies, a shaft enclosure is not required for floor openings in accordance with Section 408.5.

~~12~~14. A shaft enclosure is not required for elevator hoistways in open or enclosed parking garages that serve only the parking garage.

~~13~~15. In open or enclosed parking garages a shaft enclosure is not required to enclose mechanical exhaust or supply duct systems when such duct system is contained within and serves only the parking garage.

~~14~~16. Where permitted by other sections of this code.

SECTION 1007 (IFC [B] 1007)
ACCESSIBLE MEANS OF EGRESS

1007.6 (IFC [B] 1007.6) Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1. Every required area of refuge shall have direct access to a stairway within an exit enclosure complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4. Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier.

Exceptions:

1. A stairway serving an area of refuge is not required to be enclosed where permitted in Sections 1016.1 and 1022.1.
2. A smokeproof enclosure is not required for an elevator lobby used as an area of refuge where the elevator is not required to be enclosed.

SECTION 1028 (IFC [B] 1028)
ASSEMBLY

1028.5.1 (IFC [B] 1028.5.1) Enclosure of openings. Interior stairways and other vertical openings shall be enclosed in an exit enclosure in accordance with Section 1009, as provided in Section 1022.1, except that stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities. At least one accessible means of egress is required from a balcony, gallery or press box level containing accessible seating locations in accordance with Section 1007.3 or 1007.4.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: With over 260 changes to this proposal many of the changes are technical and were not discussed at the hearings. Many of the changes reduce the level of protection for exits and areas of refuge. If changes are to be made to the codes they should only be made to make the buildings safer for the occupants and for protection of property.

Public Comment 3:

David Collins, FAIA, Cincinnati, Ohio representing the American Institute of Architects, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1022.2 (IFC [B] 1022.2) Construction. Enclosures for interior exit stairways and ramps shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. Interior exit stairway and ramp enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps shall include any basements, but not any mezzanines. Interior exit stairways and ramps shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.

Exceptions:

1. Interior exit stairways and ramps in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.
2. Interior exit stairways or ramp located in an atrium that complies with Section 404.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: In the reasons for disapproval of G52-09/10, the committee commented that it wasn't clear how that change would coordinate with E5-09/10. This change establishes that an exit stairway or ramp located in an atrium would be acceptable as an exit.

Public Comment 4:

Jason Thompson, National Concrete Masonry Alliance, representing Masonry Allinaces for Codes and Standards, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXIT. That portion of a means of egress ~~system~~ which is separated from interior spaces of a building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel between the exit access and the exit discharge, or which provides a refuge area, or which discharges directly to the exterior. Exit components include exterior exit doors at the level of exit discharge, interior exit stairways, interior exit ramps, exit passageways, horizontal exits, exterior exit stairway, and exterior exit ramps.

EXIT ENCLOSURE. An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a vertical or horizontal direction to the exit discharge or the public way.

INTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits, ~~or~~ exit access travel distance or exit capacity, and provides for a protected path of egress travel to the exit discharge or public way.

INTERIOR EXIT STAIRWAY. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits, ~~or~~ exit access travel distance or exit capacity, and provides for a protected path of egress travel to the exit discharge or public way.

REFUGE AREA. An area within a building or structure that is accessed through a horizontal exit and provides an area adequate to accommodate the occupant load of the area plus the occupant load served by the horizontal exit.

SECTION 1009 (IFC [B] 1009)
STAIRWAYS

1009.2.1 (IFC [B] 1009.2.1) Where required. Interior exit stairways shall be included, as necessary, to meet one or more means of egress design requirements, such as required number of exits, ~~or~~ exit access travel distance or exit capacity.

SECTION 1021 (IFC [B] 1021)
NUMBER OF EXITS AND EXIT CONFIGURATION

1021.1 (IFC [B] 1021.1) General. Each story and occupied roof shall have the minimum number of exits, or access to exits, as specified in this section. The required number of exits, or exit access stairways or ramps providing access to exits, from any story shall be maintained ~~until arrival at grade~~ to the exit discharge or a public way. Exits or access to exits from any story shall be configured in accordance with this section. Each story above the second story of a building shall have a minimum of one interior or exterior exit stairway, or interior or exterior exit ramp. At each story above the second story that requires a minimum of three or more exits, or access to exits, a minimum of 50% of the required exits shall be interior or exterior exit stairways, or interior or exterior exit ramps.

Exceptions:

1. Interior exit stairways and interior exit ramps are not required in open parking garages where the means of egress serves only the open parking garage.
2. Interior exit stairways and interior exit ramps are not required in outdoor facilities where all portions of the means of egress are essentially open to the outside.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: We have submitted this Public Comment requesting approval as modified of this Code Change because of our concerns about the significant changes in the definition for "Exit" and the deletion of the definition for "Exit Enclosure." We have also made some editorial clarifications to the definitions for "Interior Exit Ramp" and "Interior Exit Stairway" and added a new definition for "Refuge Area." And we made an editorial change to Sections 1009.2.1 and 1021.1.

We believe the revisions we have proposed provide significant improvements to this very comprehensive Code Change Proposal. Regarding the definition for "Exit," we strongly believe that the original wording that has been deleted in this Code Change Proposal needs to be reinstated as it relates to the description of the exit being separated from the interior of the building by fire-resistance rated construction in order to provide a protected path of egress travel. We have also added some additional language that addresses the functioning of a horizontal exit as a nontraditional exit in the sense that it does not provide a protected path to the exterior or discharge directly to the exterior. Instead it provides a refuge area for the occupants to evacuate into to escape the fire on the side of the horizontal exit wall from which they are evacuating. Thus, there was a need to provide a definition for "refuge area" based on the provisions contained in Section 1025 Horizontal Exits. This definition will make it clear that the "refuge area" is different than the "area of refuge" used in the accessible means of egress requirements in Section 1007.

We have also made it clear that an exit may simply discharge to the exterior such as is the case for an exterior exit door. We have also reinstated the definition for "Exit Enclosure" since we believe it provides guidance to the users of the code as to what its function is since it is a critical means of egress component. Both the term "exit" and "exit enclosure" have been used successfully in the code for many years and provide important guidance to the users of the code in determining how they fit into the total means of egress system. We see no justification for the drastic changes to the definition for "Exit" and the deletion of the definition of "Exit Enclosure" as helping to further clarify the code requirements for means of egress. In fact, it is our concern that they may, in fact, actually confuse the application of Chapter 10 for means of egress, especially for novice users of the code.

Regarding our proposed revisions to the definitions for "Interior Exit Ramp" and "Interior Exit Stairway," we simply added another means of egress design requirement, namely that of exit capacity, which is just as critical as the other two components mentioned in the definitions for number of exits and exit access travel distance for consideration when designing means of egress systems utilizing these elements. Similarly, we have revised Section 1009.2.1 to add that additional design component for exit capacity for the same reasons. In this case, it is even more important to include it since this is the charging section for requiring interior exit stairways. If we are going to provide a laundry list, then we believe the laundry list should contain the most important elements of the design requirements for means of egress so as not to mislead the user.

In Section 1021.1 we made an editorial revision which we believe greatly clarifies to what extent the required number of exits and exit access stairways and ramps providing access to exits from any story shall be maintained. We deleted the phrase "until arrival at grade" since it seems to be somewhat general and subjective and does not clearly state where the egress system is to terminate. We believe the phrase we have substituted "to the exit discharge" is much more descriptive and concise. Furthermore, the term "exit discharge" is currently defined in Section 1002 as: "That portion of a means of egress system between the termination of an exit and a public way."

In summary, we believe the modifications we have proposed in this Public Comment will help to improve the use, application, interpretation, and enforcement of the means of egress requirements contained in Chapter 10 of the IBC and should be approved by the Class A voting members.

Public Comment 5:

Gerald Anderson, Overland Park, KS, representing self, requests Disapproval.

Commenter's Reason: I have read this code change a number of times and find it very difficult to follow. It would appear that the majority of the code change is simply an introduction of new terms and some reorganization. My principal concern with this code change is that I don't believe it does anything to add clarity to the code. It is almost as if change is being proposes for the sake of change.

My other concern is about Section 1021.2 Number of exits. This section essentially states that two exits, or exit access stairways from any story or occupied roof are required when any of the following conditions exists.

1. The occupant load exceeds one of the values in Table 1021.2.
2. The exit access travel distance exceeds that specified in Table 1021.2 as determined in accordance with the provisions of Section 1016.1.
3. Helistop landing areas located on buildings or structures shall be provided with tow exits, or exit access stairways or ramps providing access to exits.

My concern is with #2. I don't know why we would allow someone to use an exit access stairway once they have exceeded the allotted travel distance in Table 1021/2. I think that the 2009 IBC would require one to enter an Exit when one has reached the maximum travel distance.

#3 also doesn't fit. This language is probably more appropriately placed in the body of the first paragraph.

In the last paragraph, of the same section it states: Where one exit or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2 for that occupancy. Where applicable, cumulative occupant loads form adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. Basements with one exit shall not be located more than one story below grad plane.

As written, I think that this paragraph, might allow mixed occupancies (several tenants) on the same floor to have one exit even though the cumulative occupant load would exceed that with is specified in Table 1021.2.

With regard to the reference back to Section 1004.1, I have no idea why the proponent is directing the code use back to this section.

Public Comment 6:

Toni Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council (IFC), requests Disapproval.

Commenter's Reason: Overall, the concept that all interior stairways and ramps that are not formal exits, whether they are required means of egress components or not, are exit access components is an important clarification to the Code. However, while the revisions in this proposal for stairways should clarify when exit access stairways are part or the means of egress, and may clarify travel distance and enclosure requirements, there are some areas where further review and clarification is necessary.

For example, with the changes proposed to the definition of "Exit", the corresponding revisions to Section 708 dealing with the Shaft provisions deletes the requirement in the general article to construct any shaft enclosures as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both, but not just for exits, for all applications,. While this may suit the objectives of this proposal, it is not appropriate for any other condition where shaft construction is required by the I-Codes. This aspect of the proposal has certainly not been coordinated with the IBC, IFC, IRC, IMC, etc... The new section 708.3 does contain the requirement, but it is not clear from its location if it applies to shaft enclosures in 708.2. At a minimum, the new 708.3 needs to be relocated to 708.2.

In the same vein, proposed section 1009.3 is the new section established to regulate enclosure of exit access stairs. The justification indicates that the base line is that all exit access stairs must be enclosed, with a list of exceptions that follow. All of the current exceptions in sections 708,1016, and 1022 have been located as exceptions to the baseline requirement for enclosure because all open stairs are exit access stairs per this proposal. If that is the case, then the revisions to the definition of "Exit" are not needed. In addition, some of the exceptions in 1009.3 differ slightly from the existing provisions. These need to be explored further to determine whether they are consistent with the intent of the changes.

Lastly, a performance approach to designing exits exists in the ICC process under the Performance Code. These new provisions need to be evaluated against what the Performance Code would currently have required. Certainly, the ICCPC would require far more evaluation of the specific conditions to ensure adequate safe egress from the building. By including these provisions for unenclosed stairs directly into the IBC, it applies to ALL buildings, regardless of size, use, or whether sprinklered or unsprinklered. Chapter 19 of the IPCC addresses means of egress. The general performance requirement is as follows:

> **"1901.3.1 General.** The construction, arrangement and number of means of egress, exits and safe places for buildings shall be appropriate to the travel distance, number of occupants, occupant characteristics, building height, and safety systems and features."

Consequently, the minimum requirements in the ICCPC appear to be more comprehensive than what this proposal would create in the IBC. The proposal needs to be re-evaluated against existing ICCPC requirements before these changes can be made to the IBC.

Public Comment 7:

William E. Koffel, P.E., Koffel Associates, Inc., requests Disapproval.

Commenter's Reason: Without a doubt, the means of egress provisions in the IBC could be cleaned up and reformatted. Unfortunately, E5-09/10 is not the answer and there are too many issues and unintended technical changes to correct by a series of Public Comments. Therefore, I am left with no option other than to request Disapproval for the following reasons. I suspect that some will argue that E5-09/10 should be approved despite the problems identified below because of the improvements contained in the proposal. However, the technical changes and concerns expressed below indicate that publishing the 2012 IBC as proposed in E5-09/10 will only result in a new set of problems and unintended technical changes.

The fact that exits are typically required to be separated from other spaces to provide a protected path of travel is a fundamental concept of the three part means of egress system as defined in the IBC. The fact that the current definition for "exit" says "as required" indicates that the separation is only necessary "as required" by other sections of the Code. In the Committee Reason for Disapproval of E3-09/10 the Committee stated that "The text about separation requirements should not be removed because it makes the user look for separation requirements." The action on E5-09/10 is contradictory to the Committee Action on E3-09/10. It should also be noted that the definitions for interior exit ramp and interior exit stairway include the concept of "protected path of travel" that is proposed to be deleted from the definition of "exit."

The definitions for exit access ramp and exit access stairway limit the phrases to "interior" ramps and stairways. What are the requirements for exterior exit access ramps and exterior exit access stairways? Although exterior ramps and stairs are often either exits or exit discharge components, it is possible that they might also be exit access components.

Why does Section 1009, which is intended to apply to all stairways, address interior exit stairways (with a reference to Section 1022 for interior exit stairways) and interior exit access stairways but there is no reference to exterior exit stairs? A similar question applies to Section 1010 for ramps which also contains no reference to exterior exit ramps (Section 1022).

Section 1021 relaxes the Code by allowing either exits or exit access stairways (or ramps) from each story. In many cases the current Code requires each story to be served by at least two or more exits (existing 1021.1). The proposed Section 1021.2 permits exits or exit access components to be provided. Even in larger occupant load areas, Section 1021.2.1 would permit three or four exit access stairways (or ramps) in lieu of the current Code requirement for three or four exits.

The proposed changes to Section 403 where "exit enclosure" is changed to "interior exit stairways" results in the requirements not being applicable to interior exit ramps and exit passageways. Was this technical change intended?

Although rather circuitous, the requirements for fire barriers separating exit enclosures also applied to exit passageways. The proposed revision to Section 707.3.2 no longer includes exit passageways since there is no direct or circuitous reference to Section 1023 for exit passageways.

It is not clear how Section 707.6 provisions for openings in enclosures for exit access stairways and ramps will truly apply. The intent, most likely, is to only apply to when an enclosure is required for an exit access stairway or ramp. However, the proposed text does not really say that.

The proposed revision to section 1015.2.1 does not include interior exit ramps whereas the current text applies to all exit enclosures.

May the refuge area for a horizontal exit lead to an exit passageway instead of an interior exit stairway or ramp? The proposed revisions to Section 1025.4 would not permit such an arrangement.

Deleting the word "exit" in Item 1.2 of Exception No. 1 to Section 1027.1 and Item 2.1 of Exception No. 2 of Section 1027.1 results in less clarity in the Code. Retaining the word "exit" would clarify what enclosure is being referenced.

Final Action: AS AM AMPC____ D

E5-09/10, Part II

[F]403.3.1.1, [F]414.7.2, [F]415.8.4.6.2, [F]909.5; (IFC 909.5, 914.3.1.1, 1803.12.1.2, 2705.4.4); (IMC [F]513.5)

Proposed Change as Submitted

Proponent: Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC)

PART II – IFC

Revise as follows:

SECTION 403
HIGH-RISE BUILDINGS

[F] 403.3.1.1 (IFC 914.3.1.1.1) Riser location. Sprinkler risers shall be placed in interior exit stairways and ramps ~~exit enclosures~~ that are remotely located in accordance with Section 1015.2.

SECTION 414
HAZARDOUS MATERIALS

[F] 414.7.2 (IFC 2705.4.4) Dispensing, use and handling. Where hazardous materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 are transported through corridors ~~or exit enclosures~~, interior exit stairways or ramps or exit passageways there shall be an emergency telephone system, a local manual alarm station or an approved alarm-initiating device at not more than 150-foot (45 720 mm) intervals and at each exit and exit access doorway throughout the transport route. The signal shall be relayed to an approved central, proprietary or remote station service or constantly attended on-site location and shall also initiate a local audible alarm.

SECTION 415
GROUPS H-1, H-2, H-3, H-4 AND H-5

[F] 415.8.4.6.2 (IFC 1803.12.1.2) ~~Exit access~~ Corridors and interior exit stairways and ~~exit~~ ramps ~~enclosures~~. Emergency alarms for ~~exit access~~ corridors ~~and exit enclosures~~ interior exit stairways and ramps and exit passageways shall comply with Section 414.7.2.

SECTION 909
SMOKE CONTROL SYSTEMS

[F] 909.5 (IFC 909.5, IMC [F] 513.5) Smoke barrier construction. Smoke barriers shall comply with Section 710, and shall be constructed and sealed to limit leakage areas exclusive of protected openings. The maximum allowable leakage area shall be the aggregate area calculated using the following leakage area ratios:

1. Walls: $A/A_w = 0.00100$
2. Interior exit ~~enclosures~~ stairways and ramps and exit passageways: $A/A_w = 0.00035$
3. Enclosed exit access stairways and ramps and all other shafts: $A/A_w = 0.00150$
4. Floors and roofs: $A/A_F = 0.00050$

where:

A = Total leakage area, square feet (m^2).
A_F = Unit floor or roof area of barrier, square feet (m^2).
A_w = Unit wall area of barrier, square feet (m^2).

The leakage area ratios shown do not include openings due to doors, operable windows or similar gaps. These shall be included in calculating the total leakage area.

Reason: See E5-09/10 Part I.

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

ICCFILENAME:Heilsted-G8-410.5.3.1

Public Hearing Results

PART II- IFC
Committee Action: **Approved as Submitted**

Committee Reason: The changes to sections controlled by the International Fire Code should be revised to be consistent with the terminology and intent in Part I.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

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

Commenter's Reason: See E5-09/10 Part I.

Public Comment 2:

Mike Ashley C.B.O. representing the Alliance for Fire & Smoke Containment & Control, Inc., requests Approval as Submitted.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 3:

David Collins, FAIA, Cincinnati, Ohio representing the American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 4:

Jason Thompson, National Concrete Masonry Alliance, representing Masonry Alliances for Codes and Standards, requests Approval as Submitted.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 5:

Gerald Anderson, Overland Park, KS, representing self, requests Disapproval.

Commenter's Reason: See E5-09/10 Part I.

Public Comment 6:

Toni Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council (IFC), requests Disapproval.

Commenter's Reason: See E5-09/10 Part I**.**

Public Comment 7:

William E. Koffel, P.E., Koffel Associates, Inc., requests Disapproval.

Commenter's Reason: See E5-09/10 Part I.

Final Action: AS AM AMPC____ D

E6-09/10

505.3, 505.4, 1002.1, 1006.3, 1011.1, 1015 (IFC [B] 1002.1, 1006.3, 1011.1, 1015)

Proposed Change as Submitted

Proponent: Anne VonWeller, Murray City, and Ron Clements, Chesterfield County Building Inspection Department, representing the Utah Chapter of the International Code Council

Revise as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

EXIT ACCESS ~~DOORWAY~~ POINT. A door or access point along the path of egress travel within the exit access from an occupied room, area or space where the path of egress enters an intervening room, corridor, unenclosed exit access stair or unenclosed exit access ramp.

SECTION 1015 (IFC [B] 1015.1)
EXITS AND EXIT ACCESS ~~DOORWAYS~~ POINTS FOR ROOMS AND SPACES

1015.1 (IFC [B] 1015.1) Number required ~~Exit or exit access doorways from spaces.~~ Two exits or exit access points ~~doorways~~ from any room or space shall be provided where one of the following conditions exists:

Exception: Group I-2 occupancies shall comply with Sections 1014.2.2 through 1014.2.7

1. The occupant load of the room or space exceeds one of the values in Table 1015.1.

   Exception: In Groups R-2 and R-3 occupancies, one exit or exit access point ~~means of egress~~ is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

2. The common path of egress travel exceeds one of the limitations of Section 1014.3.
3. Where required by Section 1015.3, 1015.4, 1015.5, 1015.6 or 1015.6.1.

Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.

TABLE 1015.1 (IFC [B] 1015.1)
ROOMS & SPACES WITH ONE EXIT OR EXIT ACCESS ~~DOORWAYS~~ POINT

(*Portions of table not shown remain unchanged)*

1015.1.1 (IFC [B] 1015.1.1) Additional ~~Three or more~~ exits or exit access ~~doorways~~ points. Three exits or exit access ~~doorways~~ points shall be provided from any room or space with an occupant load of 501 to 1,000. Four exits or exit access doorways shall be provided from any room or space with an occupant load greater than 1,000.

1015.2 (IFC [B] 1015.2) Availability ~~Exit or exit access doorways arrangement~~. Required exits and exit access points shall be located in a manner that makes their availability obvious. Exits and exit access points shall be unobstructed at all times. Exit and exit access ~~doorways~~ points shall be arranged in accordance with Section~~s~~ 1015.3.~~1015.2.1 and 1015.2.2.~~

~~1015.2.1~~ 1015.3 (IFC [B] ~~1015.2.1~~ 1015.3) Arrangement ~~Two exits or exit access doorways~~. Where two or more exits or exit access ~~doorways~~ points are required from any portion of the exit access, at least two of the exit doors or exit access ~~doorways~~ points shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access ~~doorways~~ points. For doors and doorways such distance shall be measured from the center of doors and openings. For unenclosed interior stairways and ramps such distance shall be measured from the center of the first stair riser or beginning of ramp slope. Interlocking or scissor stairs shall be counted as one exit or exit access point ~~stairway~~.

Exceptions:

1.~~2.~~ Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance ~~of the exit doors or exit access doorways~~ shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

2.~~1.~~ Where exit enclosures are provided ~~as a portion of the required exit~~ and such exit enclosures are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required ~~exit~~ separation distance shall be measured along the shortest direct line of egress travel within the corridor.

~~**1015.2.2 (IFC [B] 1015.2.2) Three or more exits or exit access doorways.** Where access to three or more exits is required, at least two exit doors or exit access doorways shall be arranged in accordance with the provisions of Section 1015.2.1.~~

~~1015.3~~ 1015.4 (IFC [B] ~~1015.3~~ 1015.4) Boiler, incinerator and furnace rooms. Two exit access ~~doorways~~ points are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m^2) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422 000 KJ) input capacity. Where two exit access ~~doorways~~ points are required, one is permitted to be a fixed ladder or an alternating tread device. Exit access ~~doorways~~ points shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

~~1015.4~~ 1015.5 (IFC [B] ~~1015.4~~ 1015.5) Refrigeration machinery rooms. Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two exits or exit access ~~doorways~~ points. Where two exit access ~~doorways~~ points are required, one such ~~doorways~~ points is permitted to be served by a fixed ladder or an alternating tread device. Exit access ~~doorways~~ points shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of room.

All portions of machinery rooms shall be within 150 feet (45 720 mm) of an exit or exit access ~~doorways~~ point. An increase in travel distance is permitted in accordance with Section 1016.1.

Doors shall swing in the direction of egress travel, regardless of the occupant load served. Doors shall be tight fitting and self-closing.

~~1015.5~~ 1015.6 (IFC [B] ~~1015.5~~ 1015.6) Refrigerated rooms or spaces. Rooms or spaces having a floor area larger than 1,000 square feet (93m^2), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two exits or exit access ~~doorways~~ points.

Travel distance shall be determined as specified in Section 1016.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an exit or exit access ~~doorways~~ points where such rooms are not protected by an approved automatic sprinkler system in accordance with Section 903.3.1.1. Egress is allowed through adjoining refrigerated rooms or spaces.

Exception: Where using refrigerants in quantities limited to the amounts based on the volume set forth in the International Mechanical Code.

~~1015.6~~ 1015.7 (IFC [B] ~~1015.6~~ 1015.7) Stage means of egress. Where two ~~means of egress~~ exits or exit access points are required, based on the stage size or occupant load, one ~~means of egress~~ exit or exit access point shall be provided on each side of the stage.

~~1015.6.1~~ 1015.7.1 (IFC [B] ~~1015.6.1~~ 1015.7.1) Gallery, gridiron and catwalk means of egress. The means of egress from lighting and access catwalks, galleries and gridirons shall meet the requirements for occupancies in Group F-2.

Exceptions:

1. A minimum width of 22 inches (559 mm) is permitted for lighting and access catwalks.
2. Spiral stairs are permitted in the means of egress.
3. Stairways required by this subsection need not be enclosed.
4. Stairways with a minimum width of 22 inches (559 mm), ladders, or spiral stairs are permitted in the means of egress.
5. A second ~~means of egress~~ exit or exit access point is not required from these areas where a means of escape to a floor or to a roof is provided. Ladders, alternating tread devices or spiral stairs are permitted in the means of escape.
6. Ladders are permitted in the means of egress.

SECTION 505
MEZZANINES

505.3 Egress. Each occupant of a mezzanine shall have access to at least two independent exits ~~means of egress~~ where the common path of egress travel exceeds the limitations of Section 1014.3. Where an unenclosed stairway provides a means of exit access from a mezzanine, the maximum travel distance includes the distance traveled on the stairway measured in the plane of the tread nosing. Accessible means of egress shall be provided in accordance with Section 1007.

Exception: A single exit or exit access point ~~means of egress~~ shall be permitted in accordance with Section 1015.1.

505.4 Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. A mezzanine having two or more exits or exit access points ~~means of egress~~ is not required to be open to the room in which the mezzanine is located if at least one exit or exit access point ~~of the means of egress~~ provides direct access to an exit from the mezzanine level.
3. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the aggregate floor area of the enclosed space does not exceed 10 percent of the mezzanine area.
4. In industrial facilities, mezzanines used for control equipment are permitted to be glazed on all sides.
5. In occupancies other than Groups H and I, that are no more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a mezzanine having access to two or more exits ~~means of egress~~ shall not be required to be open to the room in which the mezzanine is located.

SECTION 1006
MEANS OF EGRESS ILLUMINATION

1006.3 (IFC [B] 1006.3) Illumination emergency power. The power supply for means of egress illumination shall normally be provided by the premises' electrical supply.

In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Aisles and unenclosed ~~egress~~ exit access stairways and ramps in rooms and spaces that require two or more exits or exit access points. ~~means of egress~~.
2. Corridors, exit enclosures and exit passageways in buildings required to have two or more exits.
3. Exterior egress components at other than their levels of exit discharge until exit discharge is accomplished for buildings required to have two or more exits.
4. Interior exit discharge elements, as permitted in Section 1027.1, in buildings required to have two or more exits.
5. Exterior landings as required by Section 1008.1.6 for exit discharge doorways in buildings required to have two or more exits.

The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Chapter 27.

SECTION 1011
EXIT SIGNS

1011.1 (IFC [B] 1011.1) Where required. Exits and exit access ~~doors~~ points shall be marked by an approved exit sign readily visible from any direction of egress travel. The path of egress travel to exits and within exits shall be marked by readily visible exit signs to clearly indicate the direction of egress travel in cases where the exit or the path of egress travel is not immediately visible to the occupants. Intervening means of egress doors within exits shall be marked by exit signs. Exit sign placement shall be such that no point in an exit access corridor or exit passageway is more than 100 feet (30 480mm) or the listed viewing distance for the sign, whichever is less, from the nearest visible exit sign.

Exception:

1. Exit signs are not required in rooms, spaces or areas which require only one exit or exit access point.
2. Main exterior exit doors or gates that are obviously and clearly identifiable as exits need not have exit signs where approved by the building official.
3. Exit signs are not required in occupancies in Group U and individual sleeping units or dwelling units in Group R-1, R-2 or R-3.
4. Exit signs are not required in dayrooms, sleeping rooms or dormitories in occupancies in Group I-3.
5. In occupancies in Groups A-4 and A-5, exit signs are not required on the seating side of vomitories or openings into seating areas where exit signs are provided in the concourse that are readily apparent from the vomitories. Egress lighting is provided to identify each vomitory or opening within the seating area in an emergency.

Reason:
Background

The 2009 edition added a definition for 'exit access doorway' to clarify that the provisions for exit access doorways applied to components where there is not always a doorway, such as the transition point along the path of egress to unenclosed interior stairways and ramps.

During the discussions of the CTC's Unenclosed Stairway Work Group it was recognized a more clear term was needed to describe the 'point' where requirements such as those for number, availability, and arrangement should be applied. 'Exit Access Point' was very clear and straight forward.

Most of the language in the above proposal was developed in the study group. However, it was determined 'exit access point' was beyond the scope of the specific study. There was a good deal of support for the concept and we were encouraged to bring it forward as a separate change.

The Changes

The one word change in the definition going from 'doorway' to 'point' is the focus of the change. The new term is carried throughout the change. Also, 'within the exit access' was added to make clear an 'exit access point' in only applicable in those portions of the means of egress.

The name of the section was expanded to assist users and avoid confusion with Section 1020.

'Means of egress' was changed to 'exit or exit access point' in several places because means of egress applies to all occupied portions of a building. The change occurs where a term refers to the number of required components which is more appropriate than the general term.

In 1015.3 we have made it clear exactly where to measure the required separation distance between egress components in the exit access. How many debates have been about "Do we measure to the center of the door? The closest edge? The furthest edge? We chose the center. This becomes more important to pin down when now using the concept of 'point'.

Changes to 505, 1006.3, and 1011.1 are for correlation with those in 1015.

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

ICCFILENAME:Vonweller-E3-1023.6

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The term "transition point" would address travel distance measurements at open stairway; however, it would be confusing for situations where there is a door on a stairway enclosure.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Anne vonWeller, Murray City, Utah, representing Utah Chapter ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1015.1.1 (IFC 1015.1.1) Additional exits or exit access points. Three exits or exit access points shall be provided from any room or space with an occupant load of 501-1,000. Four exits or exit access points ~~doorways~~ shall be provided from any room or space with an occupant load greater than 1,000.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: The reason printed in the report of the hearing does not clearly identify the committee's specific reason for disapproving this item. The proponents maintain their original reasons for this change. This change is especially beneficial if E5-09/10 is approved with the more comprehensive understanding of exit access stairways and the relationship between them and other aspects of egress design.

The purpose for modification is to correct a simple oversight in the original submittal when one of the applicable occurrences was missed.

Final Action: AS AM AMPC____ D

E8-09/10, Part I
1002.1 (IFC [B] 1002.1)

Proposed Change as Submitted

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

PART I – IBC MEANS OF EGRESS

Add new text as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

PROJECTED TREAD DEPTH. The full depth dimension of a tread with a nosing projection or the sum of the tread depth measured between adjacent nosings and the depth of the nosing projection.

NOSING PROJECTION. The additional depth of a tread in excess of the tread depth or the distance between the edges of adjacent treads overlapping horizontally.

RISER. The vertical component of a step or stair.

Reason:
Part I -These definitions clarify the intent of the code.

Projected Tread Depth is currently incorrectly characterized as the tread depth in reference to measuring alternating tread devices. This definition will allow for the same terminology to apply to all vertical egress devices as it does to both stairs and ship ladders. Please see our related change to Alternating tread devices.

Nosing projection needs to be better understood by all that use the code. One of the most common misinterpretations akin to the measurement of tread depth is the concept of a nosing projection and how it is measured. This simple definition is long overdue.

Riser is currently listed in the IRC with a definition for a plumbing application. Please see our change to the IRC as well.

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

ICCFILENAME:Cooper-G1-202

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed definition for projected tread depth is unclear. The proponent should provide figures so this definition can be fully understood. The definition for 'riser' by inclusion of the word "vertical" could be interpreted to not allow the 30 degree slope on risers currently permitted.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association, requests Approval as Modified.

Modify the proposal as follows:

1002.1 (IFC [B] 1002.1) Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

PROJECTED TREAD DEPTH. ~~The full depth dimension of a tread with a *nosing projection* or the~~ The sum of the tread depth measured between adjacent *nosings* and the depth of the *nosing projection* of the tread or floor above.

NOSING PROJECTION. ~~The additional depth of a tread in excess~~ The portion of the tread depth that extends beyond the tread below.~~ or the distance between the edges of adjacent treads overlapping horizontally~~

RISER. The vertical or sloped component of a step or *stair* connecting a *nosing* with a tread or floor below.

Commenter's Reason: The diagrams below have been provided at the committee's request to provide an easy understanding of the proposed terminology. The language of the definitions has been modified to resolve the IBC committee's concerns for clarity and objections raised in testimony. Specifically:

1. The definition of riser has been clarified to address that risers may be sloped as well as vertical. The sloping has been qualified as connecting a nosing and the tread or floor below. This is sufficient for the definition as the sloping of risers is quantified in **R311.7.4.3 Profile and 1009.4.5 Profile**
2. The concern that the original text implied that the nosing projection was "additional tread depth" has been eliminated by more clearly stating it is a portion of the tread depth. This is clearly illustrated in **Figures 1 – 4 below**.
3. The term projected tread depth has also been simplified and is clearly illustrated by the figures below.
3. The Figures also clearly illustrate that the terminology is common to stairs with vertical and sloped risers, ship ladders, and alternating tread devices. 4. Because of the illustrated relevance and current use of the term *nosing projection* in **R311.7.4.3 Profile**, the proposed change to the IRC has been modified to include *nosing projection*.
5. The term *projected tread depth* is only used in **1009.10 Alternating tread devices** and **1009.11 Ship Ladders** and is only essential to the IBC

In addition to the above referenced sections of the current code dependent on a clear understanding of these terms, please also see the following related approved proposals that include these terms; **E73** – AS, E75 Part I – AS, **RB46** – AM, **E79** – AS, and also the following disapproved proposals; **E75 Part II** – D, **E78** – D.

Illustration of Proposed Defintions

E8-09/10 Part I and Part II by Stairway Manufacturers' Association

The four figures below show that the defined terms and their dimensional relationships are common to stairs, ship ladders and alternating tread devices.

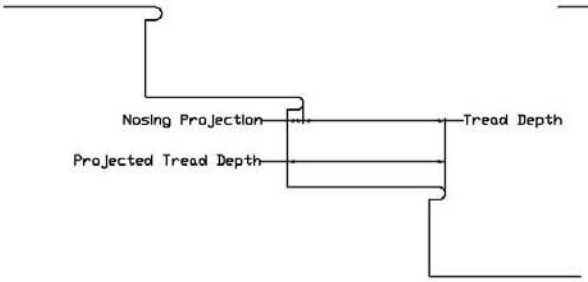


Figure 1: Stairway with traditional nosing projection

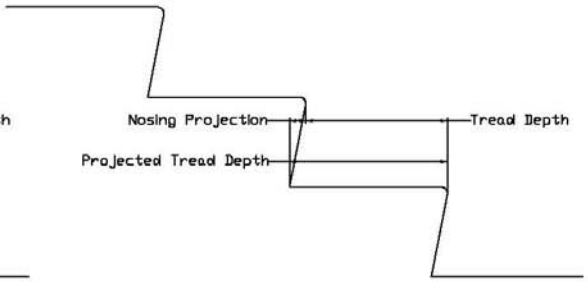


Figure 2: Stairway with sloped riser-nosing projection

Note: Both Stairways are drawn with same riser height and tread depth

Nosing Projection = The portion of the tread depth that extends beyond the tread below.
Projected Tread Depth = Tread Depth + Nosing Projection of tread or floor above .

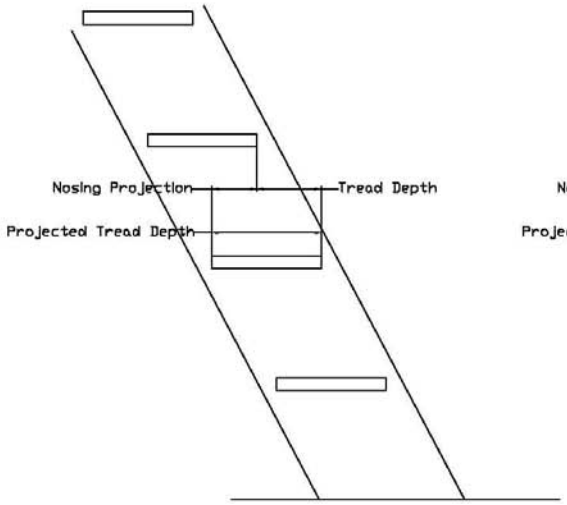


Figure 3: Ship Ladder

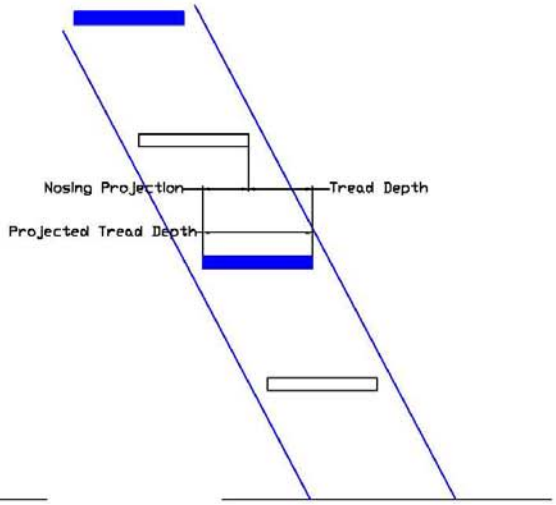


Figure 4: Alternating tread device

Central stringer and treads on opposite side shown in blue

Note: Both Ship ladder & ATD are drawn with same riser height and tread depth

Final Action: AS AM AMPC____ D

E8-09/10, Part II
IRC R202

Proposed Change as Submitted

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

PART II – IRC BUILDING/ENERGY

Revise as follows:

SECTION R202
DEFINITIONS

RISER.

1. The vertical component of a *step* or *stair*
2. A water pipe that extends vertically one full story or more to convey water to branches or to a group of fixtures.

Reason:
Part II-These definitions clarify the intent of the code.
Riser – I the 07/09 cycle the IRC committee pointed out that the term riser was confused with riser height and that further confusion was caused by the present definition of a plumbing application. The stair term is more commonly known and is therefore listed first. The existing definition remains unchanged.

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

ICCFILENAME:Cooper-G1-202

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This is a good definition and it clarifies the meaning of "riser" as it relates to a step or stair. The definition does not require the riser to be 90° vertical. A slope is permitted in the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consultants, representing the Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

RISER. 1.The vertical or sloped component of a step or *stair* connecting a *nosing* with a tread or floor below. 2. A water pipe that extends vertically one full story or more to convey water to branches or to a group of fixtures.

NOSING PROJECTION. The portion of the tread depth that extends beyond the tread below.

Commenter's Reason: See E8-09/10 Part I.

Final Action: AS AM AMPC____ D

E13-09/10
Table 1004.1.1 (IFC [B] Table 1004.1.1)

Proposed Change as Submitted

Proponent: Jay Wallace, The Boeing Company

Revise as follows:

TABLE 1004.1.1 (IFC [B] TABLE 1004.1.1)
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	FLOOR AREA IN SQ. FT. PER OCCUPANT
~~Aircraft hangars~~	~~500 gross~~
Aircraft Related Uses	
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Manufacturing	
Final assembly	500 gross
Sub-assembly fabrication	300 gross
Hangars	
Maintenance and repair	500 gross
Storage or painting	1,000 gross

(Portions of the table not shown remain unchanged.)

Reason: This proposal intends to provide more representative occupant density factors for aircraft manufacturing and storage facilities. Presently, other than for aircraft hangars, there are no industry specific occupant load factors. The recommended values are typical of industry practices. It should be noted that automation has greatly reduced the number of persons necessary to manufacture aircraft. The typically large area necessary for the manufacturing or storage of aircraft is also a factor in the determination of appropriate values. Assigning one occupant for each 32' x 32' area (1000 sf) in an aircraft storage or paint hanger is actually a conservative approach. This figure was selected to account for common usage in smaller facilities. The proposed fabrication occupant load factors also represent typical production practices. These factors become significant in means of egress design. The Boeing Company has a 4,500,000 square foot manufacturing facility. Using the current industrial area occupant load factor of 100 square feet per occupant, the design occupant load of this building is 45,000. It should be noted that The Boeing Company has only 160,000 employees worldwide. In fact, approximately 20,000 employees divided into three shifts work in this factory. The current calculated occupant load would result in a minimum of four exits having 750 feet of egress width. The proposed occupant load factor of 500 would result in a design occupant load of 9,000. Four exits would still be required, however, total egress width would now be a more realistic 150 total feet (50 x 3'-0" doors). Since the facility also contains sub-assembly fabrication operations, the occupant load would be greater than 9,000 resulting in more total egress width. Approval of this proposal will provide code users with occupant load factors representative of industry practices. Such characteristic values will provide for the safe egress of building occupants while not requiring excessive numbers of means of egress components.

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

ICCFILENAME:Wallace-E1-T1004.1.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Section 1004 already allows for code officials to approve the actual occupant load in large spaces with minimal occupants. There was no technical justification to support this occupant load across the industry: for example, is this consistent with small airplane manufacturers.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jay S. Wallace representing The Boeing Company; Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Submitted

Commenter's Reason: When a use is not included in Table 1004.1.1, Section 1004.1.1 directs the building official to "establish a use based on a listed use that most nearly resembles the intended use". In the case of aircraft manufacturing, the listed use that most nearly resembles our use is "Industrial areas" that assigns 100 square feet per occupant. As pointed out by the ICC Means of Egress Code Committee in its published reason substantiating disapproval of E13-09/10, the exception to Section 1004.1.1 states that the actual occupant load may be used when approved by the building official. This requires some good faith negotiations between the owner and the building official. It is relatively easy to do when the facility is operational, but during design it is harder for the building official to make such an assessment.

The Boeing Company is a global company with manufacturing interests throughout the United States and literally around the world. We participate in the ICC code development process to make the code more relevant and better for users. We are advocates for consistency and clarity so that the application of the code is as uniform as possible in every jurisdiction in which we have facilities. To require global users such as Boeing to negotiate something as fundamental as the occupant load in each and every jurisdiction is problematic.

Also, the committee stated that no technical justification was provided to demonstrate that the proposed occupant load factors are applicable to smaller aircraft manufactures. The Boeing Company manufactures fixed and rotary winged aircraft of all sizes from large commercial and military transport aircraft to single seat fighters. We collected data from the Cessna Aircraft Company and a variety of Boeing aircraft manufacturing environments that includes parts manufacturing and assembly of a full range of part sizes and product deliverables. The following data support our proposed occupant loads:

Modified Values to Table 1004.1.1				
Item No.	**Aircraft Industry Use**	**Floor Area in Sq. Ft. per Occupant Range**	**Floor Area Sq. Ft. per Occupant Average**	**Proposed New Table Value**
1	Manufacturing – Sub Assembly & Parts	140[a] – 976	589[b]	**300**
2	Manufacturing – Final Assembly & Associated Support Activities	373 – 1,053	740	**500**
3	Hangars – Maintenance & Repair	1,075 – 16,095	1,466	**500**
4	Hangars – Storage or Paint	2,508 – 13,086	7,797	**1000**

a) Number based on Cessna estimate in small parts use only, no sub-assembly; current actual figure is 421.
b) If actual number is used instead of Cessna estimate for current small parts use only, then average is 636.

As increased automation impacts industrial areas, the current Table 1004.1.1 occupant load factor of 100 square feet per occupant is due for an update. The Boeing Company conducted contemporary research and determined that the proposed values for aircraft manufacturing facilities are reasonable and on average, very conservative.

Final Action: AS AM AMPC____ D

E17-09/10
1004.3 (IFC [B] 1004.3)

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise as follows:

1004.3 (IFC [B] 1004.3) Posting of occupant load. Every room or space that is an assembly occupancy shall have the maximum occupant load of the room or space posted in a conspicuous place no more than 12 feet (3.66 m) above the floor, near the main exit or exit access doorway from the room or space. Posted signs shall be of ~~an approved legible~~ permanent design with letters and numbers not less than 1 inch (25 mm) high on a contrasting background and shall be maintained by the owner or authorized agent.

Reason: The term "approved legible design" for a maximum occupant load sign is ambiguous and creates unnecessary conflicts in the field, usually around the time when a certificate of occupancy is ready to be issued. The revised language creates a clear standard that will reduce disagreements and potential waste. The proposed language is similar to the text found in Section 1008.1.9.3.

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

ICCFILENAME: KRANZ-E1-1004.3.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The requirement needs stroke width of visible requirements. The proposal does not indicate what should be posted for multi-purpose rooms. The occupant load indicated should be approved by the code official/fire official.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lee J. Kranz Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1004.3 Posting of occupant load. Every room or space that is an assembly occupancy shall have the ~~maximum~~ occupant load of the room or space posted in a conspicuous place no more than ~~12 feet (3.66 m)~~ 8 feet (2.44 m) above the floor, near the main exit or exit access doorway from the room or space. Posted signs shall be of an approved permanent design with letters and numbers not less than 1 inch (25 mm) high on a contrasting background and shall be maintained by the owner or authorized agent. The uppercase letter "I" shall be used to determine the allowable stroke width of all characters of a font. The stroke width shall be 10 percent minimum and 30 percent maximum of the height of the uppercase "I" of the font.

Commenter's Reason: As advised by the Egress Committee in Baltimore, the language for this proposal has been modified to: 1) remove the term "maximum" as it relates to the occupant load of the room or space, 2) limit the placement of the sign to no more than 8' above the floor and 3) specify minimum and maximum stroke width. The language specifying the stroke width is consistent with Section 703.2.6 of ICC/ANSI A117.1-2003.

There were also comments made relating to posting of occupant load signs for multi-purpose rooms. The original proposal was not intended to address this issue nor do we intend to address it as part of this public comment. Because multi-purpose rooms can take on many different configurations we consider posting of occupant load signs to be a plan review issue that should be resolved prior to issuance of the permit.

Final Action: AS AM AMPC____ D

E22-09/10
1004.5, 1005.1 (IFC [B] 1004.5, 1005.1)

Proposed Change as Submitted

Proponent: Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International

Revise as follows:

~~**1005.1 (IFC [B] 1005.1) Minimum required egress width.** The means of egress width shall not be less than required by this section. The total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.3 inches (7.62 mm) per occupant for stairways and by 0.2 inches (5.08 mm) per occupant for other egress components. The width shall not be less than specified elsewhere in this code. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.~~

~~**Exception:** Means of egress complying with Section 1028.~~

1005.1 (IFC [B] 1005.1) General. The means of egress shall be sized in accordance with this section.

Exception: Means of egress complying with Section 1028.

1005.2 (IFC [B] 1005.2) Minimum width based on component. The width of egress components shall not be less than specified elsewhere in this code.

1005.3 (IFC [B] 1005.3) Capacity based on occupant load. The means of egress for any floor, room, or story shall be sized to accommodate the total occupant load, as determined by Section 1004, in accordance with the following:

1005.3.1 (IFC [B] 1005.3.1) Stairways. The capacity of means of egress stairways shall be calculated using a factor of 0.3 inches (7.62 mm) of width per person.

1005.3.2 (IFC [B] 1005.3.2) Other egress components. The capacity of means of egress components other than stairways shall be calculated using a factor of 0.2 inches (5.08 mm) of width per person.

1005.4 (IFC [B] 1005.4) Capacity based on egress path. The capacity of the means of egress required from any story of a building shall be maintained to the termination of the means of egress.

1005.5. (IFC [B] 1005.5) Distribution of egress capacity. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity.

1005.6 (IFC [B] 1005.6) Egress convergence. Where means of egress from floors above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the two floors.

(Renumber subsequent sections.)

Delete without substitution:

~~**1004.5 (IFC [B] 1004.5) Egress convergence.** Where means of egress from floors above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the two floors.~~

(Renumber subsequent sections.)

Reason: This proposal seeks to editorially reorganize and clarify the multiple requirements related to 'egress width' currently contained in a single paragraph in 10051, and to relocate a related provision from 1004.5 to a more logical location with other egress width/capacity provisions. No technical changes are intended by this change.

1005.1 creates a new charging paragraph.
1005.2 replaces the current second sentence of 1005.1, noting that minimum width requirements for means of egress components may be specified in other locations in the code.
1005.3 is consistent with the current egress width factors, but reorganizes the text to clarify that the total occupant load (which is determined in Section 1004) drives the capacity for which the egress width must be provided. The new text also clearly states that egress width/capacity is determined on a floor, room, and story basis.
1005.4 replaces the last sentence of current 1005.1, and notes that once a minimum capacity is required along a means of egress, it must be provided along the entire path of egress travel.
1005.5 is consistent with the current 4th sentence of 1005.1.
1005.6 relocates the provision for 'egress convergence' from 1004.5. This is really an issue of egress capacity/width, and should more appropriately be located here, instead of buried in a section on occupant load.

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

ICCFILENAME:Perry-E1-1005.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The revisions bring the capacity concept forward in the width determination. Breaking this into parts will add clarity and readability in the code when dealing with means of egress width. This is consistent with the committee approval of E10-09/10.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International; Gregory R. Keith, Professional heuristic Development, representing The Boeing Company; Anne vonWeller, Murray City Corporation, Utah, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 1005
MEANS OF EGRESS SIZING ~~WIDTH~~

1005.1 (IFC [B] 1005.1) General. All portions of the means of egress system shall be sized in accordance with this section.

Exception: Means of egress complying with Section 1028.

1005.2 (IFC [B] 1005.2) Minimum width based on component. The minimum width, in inches, of any means of egress component~~s~~ shall not be less than that specified for such component, elsewhere in this code.

1005.3 (IFC [B] 1005.3) Required capacity based on occupant load. The required capacity, in inches, of the means of egress for any ~~floor,~~ room, area, space or story shall ~~be sized to accommodate the total occupant load, as~~ not be less than that determined ~~by Section 1004,~~ in accordance with the following:

1005.3.1 (IFC [B] 1005.3.1) Stairways. The capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity ~~using a~~ factor of 0.3 inches (7.62 mm) ~~of width~~ per occupant ~~person~~. Where stairways serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the stairways serving that story.

1005.3.2 (IFC [B] 1005.3.2) Other egress components. The capacity, in inches, of means of egress components other than stairways shall be calculated by multiplying the occupant load served by such component by a means of egress capacity ~~using a~~ factor of 0.2 inches (5.08 mm) ~~of width~~ per occupant ~~person~~.

1005.4 (IFC [B] 1005.4) Continuity ~~Capacity based on egress path.~~ The capacity of the means of egress required from any story of a building shall not be reduced along the path of egress travel until arrival at the public way ~~be maintained to the termination of the means of egress~~.

1005.5. (IFC [B] 1005.5) Distribution of egress capacity. Where more than one exit, or access to more than one exit, is required, ~~multiple~~ the means of egress shall be configured ~~sized~~ such that the loss of any one exit, or access to one exit, ~~means of egress~~ shall not reduce the available capacity to less than 50 percent of the required capacity.

1005.6 (IFC [B] 1005.6) Egress convergence. Where the means of egress from stories ~~floors~~ above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the required capacities for the two adjacent stories ~~floors~~.

~~**1004.4 (IFC 1004.4) Exiting from multiple levels.** Where exits serve more than one floor, only the occupant load of each floor considered individually shall be used in computing the required capacity of the exits at that floor, provided that the exit capacity shall not decrease in the direction of egress travel.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: In its reason statement for approval of Item E22-09/10 as submitted, the ICC Means of Egress Code Committee stated, "The revisions bring the capacity concept forward in the width determination. Breaking this into parts will add clarity and readability in the code when dealing with means of egress width. This is consistent with the committee approval of E10-09/10." This public comment for approval as modified further clarifies and integrates the capacity concept into the IBC within the format established by Item E22-09/10. The deleted Section 1004.4 provisions correlate with Item E10-09/10 that separates occupant load and egress width/capacity provisions. Former Section 1004.4 provisions have been incorporated, in context, into E22-09/10 Section 1005.3.1. The exception on Section 1005.1 has been revised to be consistent with the language approved in E140-09/10 for assembly. The language and terminology are consistent with related means of egress provisions. Approval of this public comment will result in consistency in the determination of means of egress sizing requirements.

Final Action: AS AM AMPC____ D

E23-09/10
1005.1 (IFC [B] 1005.1)

Proposed Change as Submitted

Proponent: Maureen Traxler representing Washington Association of Building Officials Technical Code Development Committee

Revise as follows:

1005.1 (IFC [B] 1005.1) Minimum required egress width. The means of egress width shall not be less than required by this section. The total width of means of egress in inches (mm) shall not be less than the total occupant load served

by the means of egress multiplied by 0.3 inches (7.62 mm) per occupant for stairways and by 0.2 inches (5.08 mm) per occupant for other egress components. The width shall not be less than specified elsewhere in this code. The width of exit access doorways shall not be less than the width required for doors in Section 1008. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.

Exception: Means of egress complying with Section 1028.

Reason: The IBC lacks a reasonable provision for minimum width of exit access doorways. The factors in Section 1005.1 only make sense when they are applied to situations where another code section sets forth a minimum width for an egress element, but a high number of occupants would use that element. For example, Section 1018.2 sets forth minimum corridor widths, but also states that the width shall not be less than allowed by Section 1005.1. Section 1018.2 establishes 44 inches as the minimum for most corridors, but if the corridor serves an occupant load of 300, Section 1005.1 would require 60 inches. However, the only section that addresses minimum widths for exit access doorways is 1005.1 which can produce some unacceptable results. For example, if a doorway from a space serves 50 people, Section 1005.1 says the minimum width is 10 inches.

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

ICCFILENAME: TRAXLER-E1-1005.1

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is not the correct location for this requirement. A better place for this might be Section 1008. Other provisions of the code already cover the width of doorways, so this item is not needed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1005.1 (IFC [B] 1005.1) Minimum required egress width. The means of egress width shall not be less than required by this section. The total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.3 inches (7.62 mm) per occupant for stairways and by 0.2 inches (5.08 mm) per occupant for other egress components. The width shall not be less than specified elsewhere in this code. The width ~~of exit access doorways~~ at any point in the path of egress travel shall not be less than the width required for doors in Section 1008. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.

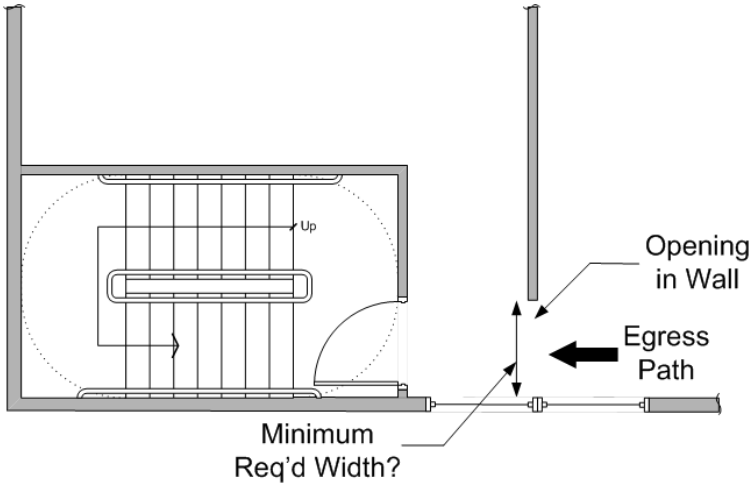
Exceptions: Means of egress width for the following elements shall be permitted to comply with the specified sections:

1. Means of egress for assembly areas in accordance ~~complying~~ with Section 1028.
2. Aisles in accordance with Section 1017.
3. Corridors in accordance with Section 1018.2.
4. Stage stairways and technical production areas in accordance with Section 410.

Commenter's Reason: There is no provision in the IBC that specifies a minimum width where there is no door or doorway. How narrow can an archway or the space between columns be? If the path of egress travel passes through an opening, there should be a required minimum width whether or not the opening is a doorway. The lack of a minimum required egress width can be especially problematic where the egress path is not an accessible path of travel. We believe Section 1005.1 is the appropriate place for this provision since it governs minimum width for means of egress. This proposed language modifies the 0.3 and 0.2 inch factors by imposing a minimum that applies where the factors would result in a width that is less than required for a doorway. For example, where there is an opening in the path of egress travel that serves 50 people, then the 0.2 factor requires a minimum width of only 10 inches. We are proposing to add 2 exceptions that correlate with the lower minimum width provisions for aisles and stage areas. The terminology in Exception 4 is coordinated with the new defined terms in G67-09/10.

The figure below illustrates a real-world example where this was an issue. An interior wall terminated near the exterior wall, creating an opening. The required egress path was not a required accessible path of travel, and passed through the opening. The occupant load was low, so

the calculated required egress width was less than 20 inches. There is nothing in the current code text that says the width would have to be greater, but 20 inches is unreasonable.



Final Action: AS AM AMPC____ D

E32-09/10

1007.1.1 (New) [IFC [B] 1007.1.1(New)]

Proposed Change as Submitted

Proponent: Rick Lupton, City of Seattle, representing Seattle Dept of Planning & Development

Revise as follows:

1007.1 (IFC [B] 1007.1) Accessible means of egress required. Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress are required by Section 1015.1 or 1021.1 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. Accessible means of egress are not required in alterations to existing buildings.
2. One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1007.3, 1007.4 or 1007.5.
3. In assembly areas with sloped or stepped aisles, one accessible means of egress is permitted where the common path of travel is accessible and meets the requirements in Section 1028.8.

1007.1.1 (IFC [B] 1007.1.1) Separation of accessible means of egress. When two accessible means of egress are required, they shall be located as far apart as practical.

Reason: This proposal is intended to address a gap in the code. Currently, there is no specific code language that would prevent two accessible means of egress (AMOE) from being located immediately adjoining. Yet complying with Section 1015.2.1 would place an undue burden on the designer because there are times that an elevator is required as an AMOE and the measure between the elevator and a stair would likely control rather than the measure between stairs as intended for conventional design. According to ICC staff the intent is that two accessible means of egress be separated, but that flexibility is necessary to accommodate types and possible locations of AMOE. While this proposal does not detail exactly how far apart the two AMOE are required to be, it does state the intent yet allows the building official flexibility where necessary.

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

ICCFILENAME:Lupton-E1F-1007 Exit slip AMOE

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The term 'practical' is not specific enough language for consistent interpretation. If this is an issue a measurement is needed – perhaps using the 30 feet minimum used in the stairway separation.

Assembly Action: **None**

Individual Consideration Agenda

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

Modify the proposal as follows:

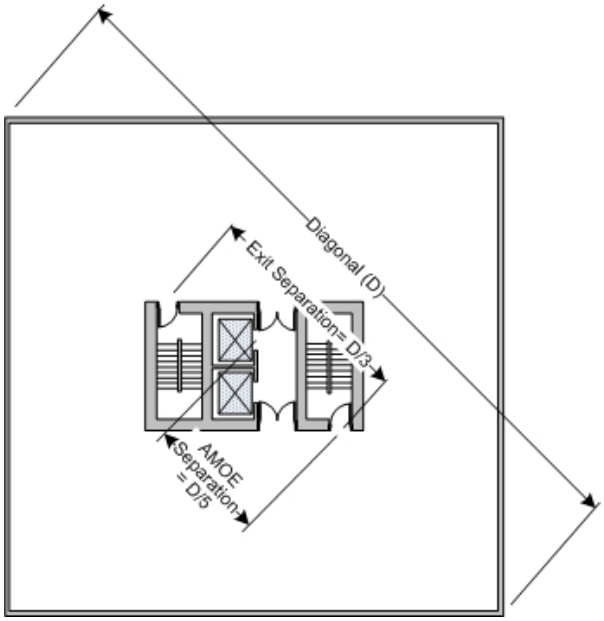
Public Comment:

Rick Lupton, Seattle, WA, representing City of Seattle, Department of Planning & Development, requests Approval as Modified by this Public Comment.

1007.1.1 (IFC [B] 1007.1.1) Separation of accessible means of egress. ~~When two accessible means of egress are required, they shall be located as far apart as practical.~~ Where more than one accessible means of egress is required, at least two accessible means of egress components complying with Section 1007.2, Items 2, 3, 4, 6, or 8 or an accessible exterior exit door shall be located a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between the access points of the accessible means of egress components.

Exception: Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall not be less than one-fifth of the length of the maximum overall diagonal dimension of the area served.

Commenter's Reason: The committee disapproved the original proposal because the language was not specific enough, suggesting that the minimum 30 foot separation required between high-rise exit stair enclosures (Section 403.5.1) might be appropriate. However, because an elevator is a required accessible means of egress (AMOE) in tall buildings, using 30 feet as a minimum separation would drive an unreasonable expansion of the building core in a small footprint building whether the elevator is located between the stairs or outside the stairs. Instead, this modification proposes a dimension that is approximately 2/3 of the exit separation calculated in accordance with Section 1015.2.1. Such a separation distance provides for an elevator used as an AMOE within a building core without driving the core size larger, using up valuable leasable space. As in Section 1015.2.1, the required separation distance is less in a fully sprinkled building. The modification also clarifies that the separation must be measured to an AMOE component that either provides direct egress or a protected area and not pathway components like an accessible route or ramp or unprotected components like a platform lift. While the basis for the minimum separation proposed is empirical, the modification clearly addresses the committee's concern and accomplishes the original goal of codifying an implied requirement for a separation of AMOEs.



Staff note: Code changes E5-09/10 and E36-09/10 added exit access stairways (complying with current Section 1016.1 Exp. 3 and 4) to the list in Section 1007.1 as a new item 3. Code changes E37-09/10 and E38-09/10 added exterior areas for assisted rescue to the list in Section 1007.1 as a new item 9. If this proposal to E32-09/10 is successful, the new items will be added to the list of acceptable elements.

Final Action: AS AM AMPC____ D

E34-09/10

1007.2.1 (New), 1007.6 (IFC [B] 1007.2.1 (New), 1007.6)

Proposed Change as Submitted

Proponent: Ed Roether, Populous (Formerly HOK Sport Venue Event), representing self

Revise as follows:

1007.2 (IFC [B] 1007.2) Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with Section 1104.
2. Interior exit stairways complying with Sections 1007.3 and 1022.
3. Exterior exit stairways complying with Sections 1007.3 and 1026.
4. Elevators complying with Section 1007.4.
5. Platform lifts complying with Section 1007.5.
6. Horizontal exits complying with Section 1025.
7. Ramps complying with Section 1010.
8. Areas of refuge complying with Section 1007.6.

Exceptions:

1. Where the exit discharge is not accessible, an exterior area for assisted rescue shall be provided in accordance with Section 1007.7.
2. Where the exit stairway is open to the exterior, the accessible means of egress shall include either an area of refuge in accordance with Section 1007.6 or an exterior area for assisted rescue in accordance with Section 1007.7.

1007.2.1 (IFC [B] 1007.2.1) Travel distance limitations. Each required accessible means of egress component shall be so located on each story such that the maximum length of accessible exit access travel, measured from the most remote point of an accessible space to an accessible means of egress exit component, shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1.

(Renumber subsequent sections)

1007.6 (IFC [B] 1007.6) Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. ~~The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1.~~ Every required area of refuge shall have direct access to a stairway in an exit enclosure complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4. Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier.

Exceptions:

1. A stairway serving an area of refuge is not required to be enclosed where permitted in Sections 1016.1 and 1022.1.
2. A smokeproof enclosure is not required for an elevator lobby used as an area of refuge where the elevator is not required to be enclosed.

Reason: Currently, any building that provides accessible means of egress without the use of an area of refuge has no limit to the travel distance required by the accessible means of egress system. Travel distance limits are only found in Section 1007.6. The general means of egress requires

a limit to travel distance as part of a holistic approach to the exit system to address the occupant flow rates through exit components and travel speeds along its path. There is limited information on how people with disabilities impact these flow rates and travel speeds, but persons with mobility impairments typically move at a slower rate than able bodied people. The exit system for persons with a disability should be within the same travel distance limits as that provided others within the building. Therefore, this proposal moves the travel distance limitation requirement from that pertaining to only an area of refuge and applies it to the continuity of the overall accessible means of egress where it belongs.

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

ICCFILENAME:Roether-E5-1007.2.1

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Travel distance should be met for all accessible means of egress, not just to those that contain areas of refuge.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Rick Lupton, Seattle, WA, representing City of Seattle, Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1007.2.1 (IFC [B] 1007.2.1) Travel distance limitations. Each required accessible means of egress component shall be so located on each story such that the maximum length of accessible exit access travel shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1, measured from the most remote point of an accessible space to an accessible exterior exit door, or an accessible means of egress exit component complying with Section 1007.2, Items 2, 3, 4, 6, or 8 ~~shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1~~.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The maximum length of accessible exit travel distance should not be measured to an accessible route, platform lift, or ramp because these components do not necessarily provide direct egress from the building nor a protected location for delayed or assisted rescue. Because the list in Section 1007.2, referred to by the proponent, includes these components, a list of specific appropriate components must be provided. As written, there is no meaningful measure to some components, such as to an accessible route. The modification provides an appropriate list for purposes of travel distance, because it requires a measurement only to those components providing either direct egress or protection. It also clarifies that each must be served by an accessible route and complies with Section 1007.2 to qualify for this measurement. Because proposal E37 was passed in Baltimore and no comments were submitted, exterior areas for assisted rescue are included as item 9 of Section 1007.2, rather than listed independently.

Staff note: Code changes E5-09/10 and E36-09/10 added exit access stairways (complying with current Section 1016.1 Exp. 3 and 4) to the list in Section 1007.1 as a new item 3. Code changes E37-09/10 and E38-09/10 added exterior areas for assisted rescue to the list in Section 1007.1 as a new item 9. If this proposed modification to E34-09/10 is successful, the new items will be added to the list of acceptable elements.

Public Comment 2:

Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International requests Disapproval.

Commenter's Reason: This code change should be disapproved for the following reasons:

• While the proponent validly notes that the current code specifically regulates travel distance for accessible means of egress only where areas of refuge are provided, expanding this concept to all accessible means of egress creates far more questions and problems than it solves.

• The change establishes a new 'starting point' for measuring travel distance (the most remote accessible point vs. the most remote point). For facilities with large spaces that are not accessible (for example, stepped or tiered seating areas in assembly occupancies), there would be significant differences in the effective travel distances permitted.

• The 'end point' of the travel distance measurement is unclear.

• The change requires measuring travel distance to the nearest 'accessible means of egress component', which is not a defined term.

• If one assumes the intent is that the list of components in 1007.2 are the 'accessible means of egress components', the proposal is seriously broken, and there are no 'quick fix' modifications that would resolve the problems.

• As approved, the change allows measurement to an 'accessible route' to determine accessible means of egress travel distance. This makes no sense, and would allow up to a doubling of the code required travel distance for accessible means of egress (maximum travel distance to 'an accessible route', then maximum travel distance to an exit).

• Where elevators are used as an accessible means of egress component, it is unclear where the travel distance would be measured. Would it be to a hoistway door, all hoistway doors, any lobby door, or the nearest lobby door (where lobbies are provided)?

• The issue of using ramps as part of the accessible means of egress needs to be studied and better coordinated. As approved, one can apparently measure to the top of any ramp to determine the accessible means of egress travel distance. Is this appropriate where ramps are part of exit access? At the other extreme, where the code allows unseparated exterior exit ramps (Section 1026), shouldn't the accessible travel distance be measured to the same point as the general travel distance (the top of the ramp)?

• The limited allowance for use of platform lifts as an accessible means of egress needs to be studied and coordinated. As approved, one can measure to the platform lift in any case where a lift is permitted, which may not be appropriate in all cases. At the other extreme, if the change were modified to exclude considering platform lifts when determining accessible travel distance, what is the point in providing standby power to the lift?

• Where the code allows unenclosed stairs (as part of exit access) in lieu of enclosed exit stairs, it makes no sense to have a general rule that would measure maximum travel distance from the upper level, down the stairs to the exit door, and then require a separate calculation using the same maximum travel distance, to assess the accessible means of egress travel distance on the upper level.

• For a very large percentage of new buildings (those that are sprinklered and use stairs in exit enclosures for both general and accessible means of egress), the change adds a new requirement that has no practical effect. In a sprinklered building, the exit stair requirements are identical whether the enclosure is an accessible means of egress or not, and the general code requirements establish the maximum travel distances permitted. Even in buildings greater than 5 stories in height, where an elevator is required as an accessible means of egress, the general travel distance rules would already have ensured that an accessible means of egress (exit stair enclosure) is within travel distance.

• Because the current 'accessible travel distance' requirement is currently a provision within the technical requirements for areas of refuge, there is validly a question as to how the requirement gets applied where the selected accessible means of egress components include those with areas of refuge (e.g., an exit stair in a non-sprinklered building) with those that do not (a horizontal exit). If any simple fix to this 'inconsistency' is needed, it appears that modifying 1007.6 would be the appropriate approach, instead of attempting to take a fundamental code concept (travel distance) and trying to force it into an entirely different application.

Final Action: AS AM AMPC____ D

E38-09/10

1007.2, 1007.7, 1007.7.1 (New), 1007.7.2 (IFC [B] 1007.2, 1007.7, 1007.7.1 (New), 1007.7.2)

Proposed Change as Submitted

Proponent: Ed Roether, Populous (Formerly HOK Sport Venue Event), representing self

Revise as follows:

1007.2 (IFC [B] 1007.2) Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with Section 1104.
2. Interior exit stairways complying with Sections 1007.3 and 1022.
3. Exterior exit stairways complying with Sections 1007.3 and 1026.
4. Elevators complying with Section 1007.4.
5. Platform lifts complying with Section 1007.5.
6. Horizontal exits complying with Section 1025.
7. Ramps complying with Section 1010.
8. Areas of refuge complying with Section 1007.6.
9. Exterior area for assisted rescue complying with 1007.7

~~Exceptions:~~

1. ~~Where the exit discharge is not accessible, an exterior area for assisted rescue shall be provided in accordance with Section 1007.7.~~
2. ~~Where the exit stairway is open to the exterior, the accessible means of egress shall include either an area of refuge in accordance with Section 1007.6 or an exterior area for assisted rescue in accordance with Section 1007.7.~~

1007.7 (IFC [B] 1007.7) Exterior area for assisted rescue. Exterior areas for assisted rescue shall be accessed by an accessible route from the area served shall be permitted in accordance with Section 1007.7.1 or 1007.7.2.

1007.7.1 (IFC [B] 1007.7.1) Level of exit discharge. Where the exit discharge does not include an accessible route from an exit located on a level of exit discharge to a public way, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1007.7.3 through 1007.7.6.

1007.7.2 (IFC [B] 1007.7.2) Stories above level of exit discharge. Where exit access from the area served is outdoor open air, an exterior area of assisted rescue is permitted as an alternative to an area of refuge. Every required exterior area of assisted recue shall have direct access to an interior exit stairway, exterior stairway, or elevator serving as an accessible means of egress component. The exterior area of assisted rescue shall comply with Section 1007.7.3 through 1007.7.6 and shall be provided with a two-way communication system complying with Sections 1007.8.1 and 1007.8.2.

1007.7.3 (IFC [B] 1007.7.3) Size. Each exterior area for assisted rescue shall be sized to accommodate wheelchair spaces in accordance with Section 1007.6.1. ~~The exterior area for assisted rescue must be open to the outside air and meet the requirements of Section 1007.6.1.~~

1007.7.4 (IFC [B] 1007.7.4) Separation. Separation walls shall comply with the requirements of Section 705 for exterior walls. Where walls or openings are between the area for assisted rescue and the interior of the building, the building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the floor level of the area for assisted rescue or to the roof line, whichever is lower.

~~1007.7.1~~ 1007.7.5 (IFC [B] ~~1007.7.1~~ 1007.7.5) Openness. The exterior area for assisted rescue shall be open to the outside air. The sides other than the separation walls shall be at least 50 percent open, and the open area above ~~the~~ guards shall be ~~so~~ distributed so as to minimize the accumulation of smoke or toxic gases.

~~1007.7.2~~ 1007.7.6 (IFC [B] ~~1007.7.2~~ 1007.7.6) ~~Exterior exit~~ Stairway. ~~Exterior exit~~ Stairways that are part of the means of egress for the exterior area for assisted rescue shall provide a clear width of 48 inches (1219 mm) between handrails.

> **Exception:** The clear width of 48 inches (1219 mm) between handrails is not required at stairways serving buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: An exterior area of assisted rescue is a component of an accessible means of egress, like other components listed. It is not an exception to a component of an accessible means of egress – it is a viable alternative to an interior area of refuge. This proposal clarifies how an exterior area of assisted rescue can serve as a component and still maintain the provisions relating to other components. With proper separation, communication and signage an exterior area of assisted rescue should not be limited to an exit discharge or an exterior exit stair. A stair complying with Section 1022 allows for an exterior stair, but it also allows for an enclosed exit stair to serve an exterior area of assisted rescue and Section 1107.4 would allow an elevator to also serve it. This option needs clarification on it use and this proposal provides that clarification.

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

ICCFILENAME:Roether-E6-1007.2

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Allowing for exterior areas of assisted rescue in smoke protected or open air assembly spaces is appropriate. There was a concern about coordination with E37-09/10.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ron Clements, representing Chesterfield County Building Inspection Dept., requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

1007.6.1 Separation. Each *area of refuge* shall be separated from the remainder of the story by a *smoke barrier* complying with section 710 or a *horizontal exit* complying with Section 1025. Each *area of refuge* shall be designed to minimize the intrusion of smoke.

Exceptions:

1. *Areas of refuge* located within *an exit enclosure*.
2. *Areas of refuge* located within group A occupancies where the *exit access* from the area served is outdoor, open air or *smoke protected seating.*

Commenter's Reason: The result of E38-09/10 is to allow what essentially is an area of refuge to be designed with the omission of the fire rated enclosure around the area of refuge when the area of refuge is located in a structure that is open to the outdoor air. This is primarily of use for stadiums and similar open structures. Parking garages are already covered with an exception to 1007.3. Unlike a complete exception to 1007.3 this change did retain the size of the wheel chair space and the two-way communication system that is required for an area of refuge and in the original proposal those two aspects of the change referred the code user back to the area of refuge provisions for design of those elements. Essentially the only two changes that the original E38-09/10 accomplishes is to allow omission of the separation and an exception to the 48" width between handrails in a sprinklered building. The exterior area for assisted rescue is a specialized accessible means of egress component that was created as an element of a grade level exit discharge and it is to awkward to attempt to use the exterior area for assisted rescue section as the method to accomplish the goal of E38-09/10. That is why it took so many modifications throughout section 1007.7 to accomplish. Since the net result of the change is to keep all of the aspects of an area of refuge accept the separation requirement it is cleaner and simpler to accomplish that goal with the single exception to 1007.6.1 Separation, which is proposed with this as-modified public comment. The second part of the original change to add an exception to 1007.7.2 (changed to 1007.7.6), which was adding the exception to the 48" width between handrails in a sprinklered building, is not necessary with this as-modified proposal because by keeping the area in question an area of refuge instead of an exterior area for assisted rescue then the existing exception #2 to 1007.3 will allow for the reduced space between handrails in a sprinklered building.

Final Action: AS AM AMPC____ D

E47-09/10
1007.6 (IFC [B] 1007.6)

Proposed Change as Submitted:

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise as follows:

1007.6 (IFC [B] 1007.6) Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1. Every required area of refuge shall have direct access to a stairway within an exit enclosure complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4. ~~Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smoke-proof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier~~.

Exceptions:

1. A stairway serving an area of refuge is not required to be enclosed where permitted in Sections 1016.1 and 1022.1.
2. A smoke-proof enclosure is not required for an elevator lobby used as an area of refuge where the elevator is not required to be enclosed.

Reason: Areas of refuge required to serve an elevator or stair enclosure must be separated from the remainder of the building by a smoke barrier or a horizontal exit per Section 1007.6.2. As written above, this sentence would never apply as all areas of refuge are formed by either a smoke barrier or horizontal exit.

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

ICCFILENAME: KRANZ-E4-1007.6.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Deletion of the last sentence in Section 1007.8 would send the wrong message. Pressurizing the elevator lobby and shaft when the lobby is used as an area of refuge is needed as an option.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lee J. Kranz representing Washington Association of Building Officials Technical Code Development Committee, requesting Approval as Modified by this Public Comment.

Replace the proposal as follows:

1007.6 Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1. Every required area of refuge shall have direct access to a stairway within an exit enclosure complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4. ~~Where an elevator lobby is used as an area of refuge, the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier~~.

1007.6.2 Separation. Each area of refuge shall be separated from the remainder of the story by a smoke barrier complying with Section 710 or a horizontal exit complying with Section 1025. Each area of refuge shall be designed to minimize the intrusion of smoke.

Exceptions:

1. Areas of refuge located within an exit enclosure.
2. An elevator lobby used as an area of refuge and complying with Section 1022.9 for smokeproof enclosures.

Commenter's Reason: The Egress Committee in Baltimore indicated that deleting the text from Section 1007.6 would eliminate pressurization of the elevator lobby as an option for elevator lobbies serving as an area of refuge. The reason for removing this text, as originally proposed, was that it did not make sense as all areas of refuge must be formed by a horizontal exit or smoke barrier so therefore would never be applicable. The smokeproof enclosure option for elevator lobbies used as an area of refuge has now been appropriately relocated to Section 1007.6.2. This exception, allows the area of refuge to comply with Section 1022.9 which refers to Section 909.20 for pressurization and separation of the area of refuge from the remainder of the building.

Final Action: AS AM AMPC____ D

E54-09/10
1008.1.4.3 (IFC [B] 1008.1.4.3)

Proposed Change as Submitted

Proponent: Gregory J. Cahanin, Cahanin Fire & Code Consulting Representing the Smoke Safety Council

Revise as follows:

1008.1.4.3 (IFC [B] 1008.1.4.3) Horizontal or vertical ~~sliding~~ doors. In other than Group H occupancies, horizontal or vertical ~~sliding~~ doors permitted to be a component of a *means of egress* in accordance with Exception 6 to Section 1008.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.
2. The doors shall be openable by a simple method from both sides without special knowledge or effort.
3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.

4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.
5. The door assembly shall comply with the applicable *fire protection rating* and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 715.4.8.3, shall be installed in accordance with NFPA 80 and shall comply with Section 715.
6. The door assembly shall have an integrated standby power supply.
7. The door assembly power supply shall be electrically supervised.
8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

Reason: Doors other than side-swinging doors have had special classifications for some time- turnstiles, revolving doors, and horizontal sliding doors suitable for egress are the most common. Horizontal sliding door classifications for egress were first developed more than 2 decades ago for Won Door's then unique bi-fold door and wall system. Since that time there have been multiple manufacturers whose opening protectives are not side swinging, but meet the same performance and safety requirements for horizontal sliding doors while have a different orientation. This change is recognition of any door system orientation that meets the specific operational requirements that have been successfully in place for horizontal doors is acceptable. Further, it does not matter if the door slides, folds, or rolls up- only that it perform successfully for safe egress. There is no change in the testing or operational requirements- only a clarification of orientation.

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

ICCFILENAME:Cahanin-E1-1008.1.4.3

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The current text requires full width and assumes that the headroom height will be provided immediately. Since these doors move up, the proposal needs to address when the full height for the means of egress would be provided – this is critical for adequate headroom during egress. It is a concern that these doors, when not yet fully open, may be a hazard for a visually impaired person during egress. There are issues for the change in forces and lifting vs. pushing to open the door in manual operation – information is needed on if this operation is doable by all persons using the means of egress. This new technology should be in a separate section to deal with the specific provisions/concerns for this type of door rather than trying to fit this in with horizontal sliding doors. The section should address requirements to prevent vertical sliding doors from coming down without warning.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing Smoke Safety Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1008.1.4.4 (IFC [B] 1008.1.4.4) Vertical doors. In other than Group H occupancies, vertical doors permitted to be a component of a *means of egress* in accordance with Exception 10 to Section 1008.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall include standby emergency power capable of operating the doors in the event of power failure.
2. Power-assisted doors shall comply with BHMA A156.19.
3. The doors shall be openable by a simple method from both sides without special knowledge or effort.
4. The force required to operate the door manually shall not exceed 50 pounds (220 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required height. The door shall contain a handle or device at its base to assist in manual operation.
5. Vertical doors shall be readily distinguishable from the adjacent walls and finishes such that the doors are easily recognizable as doors. Contrasting marking framing the opening shall be construed as readily distinguishable.
6. Vertical doors shall have an Exit Sign per Section 1011.1. Doors shall contain a label on the egress side with the words, "Exit Do Not Block" meeting the graphics requirements of Section 1011.5.1.
7. The door assembly shall comply with the applicable *fire protection rating* and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 715.4.8.3, shall be installed in accordance with NFPA 80 and shall comply with Section 715.
8. The door assembly shall have an integrated standby power supply per Section 2702.1.
9. The door assembly power supply shall be electrically supervised.
10. The door shall open to the minimum required width and height within 10 seconds after activation of the operating device. An audible alarm while the door is in motion shall sound. The audible alarm shall meet the requirements of Section 907.5.2.1.1.

11. Vertical opening size shall comply with minimum width requirements of Section1008.1.1. The maximum width of vertical doors shall be limited to their listing width.
12. Vertical opening height shall be not less than 80 inches.

(Renumber subsequent sections)

Revise text as follows:

1008.1.2 Door swing. Egress doors shall be of the pivoted or side-hinged swinging type.

Exceptions:

1. Private garages, office areas, factory and storage areas with an *occupant load* of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single dwelling unit in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1008.1.4.1.
6. In other than Group H occupancies, horizontal sliding doors complying with Section 1008.1.4.3 are permitted in a *means of egress*.
7. Power-operated doors in accordance with Section 1008.1.4.2.
8. Doors serving a bathroom within an individual sleeping unit in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 or less.
10. In other than Group H occupancies, vertical doors complying with Section 1008.1.4.6 are permitted in a means of egress.

Doors shall swing in the direction of egress travel where serving an *occupant load* of 50 or more persons or a Group H occupancy.

Commenter's Reason: Doors other than side-swinging doors have had special classifications for some time- turnstiles, revolving doors, and horizontal sliding doors suitable for egress are the most common. Horizontal sliding door classifications for egress were first developed more than 2 decades ago for Won Door's then unique bi-fold door and wall system. Since that time there have been multiple manufacturers whose opening protectives are not side swinging, but can meet the same performance and safety requirements for horizontal sliding doors while have a different orientation. This change is recognition of any door system orientation that meets the safety and egress provisions of the Code is acceptable.

The new Section takes the horizontal door requirements and incorporates them into this new section as recommended by the Committee when the original proposal was heard. This new section is also referencing other sections of the Code that has specific requirements to address committee comments during the last two cycles when these doors have been addressed. Those concerns include audibility for the sight impaired when the door is rising, emergency power to operate the door automatically with the same provisions of power operated doors, and visibility requirements that distinguish the door from adjacent walls.

This comment should not be treated as new material since it follows the dictates of the committee over the last two revisions cycles and only references current code sections. In 2 code cycles each of these provisions has been discussed on the floor. This comment has been reformatted into a new section based upon committee comments.

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

Final Action: AS AM AMPC____ D

E61-09/10
1008.1.9.3

Proposed Change as Submitted

Proponent: Jim McClintic, Sandy City, representing the Utah Chapter

Revise as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship, the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   2.1. The locking device is readily distinguishable as locked;
   2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   2.3. The use of the key-operated locking device is revocable by the building official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.

4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool and complying with the height requirements outlined in Section 1008.1.9.2.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.

Reason: This additional language will clarify hardware height requirements in these locations and help eliminate the confusion when this section of the code is being enforced.

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

ICCFILENAME:Mcclintic-E1-1008.1.9.3

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The reference to Section 1008.1.9.2 for height provides direction for the code official for where the "night latch, dead bolt or security chain" in hotel rooms must be installed when these locks are used for purposes other than just security.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jim Budzinski, requests Disapproval.

Commenter's Reason: The proposal intended modify Section 1008.1.9.3 to establish the minimum and maximum dimensions listed in 1008.9.2 and eliminate the provision permitting "..night latch, dead bolt or security chain…" in individual dwelling or sleeping units to be permitted at any height. The proposed reference to Section 1008.1.9.2 maintains the three conditions for the installation of locks and latches. The conditions include a minimum height, a maximum height, and if "…used only for security purposes and not used for normal operation…" any height; this provides no clarification to condition 4 of 1008.9.3 as intended by the proposal. The devices specified in 1008.9.3 are clearly used for 'security purposes.'

Final Action: AS AM AMPC____ D

E62-09/10
1008.1.9.3 (IFC [B] 1008.1.9.3)

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship, the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   2.1. The locking device is readily distinguishable as locked;
   2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   2.3. The use of the key-operated locking device is revocable by the building official for due cause.

3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.
6. Doors serving outdoor areas specified in Section 1004.8 having an occupant load of 300 or less are permitted to be equipped with key-operated locking devices from the egress side provided:
   6.1. The locking device is readily distinguishable as locked;
   6.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THE BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background;
   6.3. A two-way communication system complying with Sections 1007.8.1 and 1007.8.2 shall be provided on the egress side.
   6.4 The use of the key-operated locking device is revocable by the building official.

Reason: Egress from confined outdoor areas, as required by Section 1004.8, is necessary. Unfortunately, many building owners are reluctant to leave required egress doors from these areas unlocked for security reasons, which places the public at risk. Fire Code officials, who conduct maintenance inspections, and building owners are at odds on this issue. It makes sense to recognize that this conflict exists and place safeguards in the code to eliminate the conflict. The two-way communication system will allow an occupant to call for help if the egress is accidently locked while the outdoor area is occupied. This new text is similar to exception #2 of Section 1008.1.9.3 as it relates to an allowance to lock egress doors under certain conditions.

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

ICCFILENAME: KRANZ-E2-1008.1.9.3.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: It is not clear which side of the door (i.e., inside or outside) the signage should be located on. The reference to Section 1004.8 could include yards and courts where egress may be directly provided without going through the building. There were questions about the two-way communication system: Who would it go to? What is the purpose? This could be problematic with smaller facilities or with multiple balconies.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lee J. Kranz representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.3 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship , the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   2.1. The locking device is readily distinguishable as locked;
   2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   2.3. The use of the key-operated locking device is revocable by the building official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.
6. Required egress doors serving outdoor areas having an occupant load of 300 or less where a required path of egress travel from the outdoor area passes through the building ~~specified in Section 1004.8 having an occupant load of 300 or less~~ are permitted to be equipped with key-operated locking devices ~~from the egress side~~ provided:

6.1 The locking device is readily distinguishable as locked;
6.2 A readily visible durable sign is posted on the ~~egress~~ interior side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THE ~~BUILDING~~ OUTDOOR AREA IS OCCUPIED. The sign shall be in letter 1 inch high on a contrasting background;
6.3 A two-way communication system complying with Sections 1007.8.1 and 1007.8.2 shall be provided on the egress side.
6.4 The use of the key-operated locking device is revocable by the building official for due cause.

Commenter's Reason: When occupants from an outdoor area must re-enter the building for egress purposes, Section 1004.8 requires the means of egress serving the outdoor area to comply as though it were any other occupied room in the building. Currently egress doors serving these outdoor areas must remain unlocked to maintain safe egress. Building owners and tenants typically install locks on these egress doors for security purposes, which potentially creates an obstruction for safe egress and places the public at risk.

The language for this proposal has been modified to address comments made by the Means of Egress Committee in Baltimore. Specifically, the committee suggested 1) the signage should be on the interior side of required egress doors, and 2) limit the use of the exception to outdoor areas where occupants must pass through the building. They also asked about the need to install a two-way communication system accessible from the outdoor areas where occupants must pass through the building. A two-way communication system would allow occupants to call for help if the egress door is accidently locked. Two-way communication system requirements are currently found in IBC Section 1007.8.1 & 1007.8.2. Section 1007.8.1 specifies connection to a fire command center or central control point approved by the fire department. If the fire command center is not provided or the central control point is not constantly attended then connections to an approved monitoring location or 911 dispatch are required.

This exception allows locking the required egress doors serving outdoor areas where the egress path is through the building as long as:
1) the locking device is distinguishable as locked,
2) a sign is provided on the interior side of the door requiring the doors to remain unlocked while the outdoor area is occupied,
3) a two-way communication system is provided,
4) the exception is revocable by the building official if all the above conditions are not met.

Final Action: AS AM AMPC____ D

E63-09/10
1008.1.9.3 (IFC [B] 1008.1.9.3)

Proposed Change as Submitted

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

Revise as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Approved locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship, the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   2.1 The locking device is readily distinguishable as locked;
   2.2 A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   2.3 The use of the key-operated locking device is revocable by the building official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.
6. In Group I-2 occupancies housing clients where the means of egress needs to be secured for the safety of the clients provided all the following requirements are met:
   6.1 The facility is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1,
   6.2 The doors unlock upon actuation of the automatic sprinkler system,
   6.3 The doors unlock upon activation of the automatic smoke detection system,
   6.4 The doors unlock upon loss of power controlling the lock or lock mechanism,
   6.5 The door locks shall have the capability of being unlocked by a signal from an approved location,

6.6 Emergency lighting is provided at the door, and
6.7 The facility is constantly staffed.

Reason: The new language addresses the problem faced by providers of patients suffering from Alzheimer's or Dementia wandering out of facilities and endangering their persons. Cognitive impairments caused by these diseases and other forms of dementia, render the residents of this type of facility unable to make the most appropriate decisions for their safety and welfare. This proposal would allow for door locking arrangements without delayed egress locks that are currently approved in health care type occupancies.

These patients can be very quick and mobile. The delayed egress lock poses a very challenging situation for staff when providing care for these patients who seek wandering or "exit seeking" associated with their disease.

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

Analysis: A concern would be how this proposal will coordinate with Section 1008.1.9.6 Special locking arrangements in Group I-2.

ICCFILENAME:Lariviere-E1-1008.1.9.3

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposals addresses the unique locking arrangements in Group I-2 where the need is also to protect the clients, however, some of the facilities where this is needed are not necessarily medical facilities.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Joe Pierce, Dallas Fire Department, representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3] Locks and latches. *Approved* locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. through 5. *(No change to current text)*

~~6. In Group I-2 occupancies housing clients where the *means of egress* needs to be secured for the safety of the clients provided all the following requirements are met:~~

- ~~6.1. The facility is protected by an *automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3,~~
- ~~6.2. The doors unlock upon actuation of the *automatic sprinkler system*,~~
- ~~6.3. The doors unlock upon actuation of the *automatic fire detection system*,~~
- ~~6.4. The doors unlock upon loss of power controlling the lock or lock mechanism,~~
- ~~6.5. The door locks shall have the capability of being unlocked by a signal from an approved location,~~
- ~~6.6. Emergency lighting is provided at the door, and~~
- ~~6.7. The facility is constantly staffed.~~

1008.1.9.6 (IFC [B] 1008.1.9.6) Special locking arrangements in Group I-2. Approved ~~delayed~~ special egress locks shall be permitted in a Group I-2 occupancy where the clinical needs of persons receiving care require such locking. ~~Delayed~~ Special egress locks shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 ~~or~~ and an approved automatic ~~smoke or heat~~ fire detection system installed in accordance with Section 907, provided that the doors ~~unlock~~ are installed and operated in accordance with Items 1 through ~~6~~ 7 below. ~~A building occupant shall not be required to pass through more than one door equipped with a delayed egress lock before entering an exit.~~

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center, a nursing station or other approved location.
4. A building occupant shall not be required to pass through more than one door equipped with a special egress lock before entering an exit.
5. ~~4.~~ The procedures for the operation(s) of the unlocking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the *International Fire Code*.
6. ~~5.~~ The facility shall be constantly staffed and all clinical staff shall have the keys, codes or other means necessary to operate the locking devices.
7. ~~6.~~ Emergency lighting shall be provided at the door.

Exception: Items 1 through ~~3~~ 4 shall not apply to doors to areas where persons which because of clinical needs require restraint or containment as part of the function of ~~a mental hospital~~ psychiatric treatment areas.

Commenter's Reason: Code Change E63 was Approved as Submitted. However, the language approved in Item 6 of Section 1008.1.9.3 creates an overlap when compared to the language in Section 1008.1.9.6 which was Approved as Modified by G65-09/10. Therefore, the intent of this Public Comment is:

1. Combine the approved language in E36-09/10 with the approved language in IBC 1008.1.9.6 in G65-09/10. Accordingly, these revisions are: modification of the term "unlock" with the phrase "installed and operated"; relocation of the last sentence in the main paragraph to Item 4; and inclusion of Item 4 in the Exception; and revision of the phrase "a mental hospital" to "psychiatric treatment areas" in the Exception.
2. Maintain the requirement for "approved" locks that is specified in 1008.1.9.3.
3. Delete Item 6 from 1008.1.9.3, because it will now be covered in 1008.1.9.6.
4. Add the requirement for constant staffing from 1008.1.9.3 Item 6.6 into 1008.1.9.6 Item 6.
5. The allowance of either fire sprinkler system OR a fire detection system is deleted. Section 4603.4.2 requires fire sprinklers in all existing Group I-2 occupancies and Section 4603.6.3 requires a fire alarm system in all existing Group I-2 occupancies. Therefore, both systems should be present whether the building is new or existing, and requiring both systems to be present is consistent with the requirements in the IBC and IFC.

The revised sections address the problem faced by care providers of patients suffering from Alzheimer's or Dementia wandering out of facilities and endangering their persons. Cognitive impairments caused by these diseases and other forms of dementia, render the residents of this type of facility unable to make the most appropriate decisions for their safety and welfare. This proposal would allow for door locking arrangements which may be delayed egress locks, but more frequently are other types of approved locking arrangements.

Public Comment 2:

Paul K. Heilstedt, PE, Hon. AIA, Chair, representing ICC Code Technology Committee (CTC), requests Disapproval.

Commenter's Reason: The proponent correctly notes the need to address special locking arrangements for patients with Alzheimer's or Dementia. However, these provisions are not coordinated and conflict with the provisions in Section 1008.9.16 which were added last cycle via a public comment to E51-07/08 by the CTC to specifically address these conditions. Language of Section 1008.1.9.6 is unique to Group I-2 and the minor issues raised in portions of the proposed new language, such as "constantly staffed", were debated and rejected during the last cycle. We urge the membership to simply deny this change and don't create conflicts in language or loop holes for poor locking arrangements in Group I-2 uses. Approval of E63 will cause an unintended conflict within the code. The CTC supports the modifications to Section 1008.1.9.6 as modified in Code Change G65-09/10.

Final Action: AS AM AMPC____ D

E64-09/10
1008.1.9.4 (IFC [B] 1008.1.9.4)

Proposed Change as Submitted

Proponent: Gene Boecker, AIA, Code Consultants, Inc., representing Code Consultants, Inc.

Revise as follows:

1008.1.9.4 (IFC [B] 1008.1.9.4) Bolt locks. Manually operated flush bolts or surface bolts are not permitted.

Exceptions:

1. On doors not required for egress in individual dwelling units or sleeping units.
2. Where a pair of doors serves a storage or equipment room, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf.
3. Where a pair of doors serves an *occupant load* of less than 50 persons in a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf. The inactive leaf shall contain no doorknobs, panic bars or similar operating hardware.
4. Where a pair of doors serves a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf provided such inactive leaf is not needed to meet egress width requirements and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The inactive leaf shall contain no doorknobs, panic bars or similar operating hardware.
5. Where a pair of doors serves patient care rooms in Group I-2 occupancies, self-latching edge or surface-mounted bolts are permitted on the inactive leaf provided that the inactive leaf is not needed to meet

egress width requirements and the inactive leaf contains no doorknobs, panic bars or similar operating hardware.

6. Where pairs of doors are installed in accordance with Section 1008.1.9.3, item 2, the inactive leaf shall be permitted to be equipped with manually operated surface or flush bolts provided the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and the inactive leaf is not required for means of egress width.

Reason: This recognizes one of the current practices in the construction industry. Whether we choose to admit it or not, the standard manner in which the doors are installed in compliance with item #2 for Section 1008.1.9.3 is that the active leaf has the readily distinguishable lock and sign while the inactive leaf is simply held in place by flush (edge) bolts. It is the flush bolt that keeps the inactive leaf secure so that the active leaf can be locked when the building is not occupied.

Although it could be easy to simply recognize this condition and include it alone, the exception adds the requirement for sprinkler protection as an added measure of safety. It also differentiates this exception from exception #3 which limits the occupant load to less than 50 and does not address sprinkler protection.

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

ICCFILENAME:Boecker-E2-1008.1.9.4

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Any door that looks like a means of egress must meet means of egress door requirements. The correct enforcement at doors where they are intended for the movement of equipment and not for a means of egress would be to prohibit hardware on the door so it was obvious that it is not normally operational – the proposal would allow hardware on the inactive leaf.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gene Boecker, Coe Consultants Inc., requests Approval as Submitted.

Commenter's Reason: The original proposal seeks to address a condition that is present in current construction. It broadens the existing exception #4 in that it would apply to more occupancies – M, Assembly with an occupancy of 300 or less and places of worship. However, consistent with the provisions of 1008.1.9.3(2) it also requires the door to be readily distinguishable as locked; labeling of the door with the "THIS DOOR TO REMAIN OPEN. . . " sign and that the key operated locking device provision is revocable by the building official for due cause. Additionally the new exception would allow this only in sprinklered buildings.

The committee stated that any door that looks like a means of egress must meet the means of egress requirements. That is clearly not the case since doors to storage areas are allowed to be locked and the current exceptions allow for doors that are not required for egress capacity to be locked. Also, the application to assembly is limited at best since all assembly occupancies must now have panic devices the ability to use flush or surface bolts would only be where there is a large excess of doors provided such as is provided.

The truth is that the condition exists in many, many buildings today. A storefront system is constructed with a pair of doors and only a single leaf is needed for capacity. The second leaf will be provided with flush bolts as well as door hardware to be used when the door is unlocked. In these situations (and even when exceptions #3 and #4 are used) the inactive leaf will be provided with hardware so the doors have a symmetry.

The fact that these conditions exist is testimony to the fact that there are no major problems with the concept. The opponents did not identify where a single installation exists with the proposed conditions that proved to be problematic to life safety. It is time we recognized this condition and addressed it directly in the code.

Final Action: AS AM AMPC____ D

E65-09/10
1008.1.9.8 (IFC [B] 1008.1.9.8)

Proposed Change as Submitted

Proponent: Edward A. Hite, CML, representing self

Revise as follows:

1008.1.9.8 (IFC [B] 1008.1.9.8) Electromagnetically locked egress doors. Doors in the means of egress ~~that are not otherwise required to have panic hardware~~ in buildings with an occupancy in Group A, B, E, M, R-1 or R-2 and doors to tenant spaces in Group A, B, E, M, R-1 or R-2 shall be permitted to be electromagnetically locked if equipped with listed hardware that incorporates a built-in switch and meet the requirements below:

1. The listed hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.
2. The listed hardware is capable of being operated with one hand.
3. Operation of the listed hardware releases ~~to~~ the electromagnetic lock and unlocks the door immediately.
4. Loss of power to the listed hardware automatically unlocks the door.

Reason: Bars tested and listed to release electromagnetic locks include both panic bars and fire exit hardware. When power is removed from a listed electromagnetic lock, it will release in less than ½ second. Bars with switches directly release that power. The number of people going through the door has no bearing on this.

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

ICCFILENAME: HITE-E2-1008.1.9.8

Public Hearing Results

Committee Action: **Approved as Modified**

Replace the proposal with the following:

1008.1.9.8 (IFC [B] 1008.1.9.8) Electromagnetically locked egress doors. Doors in the means of egress ~~that are not otherwise required to have panic hardware~~ in buildings with an occupancy in Group A, B, E, M, R-1 or R-2 and doors to tenant spaces in Group A, B, E, M, R-1 or R-2 shall be permitted to be electromagnetically locked if equipped with listed hardware that incorporates a built-in switch and meet the requirements below:

1. The listed hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.
2. The listed hardware is capable of being operated with one hand.
3. Operation of the listed hardware <u>directly</u> releases ~~to~~ the electromagnetic lock and unlocks the door immediately.
4. Loss of power to the listed hardware automatically unlocks the door.
5. <u>Where panic or fire exit hardware is required by Section 1008.1.10, operation of the listed panic or fire exit hardware also releases the electromagnetic lock.</u>

Committee Reason: Panic hardware should be permitted where electromagnetic locks are utilized. The modification to Items 3 and 5 clarifies that the release of the lock must be automatic with the operation of the panic bar.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Edward A. Hite, CML, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.8 (IFC [B] 1008.1.9.8) Electromagnetically locked egress doors. Doors in the means of egress in buildings with an occupancy in Group A, B, E, M, R-1 or R-2 and doors to tenant spaces in Group A, B, E, M, R-1 or R-2 shall be permitted to be electromagnetically locked if equipped with listed hardware that incorporates a built-in switch and meet the requirements below:

1. The listed hardware that is affixed to the door has an obvious method of operation that is readily operated under all lighting conditions.
2. The listed hardware is capable of being operated with one hand.
3. Operation of the listed hardware directly ~~releases~~ <u>interrupts the power to</u> the electromagnetic lock and unlocks the door immediately.
4. Loss of power to the listed hardware automatically unlocks the door.
5. Where panic or fire exit hardware is required by Section 1008.1.10, operation of the listed panic or fire exit hardware also releases the electromagnetic lock.

Commenter's Reason: Proponent believes that the wording "interrupts the power to" is clearer than "releases."

Public Comment 2:

Kurt Roeper, Cincinnati, OH, representing Ingersoll Rand, requests Disapproval.

Commenter's Reason: The existing language of Section 1008.1.9.8, as it appears in the 2009 IBC, limits electromagnetic locking of egress doors to those *"that are not otherwise required to have panic hardware…"* The existing language is a clear recognition of the scope of panic and fire exit devices, in that they are not listed to act as switching devices for secondary electromagnetic locks on doors in the means of egress.

In support of this position, please consider the following from Underwriters Laboratories;

"From the proposal, when you push the pad the latches would unlock and a switch would turn off power to the magnet to release the door. Therefore this arrangement could not be covered as panic, FVSR, or fire exit hardware, GXHX. UL 305 would need to be revised to allow a magnet before it could be covered as panic, FVSR, or fire exit hardware, GXHX. "

Edgar Wolff-Klammer Principal Engineer - Exit Devices
Underwriters Laboratories

I respectfully request disapproval of E65 until such time as UL 305 has been revised to permit such applications.

Final Action: AS AM AMPC____ D

E66-09/10
1008.1.9.10 (IFC [B] 1008.1.9.10)

Proposed Change as Submitted

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

Revise as follows:

1008.1.9.10 (IFC [B] 1008.1.9.10) Stairway doors. Interior stairway means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. Stairway discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. ~~In stairways serving not more than four stories,~~ Stairway doors are permitted to be locked from the stairway side ~~opposite the egress side, provided they are openable from the egress side and~~ when the stairway serves no more than four stories and the doors are capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.
4. Stairway doors are permitted to be locked from the stairway side when the stairways serves no more than two stories and the stairway discharge door leads directly to the exit discharge and a key box is provided in accordance with Section 506 of the International Fire Code.

Reason: Many buildings are concerned with security and reentry into the building from the stairways. As a result, building owners and managers desire to lock the stairwell doors to prohibit entry onto the floor from the stairwell. This practice of locking the stairwell doors increases the building security.

This proposal will provide an additional exception for buildings not more than two stories in height. This new exception will allow for the prohibition of reentry from the stairwell as long as a key box is provided for fire department use. The fire department could access the key box and unlock the stairwell doors for fire use.

The current requirements are allow for the locking of these doors, but only is an electric override is provided within the building for fire department use. The current requirement is overly restrictive for stairways serving only two stories, and this exception will provide another option for building owners and managers.

Item 4 is added to provide the allowance for doors to be locked when the building serves no more than 2 stories. Item 3 is revised without changing the intent. This revision is to simplify the wording and clarify the section. This wording is similar to the current wording in Section 403.5.3.

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

ICCFILENAME:Lariviere-E3-1008.1.9.10

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: While there are security issues in low rise buildings, the proposed language would allow the locking of the exit discharge door at the level of exit discharge.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Joe Pierce (Chairman), representing Joint Fire Service Review Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1008.1.9.10 (IFC [B] 1008.1.9.10) Stairway doors. *Interior stairway means of egress* doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. In stairways serving not more than four stories, *stairway* doors are permitted to be locked from the *stairway* side ~~opposite the egress side,~~ provided: ~~they~~
   3.1. The doors are openable from the egress side; ~~and~~
   3.2. The *stairway* discharge door is always openable from the stairway side; and
   3.3. The doors are capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.
4. In stairways serving not more than two stories, *stairway* doors are permitted to be locked from the stairway side provided:
   4.1. The doors are openable from the egress side;
   4.2. The *stairway* discharge door leads directly to the exterior;
   4.3. The *stairway* discharge door is always openable from the stairway side; and
   4.4. A key box is provided in accordance with Section 506 of the *International Fire Code* which contains keys to unlock the *stairway* doors.

Commenter's Reason: This proposal was Disapproved at the Code Development Hearing because the Code Development Committee felt that the revisions would allow for the stairway discharge door to also be locked. This was not the intent of the code change, so the revisions have been reformatted to clarify that the discharge door from the stairway is always to remain unlocked from the stairway side.

This Public Comment reformats Items 3 and 4 to provide a clearer understanding of the conditions for allowing the stairway doors to be locked. Item 3 addresses stairways up to 4 stories in height, and Item 4 is limited to stairways up to 2 stories in height.

Final Action: AS AM AMPC____ D

E74-09/10, Part I
1009.4.2 (IFC [B] 1009.4.2)

Proposed Change as Submitted

Proponent: Jake Pauls, representing self

PART I – IBC MEANS OF EGRESS

Revise as follows:

1009.4.2 (IFC [B] 1009.4.2) Riser height and tread depth. Stair riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the leading edges of adjacent treads. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. Winder treads

shall have a minimum tread depth of 11 inches (279 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. Alternating tread devices in accordance with Section 1009.10.
2. Ship ladders in accordance with Section 1009.11.
3. Spiral stairways in accordance with Section 1009.9.
4. Aisle stairs in assembly seating areas where the stair pitch or slope is set, for sightline reasons, by the slope of the adjacent seating area in accordance with Section 1028.11.2.
5. In ~~Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in~~ Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; the maximum riser height shall be 7 ¾ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum winder tread depth at the walkline shall be 10 inches (254 mm); and the minimum winder tread depth shall be 6 inches (152 mm).A nosing not less than ¾ inch (19.1 mm) but not more than 1 ¼ inches (32 mm) shall be provided on stairways with solid risers where the tread depth is less than 11 inches (279 mm).
6. See Section 3404.1 for the replacement of existing stairways.
7. In Group I-3 facilities, stairways providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

Reason: This is purely a technical change affecting maximum and minimum rise and tread depth dimensions respectively. This is the long overdue mainstreaming of the so-called "7-11" step geometry in terms of maximum rise and minimum tread depth. (The proponent has submitted a separate change proposal which simply formats and restates the current requirements; that proposal and this one should be dealt with separately or independently as their purposes and effects are different.)

Much has been written about this topic, especially around 2003 in relation to the IRC and the NFPA codes (NFPA 101 and NFPA 5000 which adopted this change to the mainstreamed "7-11" step geometry at that time. Since that day nobody has attempted to revert to pre-"7-11" criteria for dwelling unit stairs within NFPA and for non-dwelling unit stairs within ICC. The "7-11" minimum standard is the most widely used step geometry standard internationally and reasons for keeping it at least the minimum standard have grown. This is because all the recent research on use of stairs—*including the matter of falls on stairs, including injurious ones*—confirms that it is a very reasonable minimum standard and that it is a long way—about three inches or more—from an "optimum" standard.

The very extensive 2003 proposal I submitted to both ICC and NFPA is not reproduced within this proposal for reasons of length and, more importantly, its free availability on the Internet, specifically the Downloads area of my website, http://web.me.com/bldguse. Once within the Downloads area (where over a hundred PDF files can be freely downloaded on stairway usability and safety plus means of egress performance), simply open the folder titled, "Home Stairway Safety and Codes," and download the 3.4 MB, 40-page file, "Pauls-R311-2003.pdf." Here follows an outline of what was covered in that proposal which I submitted to ICC with NFPA getting a comparable, earlier one that was approved by NFPA members and withstood technical and procedural challenges from the NAHB.

Benefit-Cost Analysis for Improved Stairs in the USA
Injury Epidemiology
History of Debate on Improved Step Geometry Requirements in Codes & Standards
Benefits and Costs
Industry's and Regulators' Reviews of Research
Latest Research on Step Geometry from Britain
Politically-driven Local and State Adoption Process
Building and Marketing Improved Stairs
The Problem of the Double Standard
Intimidation of Building Officials
Roles of NFPA and APHA
Summary.

What Has Changed Since 2003?

The changes for the worse appear to be directly attributable to even worse home stair construction and regulation than existed before 2003. This is seen in Figure 1 which shows the growth of home stair-related injuries that are NOT due to the aging of the population—as this was checked out to learn that people under 65 and those 65 or more in age both contributed in more or less the same proportion to the substantial growth in home stair, related injuries. A recent, widely-circulated document described the statistical insights as follows: "For both 1997 and 2007, the percentage of NEISS-reported injuries for the 65-and-older group was 15.3 percent plus/minus 0.4 percent for both home settings and all settings." Thus, both before and after 1997, elderly persons were only slightly—but consistently—over-represented in hospital emergency department-treated injuries associated with stairs as reported in national estimates by the US Consumer Product Safety Commission. (The note, titled "The Home Stairway Safety Problem and Related Code Development, Adoption and Enforcement Problems in the USA," is also posted for free downloading from the website "http://web.me.com/bldguse" Downloads area as file "Pauls2009Letter&InjuryNote" within the folder titled, "Home Stairway Safety and Codes.") A list of the topics addressed therein is provided below Figure 1.

Figure 1 shows an extraordinary growth in the US national estimates from the US CPSC/NEISS for stair-related injuries, particularly in homes. The average annual rate of increase in the last several years exceeds the average annual rate of US population growth by a factor of about five while stair-related injuries in non-home settings decrease slightly, resulting in about a 2 percent reduction annually for non-home stairs over the last several years—since about 1998. During these several years there has been increasing use of the "7-11" minimum step geometry standard for non-home stairs, thanks to the adoption—beginning in the 1980s—of this standard in model building codes. This is further evidence of a partial success

story on the stairway safety front and ICC members might rightly claim some of the credit for this partial success. Now building officials who control the adoption of the requirements in model codes need to finish the job where it will count most, in homes.

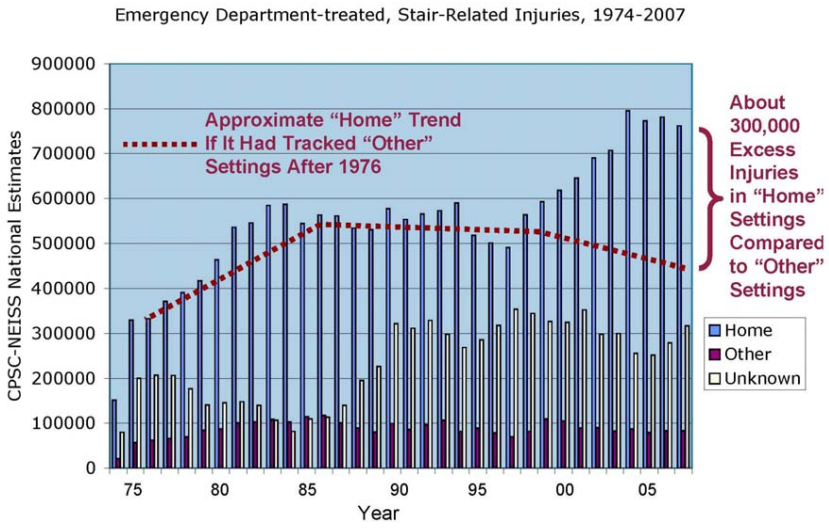


Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years.

Updating the 2003 ICC proposal on mainstreaming the "7-11" minimum standard was the note which began circulating in February of 2009. Here are the topics it addressed in its 26 pages (including over two pages of references and additional resources).

Preface
Injury Epidemiology
- CPSC-NEISS Data
- Injury Increase Comparisons
- Excess Injuries for Home Stairs
- Are Recent Increases Due to the Aging Population?

Statistical Issues
- Uncertainty in the NEISS Data
- Societal Cost of Stair-related Injuries
- Estimated Cost of Two Million Excess Home Stair-related Injuries, 1998 to 2007

Are We Finally Paying the Price for Code-triggered Defects in Home Stairways, Compared to Other Stairways?
- In the Mostly Bleak, Stair Safety Field, A Possible Success Story in Non-home Settings
- Why Are Home Stairways Relatively Dangerous?
- The Role of Code Development, Adoption and Enforcement

History of Some Relatively Important Influences on Stairway Safety and Its Regulation
- Step Geometry
- Step Geometry Uniformity
- Systemic Tread Run Non-uniformities Common in Many Recently Constructed Homes
- Resulting Misstep and Fall Scenarios
- Systemic Uniformity Defect Superimposed Upon Another Systemic Step Geometry Defect
- An Abbreviated History of Step Geometry Rules and Related Issues
- Homebuilders
- Business Arrangement Between ICC and NAHB, Among Other Strategic Partners
- NAHB Bias on ICC Committees Responsible for IRC
- Hypocrisy in ICC's Business Deal with NAHB
- Consumer-supplied Evidence of Step Geometry Efficacy
- Combination of the NAHB-favored Short Stair Treads with Top-of-Flight

Non-uniformities and with Dysfunctional Handrail Systems
- Recent Critique of Type II Handrails and Study Used to Justify Them
- ICC Codes and Stairway Defects
- What Homeowners Must Now See (beyond the failings of ICC and the code-based regulatory process generally).
- With Flawed Code Inspection, Consumers Need to Do Their Own Stair Inspection
- Recommendations: What ICC and Other Organizations Urgently Need to Do

Appendix A: Abbreviated History of Step Geometry Rules and Related Issues
Appendix B: Code of Ethics of International Code Council (ICC) and predecessor organization, Council of American Building Officials (CABO)\
References and Guide to Resources.

The 2003 proposal to ICC, "Pauls-R311-2003," included substantial benefit-cost information about stair step geometry in homes which must be updated to take account of recent, dramatic growth in home stair-related injuries (in terms of CPSC-NEISS national estimates) as well as higher-than-general inflation rates for medical treatment costs. The latter are currently running at about $1 million per hour in the USA with total, societal costs running at about $10 million per hour in the USA.

Societal Cost of Stair-related Injuries. Currently, for the USA, the annual societal costs of home stair-related injuries—currently comprising about 89 percent of all stair-related injuries where the location or setting is known—are on the order of $100 billion annually for comprehensive,

societal costs. (The basis for the 89-percent figure is the NEISS data described above.) The basis for the societal cost (the sum of medical care costs, direct productivity losses and pain-and-suffering or quality of life costs) is a paper by Lawrence, *et al.* (1999). (Among coauthors for this paper are internationally recognized experts in burden of injury, like Ted Miller.) They estimated a societal cost (in 1997 dollars) of $46.7 billion for stair-related injuries occurring in 1995. For that year the NEISS national estimate for US emergency department-treated, stair-related injuries was 892,610 for all settings and 517,641 for homes. Between 1995 and 2007 these increased, respectively, to 1,161,915 (a 30-percent increase) and 761,881 (a 47-percent increase). (These national estimates for 1995 are the "adjusted" ones obtained via the NEISS website; they correct for a change in NEISS sampling that took effect in January 1, 1997.)

Accounting also for inflation (of about 3 to 4 percent annually—although medical care increases were higher), we can assume that, for 2007, the societal costs for stair-related injuries in the USA were on the order of $100 billion in 2007 dollars (including on the order of $10 billion for medical care, $20 billion for direct productivity losses, and $70 billion for pain and suffering or quality of life costs—with this estimated distribution based on a personal communication with Bruce Lawrence and Ted Miller, among the authors of the above noted paper). This cost was about an order of magnitude greater than the annual construction cost of new stairs (just prior to the recent economic downturn) in the USA. For an analysis of home and stair construction costs see Pauls (2003). The smallest cost component, medical care, is about one million dollars per hour in the US."

Quoting also from the paper by Pauls, 2009 on "Injury Increase Comparisons: The apparent, relatively rapid increase recently in home stair-related injuries has an average annual growth rate of about 4.5%, a few times greater than annual population growth (1%). The overall increase, over a three-decade period, was about 130 percent with the most recent ten-year period showing a 55-percent increase. By contrast, fire-related injuries (the majority of which occur in homes), a major concern traditionally in safety standards and codes, have shown a three-decade pattern of average annual *decrease* of about 2 percent. (If fire-related injuries were plotted on Figure 1A, that plot would be appear very close to the base of the graph, declining from about 50,000 to about 25,000 annual injuries over a three-decade period.) Moreover, the trend for all NEISS injury national estimates for home settings—other than stairs, during the period 1997-2007 has a 39-percent increase over the same last ten-year period when home stair-related injuries increased by 55 percent. For *all* products and settings, the increase in NEISS national estimates over the same 1997-2007 period was only 19 percent, about the same as the 18-percent increase for stairs in other settings (i.e., not homes). From this, and other analyses the author has performed with the CPSC-NEISS data, we can see generally, that homes generally are the major site for injuries, relative to other settings; homes account for about 49 percent of the NEISS national estimates of injuries during the 1997-2007 period.

Aside from fire-related injuries—these NEISS-reported national estimates of all injuries in home settings are increasing faster than in other settings (39 percent versus 19 percent for all NEISS national estimates during the 1997-2007 period).

NEISS national estimates of stair-related injuries in home settings have been increasing over the last ten years at a fast rate relative to NEISS national estimates for all NEISS-coded products (55 percent versus 19 percent) and relative to population growth (55 percent versus 10 percent). Over the 1997-2007 period, NEISS national estimates of home stair-related injuries comprised 89 percent of NEISS national estimates for stair-related injuries in all known settings. For early years of NEISS national estimates, specifically 1975-1977, this was 85 percent. Most of the increase in this proportion occurred since 1990.

Generally, in recent years stairs have accounted for about 9 percent of the NEISS national estimates for all products; home stairs accounted for about 6 percent; other settings' stairs accounted for less than 1 percent; unknown settings' stairs accounted for over 2 percent.
Stairs maintain their position, since the earliest days of CPSC-NEISS, as the leading product, associated with injuries coded by NEISS. Floors are the second leading category. See Lawrence, *et al.* (1999), Table 5, using data for 1995-1996, for an analysis for the top ten NEISS-coded products, ranked by injury cost, for various age groups. As well as ranking first for all ages, stairs rank first for 5 of 12 age groups (preschool children and middle-age adults) and second for another three. Only for the two highest age categories, 70-79 and 80 or more (for which stair use is relatively rare), do floors rank first, reflecting the contribution of gait and balance deterioration. However, stairs are still the second leading product for the 70-79 age group and third (after beds) for the 80-plus age group."

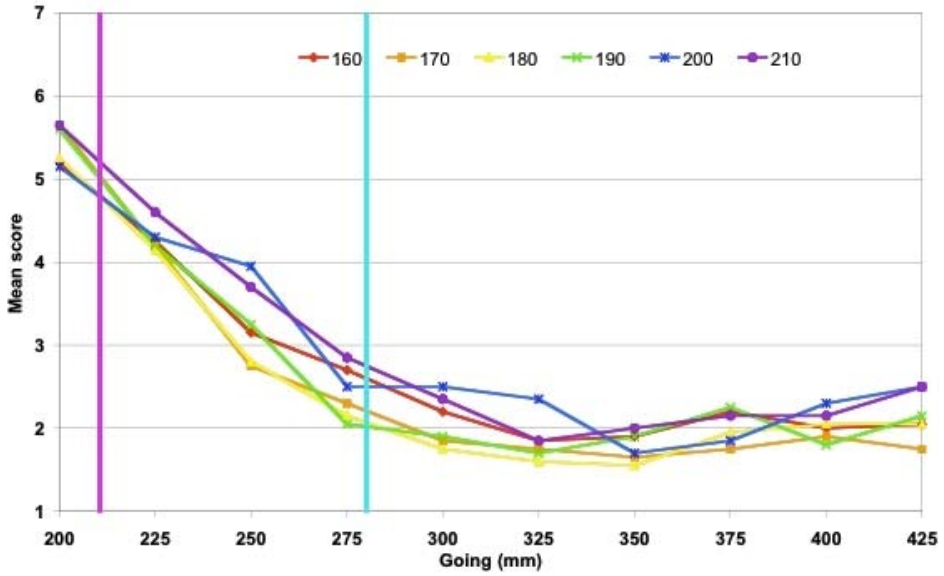
Laboratory and Field Research and Investigations of the Role of Step Geometry on Stairway Safety

The last several years have seen some important work on questions that have long troubled ICC members when addressing this issue of appropriate minimum standards for home step geometry. This work brings no comfort to those arguing that the minimum standards should stay as they are in the IRC and IBC or, even worse, that the NAHB's even lower standard should be the norm. The latter is based on NAHB's long-held national policy position which can be read directly on its website at "www.nahb.org/generic.aspx?sectionID=224&genericContentID=3093" (accessed June 1, 2009): "Support efforts by state and local affiliated Home Builder Associations to oppose the adoption of any new stair geometry that is not consistent with the requirements originally contained in the 1993 BOCA and 1992 CABO Codes by amending those provisions when adopting new editions of model building codes." This is the 8 1/4-inch maximum rise by 9-inch minimum tread depth that, especially with carpeting further degrading the usability and safety of the home stairs, makes them so dangerous and difficult to use. It is indeed beyond belief that, as the stair safety epidemic grows, the homebuilders insist on using a code that was out of date decades ago.

UK Research. Mike Roys and Mike Wright, UK Building Research Establishment have conducted some extraordinarily useful research in recent years, with the last of their papers published in May 2008. Working with a test stairway that offered 10 combinations of tread depth ("going" as it is called in the UK and "run" in some other places), in the range of 200 to 425 mm or 7.9 to 16.7 inches, with 6 combinations of rise height, in the range of 160 to 210 mm or 6.3 to 8.3 inches, they clearly showed the benefits of larger tread depths. Altogether, 60 adult subjects walked up and down each of 20 stair arrangements. Their work, while not completely published yet, is represented centrally in my recent one-day workshops on stairway usability and safety, the PowerPoint slides of which (including a fair selection of the BRE study slides) are available for downloading from my website in the folder titled, "Presentations at MUTN Conference in BC, Canada, April 2009." Papers on this work include Roys, 2001; Wright and Roys, 2005; and Wright and Roys, 2008. (Dr Wright moved to the USA in late 2008 so that now we are fortunate to have, in the USA, one of the top world talents in designing and conducting studies of step geometry and stair use performance.)

Answering a very old question in the code field, they showed that optimum tread depth in terms of many objective and subjective measures was much larger than 11 inches; 14 inches is about where this becomes optimum. The much-used 11-inch criterion is approximately where the graph of some of their findings, reproduced below as Figure 2, shows a change of direction from steep to more gradual slope and finally leveling off at the "optimum" tread depth of about 14 inches or 350 mm. This supports treating 11 inches as the minimum and clearly not the "optimum."

Figure 2. Graph of Findings from the UK Research by Wright and Roys, as Presented (in a PowerPoint) in 2005 at an International Conference on Falls in the UK.



The responses plotted here are to the scaled remark, "I felt safe walking down the stair," with the "most-safe" responses at the bottom of the curves.

The most recent of their papers, Wright and Roys (2008), contains some of the most interesting and valuable work—*in this case conducted in the field and inquiring into actual fall incidents as a function of home stairway rise and tread depth ("going" in the graph).* This is shown in Figure 3, onto which I have superimposed some of the criteria for US and Canadian home stair minimum tread depth, the same range shown in Figure 2 with the vertical bars at the left half of the Figure, specifically at the 210 and 280 mm, 8 1/4 and 11-inch minimum tread depth criteria. Note that any rounding or beveling of the nosing and presence of carpet and pad (in some cases, especially on typical home stairs), the effective tread depth is significantly reduced from these values so that the effective tread depth of some home stairs, built to code, is as small as 180 mm or 7 inches. Incidentally, the testing that led to the results in Figure 2, were with uncarpeted treads with no more than 13 mm or 1/2 inch loss of effective tread depth due to rounding of the nosing. The safety differences among the various tread depths are large and cannot be ignored.

Figure 3. Role of Stair Tread Depth ("Going" in UK) in Stair-related "Accidents" in Homes (PowerPoint slide based on Wright and Roys, 2008)

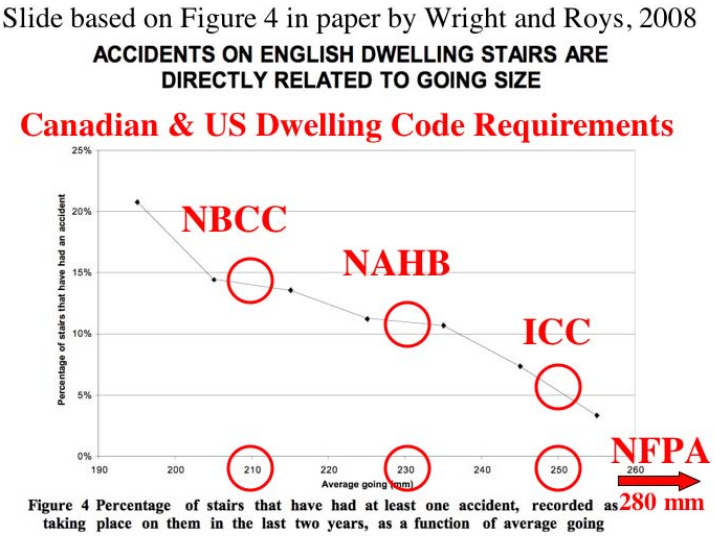


Figure 4 Percentage of stairs that have had at least one accident, recorded as taking place on them in the last two years, as a function of average going

Recent US Research on Step Geometry. While there are other studies that could be referenced and described here in relation to the step geometry issue, in the interests of time and space, I will note only one more. This was a paper based on 80 relatively intensively investigated stair-related fall injuries that led to litigation and subsequent investigation by one of the top three or so research and investigation experts in North America with excellent ergonomics credentials. The paper was published in January of 2009 *Professional Safety,* the peer-reviewed journal of the American Society of Safety Engineers and was titled, "Stairway Falls: an ergonomic analysis of 80 cases," by Cohen, LaRue and Cohen (2009). Among their conclusions they note: "In this analysis, excessive dimensional variation appeared to be the most pervasive factor in stairway fall causation, followed by noncompliance with the 7-11 design rule for risers and treads, respectively. As with dimensional variation, this investigation showed a tendency for staircase geometry to fall outside the recommended limits of established building codes. Therefore, stairs that do not follow these requirements are more likely to be involved in falls. It stands to reason that greater adherence to the criteria specified in existing codes (i.e., risers in the range of 7 in. and treads in the range of 11 in.) would decrease the number of actual stairway falls that occur. Therefore, it is essential for both architects and builders to adhere to existing codes regarding stairway dimensions. Furthermore, prevailing codes must be enforced by building code officials, plan checkers and field inspectors, since stair dimensions can often be overlooked in the haste to issue building occupancy permits."

Any ICC chapter wishing to have their members participate in a one-day workshop (also slated for presentation in Eastern Canada on September 14, 2009) should contact Jake Pauls. It is available in a not-for-profit mode. Code authorities should be prepared to deal knowledgeably with consumers who, upon discovering the defects in their home stairs, contact their local building department and ask for a re-inspection of their

home stairways. If there has been an injurious fall on such a stairway they should also be prepared to deal with resulting legal actions that might name the local building department as a third party defendant. (ICC itself is also a potential third-party defendant—as are homebuilders and their trade associations—a matter taken up in the so-called "New Orleans Declaration" I issued in the spring of 2009 and posted on my website Downloads area.) Inspectors should at least know about how measurements of the stair step geometry are performed that are of a quality expected in such litigation actions. These measurement techniques, usually requiring use of a spirit level or electronic level, are all described in the workshop materials posted on the above-mentioned website Downloads area and on the DVD of the Spring 2009 workshop noted above. These measurement techniques are consistent with the ICC requirements both as currently stated and as further clarified if the package of proposals I put forward is accepted.

As indicated with all of the epidemiological and etiological work outlined in this proposal, the home stair-related injury issue is many times larger than is the home fire-related injury problem. It should thus be nearly a no-brainer, after adopting home sprinkler requirements, for responsible ICC members to vote for the mainstreaming of the "7-11" step geometry standard. I will be counting on such ICC members and others who can sway opinion to speak out with conviction based on the primacy of their duties to the public, the first item in the code of ethics for certified officials, a code which is available on my website if it cannot be located on ICC's.

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

Roys, M.S. (2001). Serious stair injuries can be prevented by improved stair design. *Applied Ergonomics*, Vol. 32, pp. 135-139.

Wright, M. and Roys, M. (2005). Effect of changing stair dimensions on safety. In Bust, P.D. and McCabe (eds.) *Contemporary Ergonomics 2005*, Taylor and Francis Books, pp. 469-474.

Wright, M. and Roys, M. (2008). Accidents on English dwelling stairs are directly related to going size. In Bust, P.D. (ed.) *Contemporary Ergonomics 2008*. Taylor and Francis, 632-637.

Cost Impact: The code change proposal will increase the cost of construction. However, more importantly, the change will lead to much larger benefits in injury reduction and usability, especially for older users.

ICCFILENAME: Pauls-E4-1012.3

Public Hearing Results

Part I-IBC

Committee Action: **Disapproved**

Committee Reason: The injury data is not correlated with the type of stairways in the International Building Code. The data is subjective (i.e., "I felt comfortable on the stairs.").

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jake Pauls, Silver Springs, MD, representing self, requests Approval as Submitted.

Commenter's Reason: This comment adopts, by reference, all of the information in my accompanying comment on E74-09/10 Part 2 on the "7-11" rule for dwellings in the IBC. To that information is added the following pertaining specifically to E74-09/10 Part 1.

The IBC Means of Egress Committee gave the following reason for disapproval of E74-09/10 Part 1. "The injury data is not correlated with the type of stairways in the International Building Code. The data is subjective (i.e., "I felt comfortable on the stairs.")."

The paucity of content in this reason statement is astonishing in view of the wealth of information provided to Committee members and the magnitude of the home stair safety problem, currently running at an hourly societal cost of injury of about 10 million dollars.

Secondly, the injury data were correlated with the type of stairways in the IBC, both in dwellings and elsewhere. Third, it is astonishing that the Committee seized on one finding—out of many more from the UK Building Research Establishment (BRE) studies, indeed only one of 15 questions put to test subjects to buttress the claim that "the data is subjective." There were objective measures as well which correlated well with the subjective measures, all underlining the importance of adequate tread depth for comfort and safety of users as a prime criterion, with riser height being secondary in importance.

Thus, in its reason statement, the Committee was being unreasonable as well as petty.

Even worse, the most astute member on the Committee—at least in terms of formal research responsibilities at the US National Institute of Standards and Technology (NIST)—after voting against the proposal, was asked why by the proponent. He said that he recalled something in Dr. John Templer's book, The Staircase, Vol. 2 (MIT Press, 1992) recommending step geometries considerably different (and less demanding than) the "7-11" rule would dictate. Here he made procedural and technical errors. This belief or recollection on his part should have been put in the form of a question to the proponent who would have disillusioned him on the spot. Rather, in a most unscientific manner, he set aside all of the evidence in favor of a flawed recollection. Templer, in his 1974 dissertation first provided evidence supporting the "7-11" rule although his data were based on 7.2 inches for maximum riser height. (Rounding this to the conventional "7-11" is warranted as there are typically small increases in effective riser height with typically carpeted dwelling unit stairs as well as effective reduction of tread depth when carpeted. Below as Table 1 for this Comment is summary table (2.2) from Dr. Templer's book (again based largely on work he did in 1974 and published in 1992, at least a decade before the more detailed work done by researchers Wright and Roys at the UK Building Research Establishment (BRE).

Table 1. Templer's Recommendations for Maximum Riser Height and Minimum Tread Depth Based on His 1974 Work

TABLE 2.2

Range of Rise and Going Relationships for Comfort and Safety

Rise	*Goings*						
INCHES							
7.2	*11*						
7	*11*						
6.5	*11*	*11.5*	*12*	*12.5*			
6	*11*	*11.5*	*12*	*12.5*	*13*	*13.5*	*14*
5.5	*11*	*11.5*	*12*	*12.5*	*13*		
5	*11*	*11.5*	*12*				
4.6	*11*						
CENTIMETERS							
18.3	*27.9*						
17.8	*27.9*						
16.5	*27.9*	*29.2*	*30.5*	*31.8*			
15.2	*27.9*	*29.2*	*30.5*	*31.8*	*33.0*	*34.3*	*35.6*
14.0	*27.9*	*29.2*	*30.5*	*31.8*	*33.0*		
12.7	*27.9*	*29.2*	*30.5*				
11.7	*27.9*						

Note that the 14-inch maximum, as Templer explained in this book, was merely the upper limit of his test apparatus for his 1974 dissertation; he indicated that more research was needed on larger tread depths (and such work was done in the BRE study coming some three decades later). Thus, contrary to the recollection admitted by the one researcher on the IBC Means of Egress Committee, Templer was in favor of the "7-11" rule and he explicitly put this in a written statement when BOCA, one of the three legacy model code groups was considering adopting the "7-11" rule for dwellings.

Thus, not only does the overall committee—with a few exceptions—get a failing grade on their sloppy evaluation of the evidence for the "7-1" rule, the one person who should have championed such research got it wrong. As the old saying goes, "What can you expect of iron when gold rusts?"

Finally, how can the Means of Egress Committee turn its back on the longstanding "7-11" rule that is applied to building contexts where occupants are significantly less vulnerable to unsafe stairs? Their reasoning for disapproval fails the logic test. E74-09/10 should be approved by the ICC membership which, on the comparable proposal (E74-09/10 Part 2) voted 63 percent in favor of approval in Baltimore.

Final Action: AS AM AMPC____ D

E74-09/10, Part II
IRC R311.7.4.1, R311.7.4.2

Proposed Change as Submitted

Proponent: Jake Pauls, representing self

PART II – IRC BUILDING/ENERGY

Revise as follows:

R311.7.4.1 Riser height. The maximum riser height shall be 7 inches (178 mm) ~~7 ¾ inches (196 mm)~~. The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm).

R311.7.4.2 Tread depth. The minimum tread depth shall be 11 inches (279 mm) ~~10 inches (254 mm)~~. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within $^3/_8$ inch (9.5 mm) of the rectangular tread depth.

Winder treads shall have a minimum tread depth of 11 inches (279 mm) ~~10 inches (254 mm)~~. measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than $^3/_8$ inch (9.5 mm).

Reason: This is purely a technical change affecting maximum and minimum rise and tread depth dimensions respectively. This is the long overdue mainstreaming of the so-called "7-11" step geometry in terms of maximum rise and minimum tread depth. (The proponent has submitted a separate change proposal which simply formats and restates the current requirements; that proposal and this one should be dealt with separately or independently as their purposes and effects are different.)

Much has been written about this topic, especially around 2003 in relation to the IRC and the NFPA codes (NFPA 101 and NFPA 5000 which adopted this change to the mainstreamed "7-11" step geometry at that time. Since that day nobody has attempted to revert to pre-"7-11" criteria for dwelling unit stairs within NFPA and for non-dwelling unit stairs within ICC. The "7-11" minimum standard is the most widely used step geometry standard internationally and reasons for keeping it at least the minimum standard have grown. This is because all the recent research on use of stairs—*including the matter of falls on stairs, including injurious ones*—confirms that it is a very reasonable minimum standard and that it is a long way—about three inches or more—from an "optimum" standard.

The very extensive 2003 proposal I submitted to both ICC and NFPA is not reproduced within this proposal for reasons of length and, more importantly, its free availability on the Internet, specifically the Downloads area of my website, http://web.me.com/bldguse. Once within the Downloads area (where over a hundred PDF files can be freely downloaded on stairway usability and safety plus means of egress performance), simply open the folder titled, "Home Stairway Safety and Codes," and download the 3.4 MB, 40-page file, "Pauls-R311-2003.pdf." Here follows an outline of what was covered in that proposal which I submitted to ICC with NFPA getting a comparable, earlier one that was approved by NFPA members and withstood technical and procedural challenges from the NAHB.

Benefit-Cost Analysis for Improved Stairs in the USA
Injury Epidemiology
History of Debate on Improved Step Geometry Requirements in Codes & Standards
Benefits and Costs
Industry's and Regulators' Reviews of Research
Latest Research on Step Geometry from Britain
Politically-driven Local and State Adoption Process
Building and Marketing Improved Stairs
The Problem of the Double Standard
Intimidation of Building Officials
Roles of NFPA and APHA
Summary.

What Has Changed Since 2003?

The changes for the worse appear to be directly attributable to even worse home stair construction and regulation than existed before 2003. This is seen in Figure 1 which shows the growth of home stair-related injuries that are NOT due to the aging of the population—as this was checked out to learn that people under 65 and those 65 or more in age both contributed in more or less the same proportion to the substantial growth in home

stair, related injuries. A recent, widely-circulated document described the statistical insights as follows: “For both 1997 and 2007, the percentage of NEISS-reported injuries for the 65-and-older group was 15.3 percent plus/minus 0.4 percent for both home settings and all settings.” Thus, both before and after 1997, elderly persons were only slightly—but consistently—over-represented in hospital emergency department-treated injuries associated with stairs as reported in national estimates by the US Consumer Product Safety Commission. (The note, titled “The Home Stairway Safety Problem and Related Code Development, Adoption and Enforcement Problems in the USA,” is also posted for free downloading from the website “http://web.me.com/bldguse” Downloads area as file “Pauls2009Letter&InjuryNote” within the folder titled, “Home Stairway Safety and Codes.”) A list of the topics addressed therein is provided below Figure 1.

Figure 1 shows an extraordinary growth in the US national estimates from the US CPSC/NEISS for stair-related injuries, particularly in homes. The average annual rate of increase in the last several years exceeds the average annual rate of US population growth by a factor of about five while stair-related injuries in non-home settings decrease slightly, resulting in about a 2 percent reduction annually for non-home stairs over the last several years—since about 1998. During these several years there has been increasing use of the “7-11” minimum step geometry standard for non-home stairs, thanks to the adoption—beginning in the 1980s—of this standard in model building codes. This is further evidence of a partial success story on the stairway safety front and ICC members might rightly claim some of the credit for this partial success. Now building officials who control the adoption of the requirements in model codes need to finish the job where it will count most, in homes.

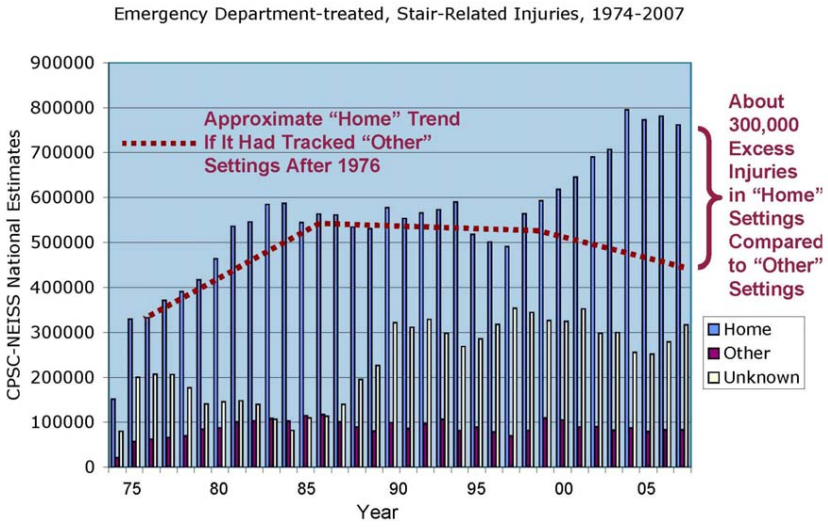


Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years.

Updating the 2003 ICC proposal on mainstreaming the “7-11” minimum standard was the note which began circulating in February of 2009. Here are the topics it addressed in its 26 pages (including over two pages of references and additional resources).

Preface
Injury Epidemiology
- CPSC-NEISS Data
- Injury Increase Comparisons
- Excess Injuries for Home Stairs
- Are Recent Increases Due to the Aging Population?

Statistical Issues
- Uncertainty in the NEISS Data
- Societal Cost of Stair-related Injuries
- Estimated Cost of Two Million Excess Home Stair-related Injuries, 1998 to 2007

Are We Finally Paying the Price for Code-triggered Defects in Home Stairways, Compared to Other Stairways?
- In the Mostly Bleak, Stair Safety Field, A Possible Success Story in Non-home Settings
- Why Are Home Stairways Relatively Dangerous?
- The Role of Code Development, Adoption and Enforcement

History of Some Relatively Important Influences on Stairway Safety and Its Regulation
- Step Geometry
- Step Geometry Uniformity
- Systemic Tread Run Non-uniformities Common in Many Recently Constructed Homes
- Resulting Misstep and Fall Scenarios
- Systemic Uniformity Defect Superimposed Upon Another Systemic Step Geometry Defect
- An Abbreviated History of Step Geometry Rules and Related Issues
- Homebuilders
- Business Arrangement Between ICC and NAHB, Among Other Strategic Partners
- NAHB Bias on ICC Committees Responsible for IRC
- Hypocrisy in ICC’s Business Deal with NAHB
- Consumer-supplied Evidence of Step Geometry Efficacy
- Combination of the NAHB-favored Short Stair Treads with Top-of-Flight

Non-uniformities and with Dysfunctional Handrail Systems
- Recent Critique of Type II Handrails and Study Used to Justify Them
- ICC Codes and Stairway Defects
- What Homeowners Must Now See (beyond the failings of ICC and the code-based regulatory process generally).
- With Flawed Code Inspection, Consumers Need to Do Their Own Stair Inspection

Recommendations: What ICC and Other Organizations Urgently Need to Do

Appendix A: Abbreviated History of Step Geometry Rules and Related Issues
Appendix B: Code of Ethics of International Code Council (ICC) and predecessor organization, Council of American Building Officials (CABO)\
References and Guide to Resources.

The 2003 proposal to ICC, "Pauls-R311-2003," included substantial benefit-cost information about stair step geometry in homes which must be updated to take account of recent, dramatic growth in home stair-related injuries (in terms of CPSC-NEISS national estimates) as well as higher-than-general inflation rates for medical treatment costs. The latter are currently running at about $1 million per hour in the USA with total, societal costs running at about $10 million per hour in the USA.

Societal Cost of Stair-related Injuries. Currently, for the USA, the annual societal costs of home stair-related injuries—currently comprising about 89 percent of all stair-related injuries where the location or setting is known—are on the order of $100 billion annually for comprehensive, societal costs. (The basis for the 89-percent figure is the NEISS data described above.) The basis for the societal cost (the sum of medical care costs, direct productivity losses and pain-and-suffering or quality of life costs) is a paper by Lawrence, *et al.* (1999). (Among coauthors for this paper are internationally recognized experts in burden of injury, like Ted Miller.) They estimated a societal cost (in 1997 dollars) of $46.7 billion for stair-related injuries occurring in 1995. For that year the NEISS national estimate for US emergency department-treated, stair-related injuries was 892,610 for all settings and 517,641 for homes. Between 1995 and 2007 these increased, respectively, to 1,161,915 (a 30-percent increase) and 761,881 (a 47-percent increase). (These national estimates for 1995 are the "adjusted" ones obtained via the NEISS website; they correct for a change in NEISS sampling that took effect in January 1, 1997.)

Accounting also for inflation (of about 3 to 4 percent annually—although medical care increases were higher), we can assume that, for 2007, the societal costs for stair-related injuries in the USA were on the order of $100 billion in 2007 dollars (including on the order of $10 billion for medical care, $20 billion for direct productivity losses, and $70 billion for pain and suffering or quality of life costs—with this estimated distribution based on a personal communication with Bruce Lawrence and Ted Miller, among the authors of the above noted paper). This cost was about an order of magnitude greater than the annual construction cost of new stairs (just prior to the recent economic downturn) in the USA. For an analysis of home and stair construction costs see Pauls (2003). The smallest cost component, medical care, is about one million dollars per hour in the US."

Quoting also from the paper by Pauls, 2009 on "Injury Increase Comparisons: The apparent, relatively rapid increase recently in home stair-related injuries has an average annual growth rate of about 4.5%, a few times greater than annual population growth (1%). The overall increase, over a three-decade period, was about 130 percent with the most recent ten-year period showing a 55-percent increase. By contrast, fire-related injuries (the majority of which occur in homes), a major concern traditionally in safety standards and codes, have shown a three-decade pattern of average annual *decrease* of about 2 percent. (If fire-related injuries were plotted on Figure 1A, that plot would be appear very close to the base of the graph, declining from about 50,000 to about 25,000 annual injuries over a three-decade period.) Moreover, the trend for all NEISS injury national estimates for home settings—other than stairs, during the period 1997-2007 has a 39-percent increase over the same last ten-year period when home stair-related injuries increased by 55 percent. For *all* products and settings, the increase in NEISS national estimates over the same 1997-2007 period was only 19 percent, about the same as the 18-percent increase for stairs in other settings (i.e., not homes). From this, and other analyses the author has performed with the CPSC-NEISS data, we can see generally, that homes generally are the major site for injuries, relative to other settings; homes account for about 49 percent of the NEISS national estimates of injuries during the 1997-2007 period.

Aside from fire-related injuries—these NEISS-reported national estimates of all injuries in home settings are increasing faster than in other settings (39 percent versus 19 percent for all NEISS national estimates during the 1997-2007 period).

NEISS national estimates of stair-related injuries in home settings have been increasing over the last ten years at a fast rate relative to NEISS national estimates for all NEISS-coded products (55 percent versus 19 percent) and relative to population growth (55 percent versus 10 percent). Over the 1997-2007 period, NEISS national estimates of home stair-related injuries comprised 89 percent of NEISS national estimates for stair-related injuries in all known settings. For early years of NEISS national estimates, specifically 1975-1977, this was 85 percent. Most of the increase in this proportion occurred since 1990.

Generally, in recent years stairs have accounted for about 9 percent of the NEISS national estimates for all products; home stairs accounted for about 6 percent; other settings' stairs accounted for less than 1 percent; unknown settings' stairs accounted for over 2 percent.
Stairs maintain their position, since the earliest days of CPSC-NEISS, as the leading product, associated with injuries coded by NEISS. Floors are the second leading category. See Lawrence, *et al.* (1999), Table 5, using data for 1995-1996, for an analysis for the top ten NEISS-coded products, ranked by injury cost, for various age groups. As well as ranking first for all ages, stairs rank first for 5 of 12 age groups (preschool children and middle-age adults) and second for another three. Only for the two highest age categories, 70-79 and 80 or more (for which stair use is relatively rare), do floors rank first, reflecting the contribution of gait and balance deterioration. However, stairs are still the second leading product for the 70-79 age group and third (after beds) for the 80-plus age group."

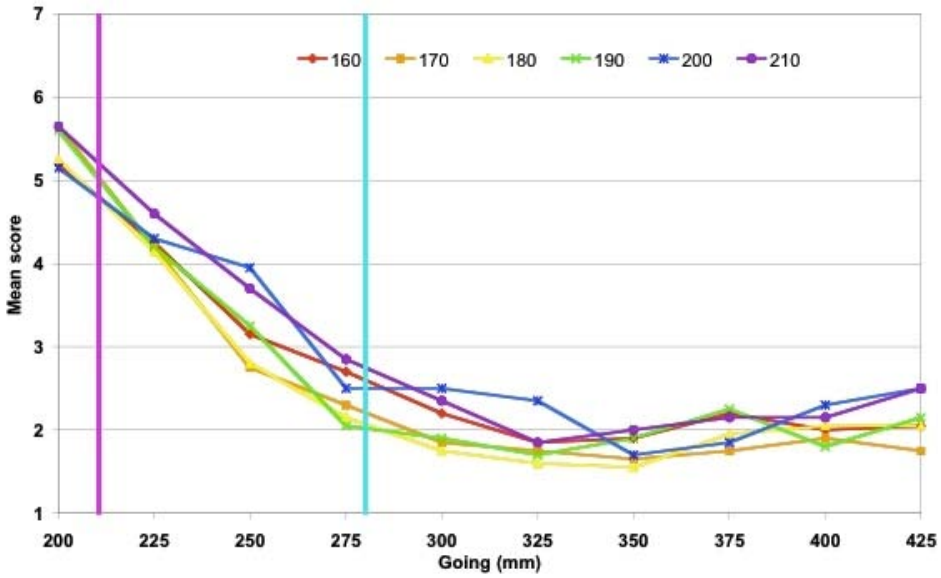
Laboratory and Field Research and Investigations of the Role of Step Geometry on Stairway Safety

The last several years have seen some important work on questions that have long troubled ICC members when addressing this issue of appropriate minimum standards for home step geometry. This work brings no comfort to those arguing that the minimum standards should stay as they are in the IRC and IBC or, even worse, that the NAHB's even lower standard should be the norm. The latter is based on NAHB's long-held national policy position which can be read directly on its website at "www.nahb.org/generic.aspx?sectionID=224&genericContentID=3093" (accessed June 1, 2009): "Support efforts by state and local affiliated Home Builder Associations to oppose the adoption of any new stair geometry that is not consistent with the requirements originally contained in the 1993 BOCA and 1992 CABO Codes by amending those provisions when adopting new editions of model building codes." This is the 8 1/4-inch maximum rise by 9-inch minimum tread depth that, especially with carpeting further degrading the usability and safety of the home stairs, makes them so dangerous and difficult to use. It is indeed beyond belief that, as the stair safety epidemic grows, the homebuilders insist on using a code that was out of date decades ago.

UK Research. Mike Roys and Mike Wright, UK Building Research Establishment have conducted some extraordinarily useful research in recent years, with the last of their papers published in May 2008. Working with a test stairway that offered 10 combinations of tread depth ("going" as it is called in the UK and "run" in some other places), in the range of 200 to 425 mm or 7.9 to 16.7 inches, with 6 combinations of rise height, in the range of 160 to 210 mm or 6.3 to 8.3 inches, they clearly showed the benefits of larger tread depths. Altogether, 60 adult subjects walked up and down each of 20 stair arrangements. Their work, while not completely published yet, is represented centrally in my recent one-day workshops on stairway usability and safety, the PowerPoint slides of which (including a fair selection of the BRE study slides) are available for downloading from my website in the folder titled, "Presentations at MUTN Conference in BC, Canada, April 2009." Papers on this work include Roys, 2001; Wright and Roys, 2005; and Wright and Roys, 2008. (Dr Wright moved to the USA in late 2008 so that now we are fortunate to have, in the USA, one of the top world talents in designing and conducting studies of step geometry and stair use performance.)

Answering a very old question in the code field, they showed that optimum tread depth in terms of many objective and subjective measures was much larger than 11 inches; 14 inches is about where this becomes optimum. The much-used 11-inch criterion is approximately where the graph of some of their findings, reproduced below as Figure 2, shows a change of direction from steep to more gradual slope and finally leveling off at the "optimum" tread depth of about 14 inches or 350 mm. This supports treating 11 inches as the minimum and clearly not the "optimum."

Figure 2. Graph of Findings from the UK Research by Wright and Roys, as Presented (in a PowerPoint) in 2005 at an International Conference on Falls in the UK.



The responses plotted here are to the scaled remark, "I felt safe walking down the stair," with the "most-safe" responses at the bottom of the curves.

The most recent of their papers, Wright and Roys (2008), contains some of the most interesting and valuable work—*in this case conducted in the field and inquiring into actual fall incidents as a function of home stairway rise and tread depth ("going" in the graph).* This is shown in Figure 3, onto which I have superimposed some of the criteria for US and Canadian home stair minimum tread depth, the same range shown in Figure 2 with the vertical bars at the left half of the Figure, specifically at the 210 and 280 mm, 8 1/4 and 11-inch minimum tread depth criteria. Note that any rounding or beveling of the nosing and presence of carpet and pad (in some cases, especially on typical home stairs), the effective tread depth is significantly reduced from these values so that the effective tread depth of some home stairs, built to code, is as small as 180 mm or 7 inches. Incidentally, the testing that led to the results in Figure 2, were with uncarpeted treads with no more than 13 mm or 1/2 inch loss of effective tread depth due to rounding of the nosing. The safety differences among the various tread depths are large and cannot be ignored.

Figure 3. Role of Stair Tread Depth ("Going" in UK) in Stair-related "Accidents" in Homes (PowerPoint slide based on Wright and Roys, 2008)

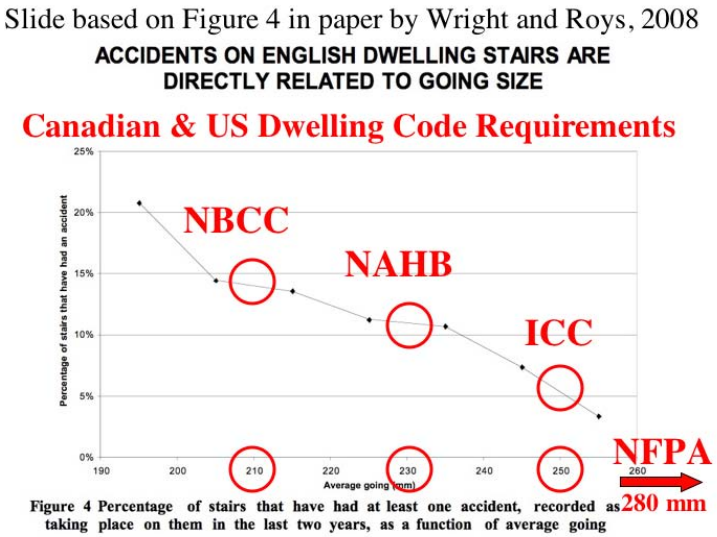


Figure 4 Percentage of stairs that have had at least one accident, recorded as taking place on them in the last two years, as a function of average going

Recent US Research on Step Geometry. While there are other studies that could be referenced and described here in relation to the step geometry issue, in the interests of time and space, I will note only one more. This was a paper based on 80 relatively intensively investigated stair-related fall injuries that led to litigation and subsequent investigation by one of the top three or so research and investigation experts in North America with excellent ergonomics credentials. The paper was published in January of 2009 *Professional Safety,* the peer-reviewed journal of the American Society of Safety Engineers and was titled, "Stairway Falls: an ergonomic analysis of 80 cases," by Cohen, LaRue and Cohen (2009). Among their conclusions they note: "In this analysis, excessive dimensional variation appeared to be the most pervasive factor in stairway fall causation, followed by noncompliance with the 7-11 design rule for risers and treads, respectively. As with dimensional variation, this investigation showed a tendency for staircase geometry to fall outside the recommended limits of established building codes. Therefore, stairs that do not follow these requirements are more likely to be involved in falls. It stands to reason that greater adherence to the criteria specified in existing codes (i.e., risers in the range of 7 in. and treads in the range of 11 in.) would decrease the number of actual stairway falls that occur. Therefore, it is essential for both architects and builders to adhere to existing codes regarding stairway dimensions. Furthermore, prevailing codes must be enforced by building code officials, plan checkers and field inspectors, since stair dimensions can often be overlooked in the haste to issue building occupancy permits."

Any ICC chapter wishing to have their members participate in a one-day workshop (also slated for presentation in Eastern Canada on September 14, 2009) should contact Jake Pauls. It is available in a not-for-profit mode. Code authorities should be prepared to deal knowledgeably with consumers who, upon discovering the defects in their home stairs, contact their local building department and ask for a re-inspection of their home stairways. If there has been an injurious fall on such a stairway they should also be prepared to deal with resulting legal actions that might name the local building department as a third party defendant. (ICC itself is also a potential third-party defendant—as are homebuilders and their trade associations—a matter taken up in the so-called "New Orleans Declaration" I issued in the spring of 2009 and posted on my website Downloads area.) Inspectors should at least know about how measurements of the stair step geometry are performed that are of a quality expected in such litigation actions. These measurement techniques, usually requiring use of a spirit level or electronic level, are all described in the workshop materials posted on the above-mentioned website Downloads area and on the DVD of the Spring 2009 workshop noted above. These measurement techniques are consistent with the ICC requirements both as currently stated and as further clarified if the package of proposals I put forward is accepted.

As indicated with all of the epidemiological and etiological work outlined in this proposal, the home stair-related injury issue is many times larger than is the home fire-related injury problem. It should thus be nearly a no-brainer, after adopting home sprinkler requirements, for responsible ICC members to vote for the mainstreaming of the "7-11" step geometry standard. I will be counting on such ICC members and others who can sway opinion to speak out with conviction based on the primacy of their duties to the public, the first item in the code of ethics for certified officials, a code which is available on my website if it cannot be located on ICC's.

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

Roys, M.S. (2001). Serious stair injuries can be prevented by improved stair design. *Applied Ergonomics*, Vol. 32, pp. 135-139.

Wright, M. and Roys, M. (2005). Effect of changing stair dimensions on safety. In Bust, P.D. and McCabe (eds.) *Contemporary Ergonomics 2005*, Taylor and Francis Books, pp. 469-474.

Wright, M. and Roys, M. (2008). Accidents on English dwelling stairs are directly related to going size. In Bust, P.D. (ed.) *Contemporary Ergonomics 2008*. Taylor and Francis, 632-637.

Cost Impact: The code change proposal will increase the cost of construction. However, more importantly, the change will lead to much larger benefits in injury reduction and usability, especially for older users.

ICCFILENAME: Pauls-E4-1012.3

Public Hearing Results

PART II- IRC B/E
Committee Action: **Disapproved**

Committee Reason: The committee feels the data submitted seems to be a gray area in what the data is revealing. The solution does not necessarily show that it is related to the problem. The committee feels the "7 3/4-10" standard is a good standard and prefers to keep it.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jake Pauls, Silver Springs, MD, representing self, requests Approval as Submitted.

Commenter's Reason: Several aspects of the IRC RB Committee actions and related, more general policy, process and ethics issues central to this proposal are—as this comment is submitted on the deadline (February 8, 2010)—still subject to an Appeal process filed by the proponent and submitter of this comment. The public hearing on this appeal is scheduled to occur four days after the comment filing deadline. Requests to ICC staff, to extend the comment submission deadline for E74-09/10, were rebuffed as if to say the Appeal process is not important anyway so what does it matter if the comment deadline precedes the Appeal process.

One aspect of the Appeal did occur before the comment submission deadline. That was the IRC RB Committee reconsideration of its action on E74-09/10 Part II. It was not much of a reconsideration—in terms of the central issue of conflict of interest of the four National Association of Home Builders (NAHB) representatives—as a sustaining of the Committee's action at the Baltimore hearings in October. The

extent of the hold that the NAHB has on the Committee was exemplified by the fact that the motion to sustain previous action was made and seconded by NAHB representatives. Neither they nor anyone else on the Committee even bothered to try to justify their mostly nonsensical reason for disapproval. That published reason for disapproval was the following.

> Committee Reason: The committee feels the data submitted seems to be a gray area in what the data is revealing. The solution does not necessarily show that it is related to the problem. The committee feels the "7 3/4-10" standard is a good standard and prefers to keep it.

What does this mean? What does the committee mean by "gray area?" The Committee, during its reconsideration, never even bothered to try to explain this or other weaknesses in the reasoning.

Taken as a whole—with year after year of growing injury tolls related to the least regulated of stairs—combined with decades of research specifically on the relationships between step geometry and falls—*all of which was made known to the Committee via the supplied CD of many publications and available more publicly on the referenced websites*, the data are very clear. They are in stark black and white, not gray!

It is now well established by etiological research and by abundant epidemiological data that home stairs are relatively dangerous and the largest set of factors behind the increased dangers are mainly the smaller tread depths, complicated somewhat with higher risers, for dwelling unit stairs.

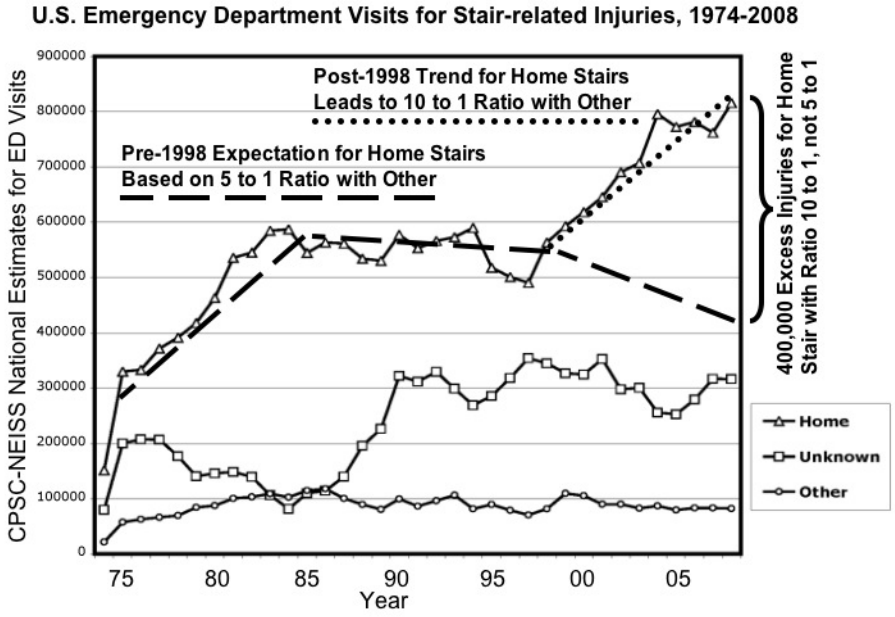
If there is any correct use of the term "gray area," it is in the Committee Reason's use of the phrase, "The committee feels." US residents are currently paying about one million dollars per hour for medical treatment costs *alone* for stair-related injuries—*90 percent of which occur in home settings.* Thus, the most legitimate feelings are indignation over the inaction on the part of ICC, responsible code officials and home builders about the unnecessary perils to which unsuspecting home stair users are exposed.

I do not mean to be critical of only the four NAHB representatives on the IRC BE committee. If they were the only problem here, the vote would have been about seven to four on approval of the proposal rather than nine to two on disapproval. No, the committee appears to have some builder confederates or, at the minimum, some people who want codes based on vague feelings rather than facts or who are not sufficiently aware of the facts. With one or two standout exceptions (including at least one member who appears to have considered the facts with great care), the code officials on the committee appear not to care about facts or due process. This is why the current appeal focuses on ethics issues in the ICC process and these are on the hearing agenda for February 12, 2010.

Notably, the majority of the IRC BE Committee are out of step with the ICC membership as reflected in the assembly vote immediately after the Committee voted 9 to 2 to disapprove E74-09/10 Part II; that assembly vote of nearly 1,000 ICC members was 63 percent in favor of approval of E74-09/10.

The last sentence of the provided reason is especially astonishing. In the face of contrary facts, the committee again "feels" something but does not put any force of action behind the feeling. At least four of the twelve committee members represent the National Association of Home Builders (NAHB) which, for years, has had a policy preventing code professionals from adopting and enforcing even the compromise "7 3/4-10" standard for which there was never a good research basis. The research basis was for the "7-11" standard. (It is another fact that, for all but homes, "7-11" has been the most widely used standard in the world for step geometry in buildings where the stair-related injury toll is showing slight decreases—a few percent per year in the US when population corrected—while US home stairs are showing large increases, especially since ICC and the NAHB made their business agreement that was intended, in part, to keep home stairs at a low standard. If there were a case to be made for the "7 3/4-10" standard, then why haven't all the codes that adopted the "7-11" standard reverted to the lower, "7 3/4-10" standard? The performance of the "7-11" standard is based on fact, not "feeling." There are decades of experience with "7-11" in buildings other than homes and as seen in Figure 1, we are now reaping the benefits of that enlightened policy, unfortunately only in the settings where people are least vulnerable. The data in Figure 1 come from the US Consumer Product Safety Commission (CPSC) National Electronic Injury Surveillance System (NEISS for hospital emergency department-treated injuries which comprise about 40 percent of all medically treated injuries—which total about 2 million home stair-related injuries per year in the USA. Thus Figure 1 tends to understate the total medical problem posed by stair-related injuries.

Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years
This is an update, including data for 2008, of Figure 1 in proposal E74-09/10



Five reasons have been identified recently for the diverging injury records for home stairways and for stairways in all other settings that are clearly shown in Figure 1. The former are rising rapidly (approaching a growth rate of over 4 percent, about five times US population growth) in a

trend begun at about the time the ICC started affecting residential codes in the USA through its production and promotion of the International Residential Code. The latter are now dropping at a notable rate (about 2 percent reduction per year at a time of about 1 percent a year of population growth in the USA). These factors, in no particular order, are:

(A) Significantly lower ICC standard for maximum rise and minimum tread depth for home stairs (the result of the code-development compromise and the code-adoption compromise).
(B) The systemic top-of-flight defect in many homes' (and some other buildings') stairs partly due to ICC's failure to provide clearly stated code requirements and to include the rules preventing this in their inspection guides.
(C) ICC's adoption of seriously compromised requirements for handrails for home stairways.
(D) An apparent deterioration in enforcement/inspection quality generally in relation to homes, partly influenced by the widespread perception—possibly nurtured by ICC leaders—that the builders' work should receive minimal scrutiny in view of their "Strategic Partnership."
(E) The concurrent deterioration of movement performance of population capability generally with the effects of reduced physical activity, overweight and obesity. (In a public health model, this should lead to increased—*not decreased*—compensation with the design and construction of critical built environment features such as stairways, particularly in the home settings where the most vulnerable populations and use conditions are common and easily predicted.)

Other code change proposals, before ICC this cycle, address at least three of the five reasons. For example, two comments have been submitted in relation to item B (on proposals RB46-09/10 and RB47-09/10). Comments could have been submitted also on item C, especially as there were competing proposals from the Stairway Manufacturers Association (SMA) and from Pauls focused on either expanding or eliminating, respectively, the ability to use Type II handrails. This commenter hopes that the ICC members have the good sense to refuse any expansion of Type II handrail usage and, on a more proactive front, prohibit their further use in all settings, especially dwellings where there is a larger proportion of users disserved by the oversized, ungraspable Type II railings, especially on stairways.

Item D is being addressed in the public hearing on February 12, 2010, just four days after the deadline for submission of comments. (ICC staff refused to provide a later date for comments that would be based on the outcome of the public hearing—as if to imply that the public hearing result was predetermined and would not affect the nature of comments on E74-09/10 one way or another.)

This comment focuses on item A and for the benefit of all who did not see the proponent's handout at the Baltimore hearings here follow some highlights of that handout. They focused partly on comparisons between home sprinkler requirements and "7-11" stair geometry rule for dwelling unit stairs.

Information on Home Stairways and Sprinklers for Fire Safety Authorities, Building Code Authorities and Others (Re. IRC-BE Proposals E74-09/10 and E97-09/10)

ICC members—including new members wanting to participate in the deliberations on the home fire sprinkler issue, beyond supporting home fire sprinklers (by defeating proposals to pull back from the position taken last year), *should also support proposal E74-09/10 re. home stair step geometry and proposal E97-09/10 re. stair handrails.*

This approach is best for your colleagues, for the public and your mission. For example, fire services—in their EMS work—attend to more non-fire injuries (e.g. from falls) than to fire-related ones. Many of the fall injuries occur because of stairs—*90 percent are in homes.* Currently, the number of medically treated home stair-related injuries in the US total about 2 million per year. About 800,000 of these are treated in hospital emergency departments—*and this toll is increasing at about 5 percent per year*. Meanwhile, *reflecting better codes and enforcement for non-home stairs—e.g. "7-11" stairs*, other settings show a recent 2 percent per year drop in injuries. See Figure 1.

Risk. Fatalities from fire and (under-reported) stair-related fatalities are similar with a risk of about one in 100,000 per year. Annual risk of nonfatal injury is greater for stairs at about one medically treated injury in 150 while for fires the risk is one civilian injury in 17,600.

A civilian has about 100 times greater risk of nonfatal injury due to stairs than from a structural fire with the latter often more serious.

Fire services have to use the same bad stairs in homes during fire response, but they face even more usability and safety challenges, e.g., lack of familiarity, plus stairs with badly undersized treads that are very difficult and dangerous for firefighters to use with large boots, breathing apparatus and other gear affecting vision and movement.

Fire services: Improved home stair step geometry and proper handrails are essential for your members and your mission.

Role of Step Geometry in Stair-related Falls and Injuries. Much has been learned since 2003, the last time there were code-change proposals on the "7-11" rule for homes. Research at the UK Building Research Establishment, based on a survey of "accident" experience by home owners, suggests that the added risk of the short, 9-in tread depths, compared to even a 10-in tread depth (the largest for which sufficient home-based data were available), was a factor of about four (i.e. a risk of 0.12 versus 0.03 of an "accident" occurring in a two-year period). See Table 1; this replaces illegible Fig. 3 of proposal E74-09/10.

Table 1. Risk of Falls Relative to Home Stair Tread Depth
(Risk estimates derived from Wright and Roys (2008) Figure 4)

Tread Depth dimension	Relative risk of falls	Used for home stairs by
255 mm (10.0")	0.03	ICC Codes in USA
245 mm (9.6")	0.07	
235 mm (9.3")	0.11	
225 mm (8.9")	0.12	NAHB in USA
215 mm (8.5")	0.13	
205 mm (8.1")	0.14	NBCC in Canada
195 mm (7.7")	0.21	

NBCC—*National Building Code of Canada*

Based on evidence from actual falls on home stairs, a 10-in tread depth is nearly four times safer than is 9-inches; 11 inches is even more favored and safer. See Figure 2 re. *optimum depth*—14 in.

Figure 2. Findings about the Effectiveness of Ten Tread Depths and Six Step Rise Heights from UK Research by Wright and Roys, as presented in 2005 at an International Conference on Falls
("Going" is the UK and international term for tread depth. Lower is better in the graph.)

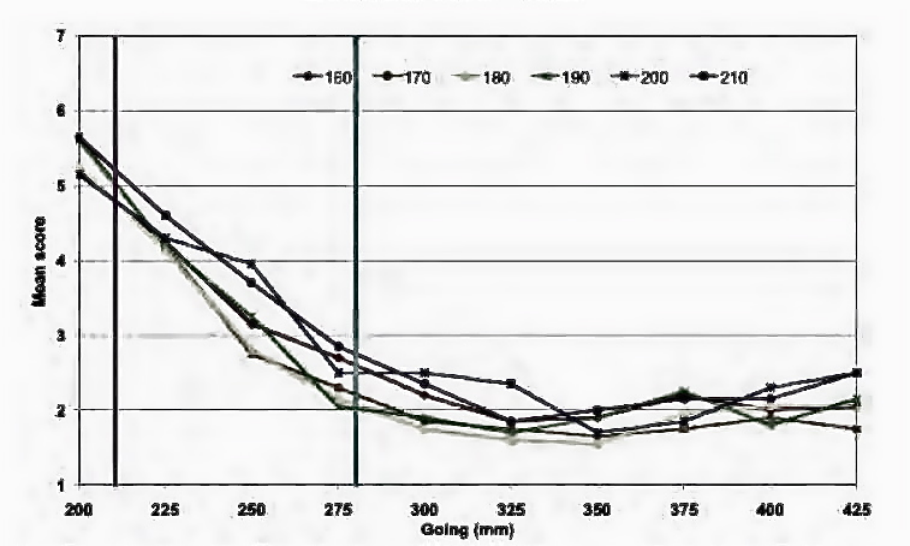


Figure 2 is one of several studies reported after 2003; this counters the claim made by the SMA representative at the Batlimore Hearings that there was nothing new in the research since the prior proposal, in 2003, to have the "7-11" step geometry rule apply to dwelling unit stairs. Among other studies there were some from 2008 (e.g., the study behind Table 1) and 2009. Other incorrect claims made, by the NAHB representative, in the Baltimore hearing and/or the Committee reconsideration relate to the dwelling unit stair rules long used in the UK; he claimed that the UK requirements allowed 220 mm (8.67 inch) dimensions for both rise and tread depth. This is completely wrong as these limits are applied in conjunction with two other rules; you cannot have both a maximum height riser and a minimum tread depth due to the application of the other limits. The SMA representative made a big deal, or so was the initial impression, about the fact that two recommendations came out of the UK Building Research Establishment (BRE) team who did the research. One was for a minimum 300 mm (12-inch) tread depth for all but dwellings and 250 mm (10 inches) for dwellings. What he failed to take into account is that, as in all other countries traditionally—*due to homebuilding industry pressures on both code-development bodies and on technical institutes such as the industry-sponsored BRE*—there was a built in premise that there would be a continuation of the double, lower standard for step geometry in dwellings—even if the research did not support this conclusion.

From Figure 2, it is clear that there are two regions of the graphs, the portion with a fairly steep slope and the region where the slope is relatively gradual. The break between the two regions occurs at approximately 275 mm (about 11 inches). This means that every inch that you add to the depth up to about 11 inches contributes more benefit, in safety performance, than do the inch increments beyond 11 inches (about 275 mm). This is one bit of evidence, among many for the 11-inch minimum.

Also very notable from Figure 2 is that 11 inches (about 275 mm) is not an "optimum" tread depth. That is not achieved until the tread depth is about 14 inches or 350 mm.

Benefits and Costs. Any analysis should address the lifetime benefits and costs, for some period like 50 years. First costs or even mortgage payments are not enough. The long-term costs of not building the house stairs properly—or, conversely, the benefits of building them properly, i.e., to the "7-11" standard—must be taken into account. This was done in 2003, for the ICC-IRC proposal on mainstreaming the "7-11" step geometry rule. Except for the $23,000 item, Table 2 is based on one of the tables from the detailed analysis by Pauls (2003).

Table 2. Values per new home, over a fifty-year period, 2000-2050 (with all costs and benefits expressed in constant year 2000 dollars). Unless noted, the stair step geometry (max. rise by min. tread depth) is 8 1/4 by 9, the step geometry demanded by NAHB.

Cost of new home stairs:	$800
Added cost if "7-11" stair geometry used:	$250-980
Medical care cost for new-stair related injuries:	$3,000
Comprehensive cost of new-stair related injuries:	$30,000
Benefit of injury reduction with "7-11"—at least:	$23,000
Usability benefit for all new-stair users(@$0.002/use):	$2,000
Total usability benefit for certain elderly users of new stairs with "7-11" step geometry:	$7,000

Note: The $800 base cost for home stairways came from data in a house building cost analysis published by NAHB (1999). Injury cost data come from world experts on this: Lawrence, et al. (1999).

Given current data on home stair falls, in relation to step geometry, changing home stair step geometry from what the builders provide to the "7-11"—at a per-home cost of about $1,000—would save at least $23,000 in comprehensive injury costs and provide $7,000 additional in usability benefit, per home, between 2000 and 2050.

Annual US, per capita, comprehensive costs of stair-related injuries are about $300—a grand total of $100 billion annually for all of US.

Concluding Comments. Along with fire sprinklers, improved stair step geometry and functional handrails are cost-effective, especially for our aging and less physically fit population. Each can ultimately save a few thousand lives per year, but better stairways impact a larger number of injuries than can fire sprinklers. Stairs have an ongoing normal use while sprinklers significantly reduce property loss. Fire services and other advocates for home sprinklers: your interests are well served by also advocating for improved home stairways.

Referring back to Figure 1 and Table 2, ICC members (who will be voting on comments such as this one) should ask the following questions. Do they want one of the legacies of the ICC to be the fact that during ICC's time of influence in the model code field in the USA, the number of home stair related injuries grew from five times those in all other settings to ten times those in all other settings. (Note that, according to the latest US injury statistics, homes are—overall—the site of about one-half of all injuries treated in hospital emergency departments. Thus stairs are in a different league in terms of their impact in home settings compared to all others. As indicated in the first four items in the list of five sets of factors affecting home stair-related injuries, the design, construction and regulation of home stairs are major factors in the heightened dangers with stairs in

homes. ICC, through its code development process and through its strategic partnership with NAHB—the topic of the public hearing on February 12, 2010—is thus the number one suspect when blame is laid for the huge and growing toll of stair-related injuries, currently costing about 10 million dollars per hour for societal costs in the USA. Also, on the matter of costs and benefits, what other aspects of buildings provide the kind of benefit-cost ratios that we see for properly designed and constructed stairs (Table 2)? Clearly not the vast majority of issues that occupy ICC members in code-development hearings and in their day to day work in building regulation.

Finally, on the frequently made comment by IRC BE Committee members: "the 7 3/4 by 10 standard is a good one; let's stay with it." If it is so good why then has there never been a proposal, let alone a successful proposal to replace the "7-11" rule with the 7 3/4 by 10 rule? Also, for the NAHB members on the IRC BE Committee who claimed the 7 3/4 by 10 is a good standard; why does not the organization they represent then even allow its adoption at state and local level. Hypocrisy does not quite cover the nature of such comments coming from the organization that has done immense harm to home stair users for decades. Soon they will pay. Will ICC, as a Strategic Partner of NAHB pay also in dollars or credibility or both? That, fellow ICC members is something you should think about very carefully.

Final Action: AS AM AMPC____ D

E75-09/10, Part I

1009.4.5, 1009.4.5.1 (New), 1009.4.5.2 (New), 1009.4.5.3 (New) [IFC [B] 1009.4.5, 1009.4.5.1 (New), 1009.4.5.2 (New), 1009.4.5.3 (New)]

NOTE: PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART I.

Proposed Change as Submitted

PART I – IBC MEANS OF EGRESS

Revise as follows:

1009.4.5 (IFC [B] 1009.4.5) Nosing and Riser Profile. The radius of curvature at the leading edge of the tread shall be not greater than $^{9}/_{16}$ inch (14.3 mm). Beveling of nosings shall not exceed $^{9}/_{16}$ inch (14.3 mm). Risers shall be ~~solid and~~ vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.52 rad) from the vertical. ~~The leading edge (nosings) of treads shall project not more than 1 ¼ inches (32 mm) beyond the tread below and all projections of the leading edges shall be of uniform size, including the leading edge of the floor at the top of a flight.~~

~~**Exceptions:**~~

1. ~~Solid risers are not required for stairways that are not required to comply with Section 1007.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~
2. ~~Solid risers are not required for occupancies in Group I-3 or in F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.~~
3. ~~Solid risers are not required for spiral stairways constructed in accordance with Section 1009.9.~~
4. ~~Solid risers are not required for alternating tread devices constructed in accordance with Section1009.10.~~

1009.4.5.1 (IFC [B] 1009.4.5.1) Nosing Projection Size. The leading edge (nosings) of treads shall project not more than 1 ¼ inches (32 mm) beyond the tread below.

1009.4.5.2 (IFC [B] 1009.4.5.2) Nosing Projection Uniformity. All nosing projections of the leading edges shall be of uniform size, including the projections of the nosings leading edge of the floor at the top of a flight.

1009.4.5.3 (IFC [B] 1009.4.5.3) Solid Risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for stairways that are not required to comply with Section 1007.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.
3. Solid risers are not required for spiral stairways constructed in accordance with Section 1009.9.
4. Solid risers are not required for alternating tread devices constructed in accordance with Section 1009.10.

Reason: There is no technical change to the requirements in this proposal. It is a clarification of intent by separating out and labeling the separate issues of (1) nosing and riser profile or shape, (2) nosing projection size, (3) nosing projection uniformity, and (3) open risers. Based on evidence of poor compliance and inspection, it has been confusing for various topics to be lumped together in one long paragraph.

My special concern here is the apparent widespread failure to build and inspect stairs with regard to uniformity of nosing projection, especially at the top of stair flights. For this reason alone, it is important for this section—with a few topics in one paragraph—to be divided into smaller pieces dealing with a smaller set of issues. It appears that the nosing projection uniformity issue— particularly omitting the nosing projection on the landing nosing—might be mostly responsible for the rapid growth of what I refer to as "Excess Injuries" in Figure 1. Over the several years where these "Excess Injuries" have been seen in the CPSC-NEISS national estimates, there have been a total of about 2 million such "Excess Injuries" which have an associated annual societal cost in the USA of about $200 billion (yes, that is billion with a "b") with the medical care component of these "Excess Injuries" accounting for about $20 billion. (The substantial basis for these cost-of-injury estimates comes from the work of Lawrence, et al., 1999.)

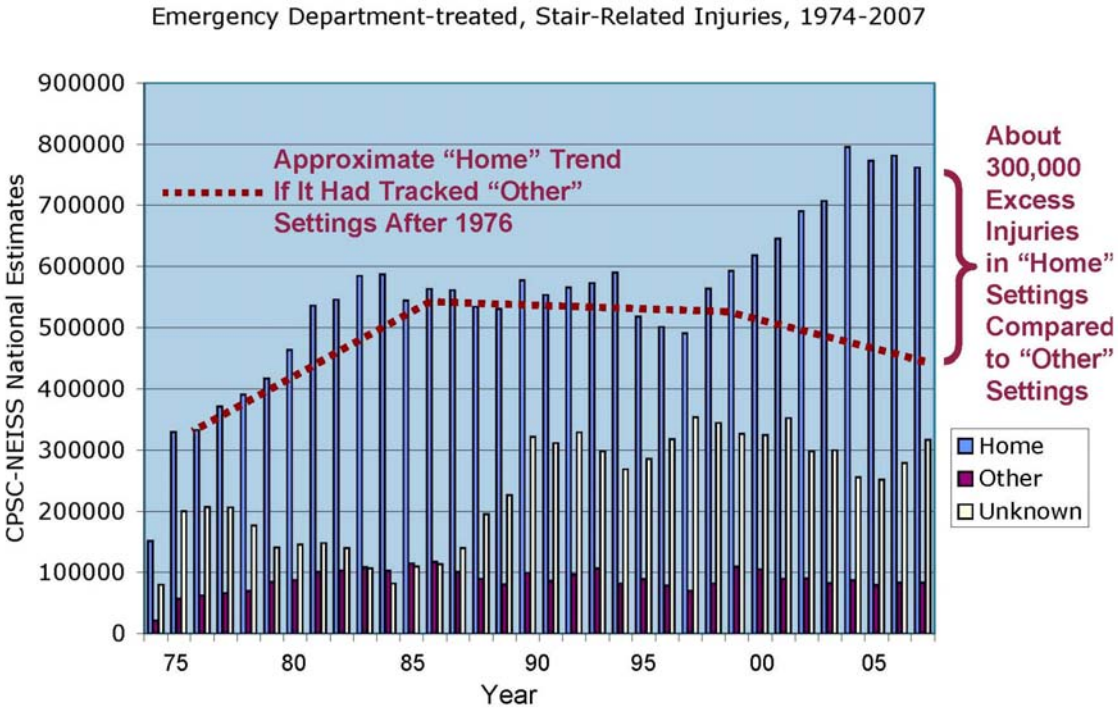


Figure 1. Growth of Home Stair-related Injuries in USA in Recent Years.

A far too common error in design and construction of stairways is the lack of attention to keeping all tread depths, especially the top one in a flight, uniform in size, particularly where projecting nosings are provided on a flight of stairs installed as a manufactured unit which does not include the top or landing nosing projection. Thus this is a dual issue of non-uniform tread depths and non-uniform nosing projections. ICC IRC guides for inspection and for the homebuilding industry (published by ICC in conjunction with NAHB) fail to even mention these two important IRC rules. These two ICC publications are listed in the Bibliography. Surely it is fairly strong evidence of a code inadequacy when even ICC experts apparently do not recognize the existence and importance of two rules governing the most potent of factors—step geometry uniformity—for the most dangerous product in homes and other buildings.

The resulting non-uniformities in tread depths, with a larger top tread followed by smaller treads in the flight make the stair flight orders of magnitude more dangerous for descent-direction users. This pervasive systemic defect has also become so concerning to leading stairway safety professionals such as myself that a special website page has been created simply to deal with this issue. See http://web.me.com/bldguse/Site/Stairways.html for information on this including the graph provided below as Figure 1 showing a large increase in the number of home stair-related injuries identified in the CPSC NEISS national estimates for the USA in the last several years. Excerpts of text from the Stairways website page are also quoted below as are excerpts from an American Society of Safety Engineers 2008 Professional Development Conference paper by Pauls and Harbuck. The full ASSE conference paper is freely accessible as a PDF download from the Downloads area of my website, http://web.me.com/bldguse/Site/Downloads.html. Generally, it is suspected that with recent greater use of manufactured stair flights, the incidence of systemic, top-of-flight non-uniformities has grown with resulting significant increases in home stair-related injuries.

On the Stairways website page, referenced above, is the following text and photograph (here identified as Figure 2) of a typical dwelling unit stairway with the systemic top-of-flight defect in nosing projection non-uniformity, the most common reason for the tread depth below the landing to be larger in size than the tread depths below it. Below Figure 2 is an additional photograph, Figure 3, showing what a stair flight looks like it very likely conforms to the uniformity requirements. The crouch-and-sight, visual test is helpful but is neither perfect nor quantitative; therefore, the stair geometry should be properly measured, at least at the top three steps, to confirm that there is not a rare coincidence of both larger tread depth and larger rise dimensions at the top step.

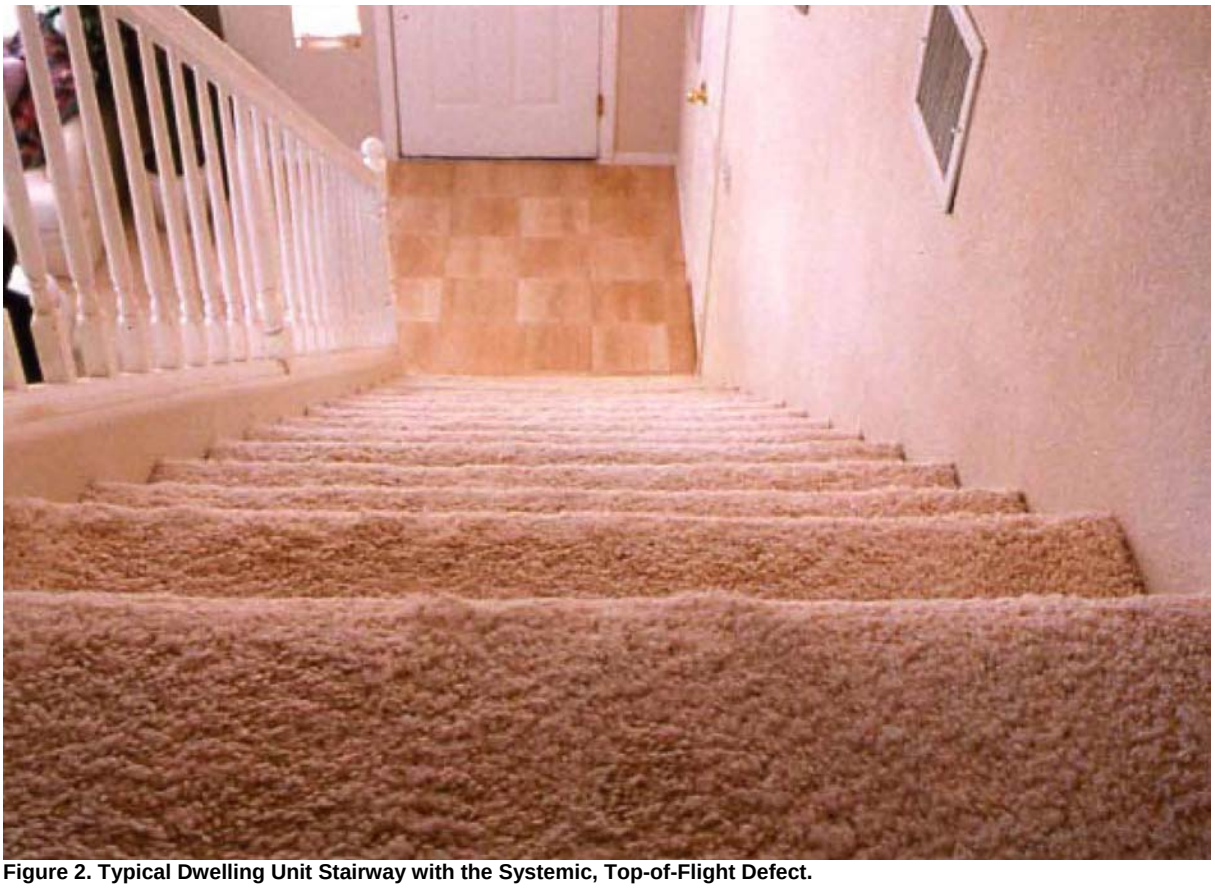


Figure 2. Typical Dwelling Unit Stairway with the Systemic, Top-of-Flight Defect.

Here follows the text from the website (http://web.me.com/bldguse/Site/Stairways.html) which has been publicly available since May 2009.

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

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

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

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

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

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

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

•Home Stairway Safety and Codes (Posted February 2009)

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

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

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

Any ICC chapter wishing to have their members participate in a one-day workshop (also slated for presentation in Eastern Canada on September 14, 2009) should contact Jake Pauls. It is available in a not-for-profit form. Code authorities should be prepared to deal knowledgeably with consumers who, upon discovering the systemic defect in their homes (after performing their own "crouch-and-sight" test), contact their local building department and ask for a re-inspection of their home stairways. If there has been an injurious fall on such a stairway they should also be prepared to deal with resulting legal actions that might name the local building department as a third party defendant. They should know how to perform the measurements of the stair step geometry that are of a quality expected in such litigation actions. These measurement techniques, usually requiring use of a spirit level or electronic level, are all described in the workshop materials posted on the above-mentioned website Downloads area and on the DVD of the Spring 2009 workshop noted above. These measurement techniques are consistent with the ICC requirements both as currently stated and as further clarified if this proposal is accepted.

In order to begin stopping all future misinterpretations of the IRC requirements for tread depth uniformity—and thus preventing many predictable and preventable missteps and falls (NOT "accidents" which are defined in the public health field as unpredictable and unpreventable events)—it is hoped that all code enforcement authorities heed very carefully the current and clarified requirements in IBC 109.4.5 (and1009.4.2) as well as R311.7.4.2 (and R311.7.4.3).

Bibliography

ICC (2007). Residential Inspector's Guide Based on the 2006 IRC, Chapters 1-11. International Code Council, Washington, DC., ISBN 978-1-58001-568-4.

ICC and NAHB. Home Builders' Jobsite Codes: a Pocket Guide to the 2006 International Residential Code. International Code Council, Washington, DC and National Association of Home Builders, Washington, DC.

Lawrence, B.A. et al. (1999). Estimating the costs of nonfatal consumer product injuries in the United States. *Proceedings of 7th International Conference on Product Safety Research*, September 30 - October 1, 1999, Washington, DC, pp. 97-113. Also, *Injury Control & Safety Promotion*, Vol. 7, No. 2, pp. 97-113.

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

Cost Impact: The code change proposal will not increase the cost of construction as there is no technical change proposed. (The nosing piece required to comply with both the current code and the code as clarified by this proposal costs about $10 per home stair flight in terms of material, in oak, at retail level.)

ICCFILENAME: PAULS-E1-1009.4.5.1

Public Hearing Results

PART I IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Committee Reason: By breaking the current text into smaller sections the proposal clarifies the requirements for stair nosings and risers.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufactures' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.4.5 (IFC [B] 1009.4.5) Nosing and Riser ~~Profile~~ Cross Section. The ~~radius of~~ curvature or beveling of the nosing ~~at the leading edge of the tread shall be not greater than 9/16 inch (14.3 mm). Beveling of nosings~~ shall not exceed 9/16 inch (14.3 mm) from the leading edge. Risers shall be solid and vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.52 rad) from the vertical.

Exceptions:

1. Solid risers are not required for stairways that are not required to comply with Section 1007.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.
3. Solid risers are not required for spiral stairways constructed in accordance with Section 1009.9.
4. Solid risers are not required for alternating tread devices constructed in accordance with Section 1009.10.

1009.4.5.1 (IFC [B] 1009.4.5.1) Nosing Projection Size. The leading edge (nosings) of treads shall project not more than 1 ¼ inches (32 mm) beyond the tread below.

1009.4.5.2 (IFC [B] 1009.4.5.2) Nosing Projection Uniformity. All nosing projections of the leading edges shall be of uniform size, including the projections of the nosings leading edge of the floor at the top of a flight.

~~**1009.4.5.3 (IFC [B] 1009.4.5.3) Solid Risers.** Risers shall be solid.~~

~~**Exceptions:**~~

~~1. Solid risers are not required for stairways that are not required to comply with Section 1007.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~
~~2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.~~
~~3. Solid risers are not required for spiral stairways constructed in accordance with Section 1009.9.~~
~~4. Solid risers are not required for alternating tread devices constructed in accordance with Section 1009.10.~~

Commenter's Reason:
1. This modification to Part I changes the section title to use a term more appropriate to the content and technical language used in the code and by those persons and industries using the code.
2. The radius of the curvature has no effect on stair safety provided the point at which the curvature begins on the walking surfaces can be controlled. Please see the illustrated use of larger radii to provide a rounded nosing that is actually less intrusive on the walking surface of the tread. The control for beveling and curvature can in fact be one in the same there by simplifying the text. (See Figures 1 - 3 below)
3. There is no need to establish another section to regulate the properties of risers. An additional section will only cause confusion and misinterpretation. The solidity of the riser is a property of its cross section. Cross section is aptly part of the section title proposed. For this reason all related text and exceptions have been moved back into section 1009.4.5 where they should remain.
4. No comment is offered for E75 Part II because we support the IRC committee's reasons for disapproval of E75 Part II and approval as modified of RB46.

The Figures below show that larger radii can be safely allowed by regulating the extent of the curvature in the same way beveling is regulated.

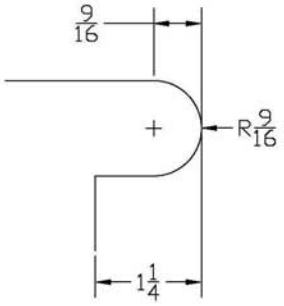


Figure 1

Figure 1 illustrates the maximum radius at the nosing regulated by the current radius dimension

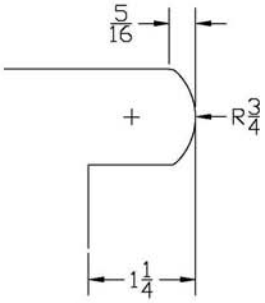


Figure 2

Figure 2 illustrates an alternate curvature or rounding using a radius larger than allowed.

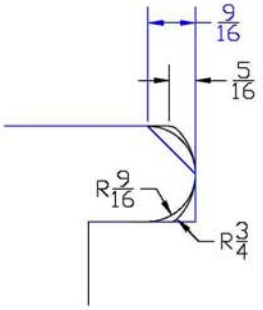


Figure 3

Figure 3 illustrates the maximum beveling in blue in a composite with the nosings of figure 2 and 3.

Final Action: AS AM AMPC____ D

NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY- SEE ABOVE

E75-09/10, PART II – IRC

IRC R311.7.4.3, R311.7.4.3.1 (New), R311.7.4.3.2 (New), R311.7.4.3.3 (New)

PART II – IRC BUILDING/ENERGY

Revise as follows:

R311.7.4.3 Nosing and Riser Profile. The radius of curvature at the nosing shall be no greater than $^{9}/_{16}$ inch (14 mm). ~~A nosing not less than ¾ inch (19 mm) but not more than 1 ¼ inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than $^{3}/_{8}$ inch (9.5 mm) between two stories, including the nosing at the level of floors and landings.~~ Beveling of nosings shall not exceed ½ inch (12.7 mm). Risers shall be vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.51 rad) from the vertical. ~~Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.~~

~~**Exceptions:**~~

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

R311.7.4.3.1 Nosing Projection Size. A nosing projection of not less than ¾ inch (19 mm) but not more than 1 ¼ inches (32 mm) shall be provided on stairways with solid risers.

Exception: A nosing projection is not required where the tread depth is a minimum of 11 inches (279 mm).

R311.7.4.3.2 Nosing Projection Uniformity. The greatest nosing projection shall not exceed the smallest nosing projection by more than $^{3}/_{8}$ inch (9.5 mm) within each flight of stairs, including the nosing at the level of floors and landings.

R311.7.4.3.3 Open Risers. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch

diameter (102 mm) sphere.

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

Reason: See Part I-E75-09/10

Cost Impact: See Part I-E75-09/10

PART II- IRC B/E
Committee Action: **Disapproved**

Committee Reason: The committee feels the code already addresses this and it is an enforcement and education issue. There is a concern about correlation of this with the previous action on RB46-09/10. The committee suggests both parties work together and bring this back later.

Assembly Action: **None**

E77-09/10
1009.5 (IFC [B] 1009.5)

Proposed Change as Submitted

Proponent: Lee Kranz representing Washington Association of Building Officials (WABO), Technical Code Development Committee

Revise text as follows:

1009.5 (IFC [B] 1009.5) Stairway Landings. There shall be a floor or landing at the top and bottom of each stairway. The width of landings shall not be less than the width of stairways they serve. Every landing shall have a minimum dimension measured in the direction of travel equal to the width of the stairway. Such dimension need not exceed 48 inches (1219 mm) where the stairway has a straight run or where a curved stairway has a continuous radius. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing. When wheelchair spaces are required on the stairway landing in accordance with Section 1007.6.1, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

Exception: Aisle stairs complying with Section 1028.

Reason: There are many curved or radius stairways that exceed the minimum required egress width. In those cases, to require the length of the landing in the direction of travel to be equal to the width of the stair is impractical and takes up valuable floor space. Per Section 1005.1, egress width must be maintained to the termination of the means of egress so changes in direction of the stair will not be allowed to be less than the width of the stair.

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

ICCFILENAME: KRANZ-E3-1009.5.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The term “continuous radius” is not clear and will lead to inconsistent interpretations.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufacturers’ Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.5 (IFC [B] 1009.5) Stairway Landings. There shall be a floor or landing at the top and bottom of each stairway. The width of landings shall not be less than the width of stairways they serve. Every landing shall have a minimum dimension measured in the direction of travel equal to the width of the stairway. Such dimension need not exceed 48 inches (1219 mm) where the stairway has a straight run~~ or where a curved stairway has a continuous radius~~. Where a curved stairway consists of flights connected by a landing of equal or larger radius in a continuous run rotating in the same direction the minimum dimension need not exceed 48 inches (1219 mm). Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing. When wheelchair spaces are required on the stairway landing in accordance with Section 1007.6.1, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

Exception: Aisle stairs complying with Section 1028.

Commenter's Reason: This modification clarifies the original proponent's intent to provide for intermediate landings of reasonable size in curved stairways where changes in the direction of the user are controlled by the design of a consistent path of travel and thereby also addresses the committees concerns.

Final Action: AS AM AMPC____ D

E85-09/10
1009.13 (IFC [B] 1009.13)

Proposed Change as Submitted

Proponent: David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects

Revise as follows:

1009.13 (IFC [B] 1009.13) Stairway to roof. In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope). In buildings four stories or more above grade plane, without an occupied roof, access to the roof from the top story shall be permitted to be by an alternating tread device or ladder.

Reason: The second sentence in Section 1009.13 isn't clear as to what it applies to; buildings four or more stories above grade plane, buildings of any height, or any building without an occupied roof? The proposed amendment clarifies the criteria to apply to buildings four stories above grade plane and having an unoccupied roof.

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

ICCFILENAME:Collins-E4-1009.13

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: While ladder access may be a viable alternative for roof access, requirements for what type of ladder would be permitted are needed (i.e., fixed).

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consulting, representing Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.13 (IFC [B] 1009.13) Stairway to roof. In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope). In buildings four stories or more above grade plane, without an occupied roof, access to the roof from the top story shall be permitted to be by an alternating tread device or ship ladder.

Commenter's Reason: The modification addresses the committee's concern in define what type of ladder. Ship ladders are regulated by Section 1009.11 Ship ladders.

Final Action: AS AM AMPC____ D

E86-09/10
1009.13 (IFC [B] 1009.13)

Proposed Change as Submitted

Proponent: J. Nigel Ellis, Ph.D., PE, Ellis Fall Safety Solutions, LLC

Revise as follows:

1009.13 (IFC [B] 1009.13) Stairway to roof. In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope). In buildings without an occupied roof, access to the roof from the top story shall be permitted to be by an alternating tread device. Hatch openings shall be provided with a means to facilitate access and exit such as ladder grab bars that can be grasped by the climber. Ladder grab bars shall be elevated above the roof and horizontally arranged in a uniform manner.

Reason: The code is presently silent on roof hatch fall hazards.

To avoid necessity for crouching to stabilize balance before entering the roof hatch or to reduce the incidence of tripping on the curb before descending, he externally mounted grab bars can be reached without stooping to permit access or bodily turn around with reduced falling hazard; such fall hazard can be up to 30 ft. in some mental buildings with highly injurious or fatal consequences.

The requirement would also apply to fixed ladder roof hatch access where exemptions to the IBC Code are permitted.

ANSI A14.3 – 2008 Section 5.3.4.3 states the following: "5.3.4.3 Hatch opening shall be provided with a means to facilitate access and exit from a fixed ladder (i.e, grab bars or other such items that can be grasped by the climber."

The University of Michigan Biomechanics Laboratory research report 4/08 financed by NIOSH (awarded by The Center to Protect Worker' Rights) supports the selection of effective horizontal grab bars over ineffective vertical grab bars. NIOSH/CDC is the National Institute of Occupational Safety & Health/Center for Disease Control.

A picture of ladder grab bars for roof hatch access is attached for a commercial building roof hatch. Ladder grab bars have been recognized for decades in industry by OSHA and ANSI known simply as "grab bars". Since 1971, OSHA 1910.27(b)(5) and (d)(4) only has "grab bars" in mind for fixed ladders which are typically 12 inches long, one inch diameter, bolted or welded at each end and 1.5-4" space to grab where a fixed ladder is used. I am proposing that these ladder grab bars only be placed horizontally. Side rails are always vertically arranged which when grasped is a hazard when you fall more than approx. six inches because the hand slides as shown in the University of Michigan ladder report which I submitted electronically to ICC with the file name UM_CPWR_Final1.pdf and can be viewed on the FallSafety.com website under Ladder Improvements. CPWR (Center for Protection of Worker Rights) dispenses NIOSH grants for research. Another reference is the US Corps of Engineers EM385-1-1 (2003) (mandatory) Appendix Fixed Ladder and Stairs J3(h) "Openings shall be provided with elevated horizontal grab bars to facilitate access and exit from upper levels", J4(d) Horizontal grab bars shall be provided to facilitate grip in case of a fall".

I also understand the use of the term "grab bar" since 1990 approx. for bathroom safety rails in the building code and to which no reference is made in this proposal.

ANSI (American National Standards Institute) has used the term "grab bars" for ladder holding stability (when rungs and side rails were not available) since 1956 in the A14.3 fixed ladder standard, as defined in section 2 as follows:
"2.14 Grab Bars are individual handholds placed adjacent to or as an extension above ladders for the purpose of providing access beyond the limits of the ladder"

Fixed ladder grab bars are addressed in proposed OSHA standard 1910.23(c)(21), and alternating tread type stairs are addressed in ANSI A1264.1-2007 section 6 and also proposed OSHA Standard 1910.25(f) and Fig. D3 (4 10 90). OSHA/DOL is the Occupational Safety & Health Administration/Department of Labor.

Horizontal grab bars can be attached by bolting or welding to protective guardrails arranged around roof openings for access to and from alternating tread devices and fixed ladders. More information on www.FallSafety.com Ladder Improvements related to ladder horizontal grab bars.

Cost Impact: Roof Hatch grab bars permanently installed approximately $320 cost and four bolt holes to drill for installation. Where guardrails are added around the roof hatch, the total system costs approximately $1300 before installation.

ICCFILENAME:Ellis-E1-1009.12

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: While this safety issue for hatch access on a roof should be addressed, for consistent enforcement additional information is needed for height and attachment of the handholds. Perhaps this would be better located in the International Mechanical Code of International Plumbing Code since this deals with unoccupied roofs.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

J. Nigel Ellis, Ph.D., PE, representing Ellis Fall Safety Solutions, LLC, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1009.13.3 Roof hatch grab bars. Roof hatch openings shall be provided with a means to facilitate access and exit such as grab bars that can be grasped by the climber. Grab bars shall be one inch in diameter and elevated up to 3.5 feet above the roof and horizontally arranged in a uniform manner passed which the access is made.

Commenter's Reason: The code is presently silent on roof hatch fall hazards. Roof maintenance by the owner is anticipated along with periodic contractor visits accompanied by the owner's escort over the life of the building making the IBC the correct location for the wording.

To avoid necessity for crouching to stabilize balance before entering the roof hatch or to reduce the incidence of tripping on the curb before descending, the externally mounted elevated grab bars can be reached and held firmly, without the present curb nipping hazard, to grasp and permit stepping access and/or bodily turn-around with reduced falling hazard; such fall hazard can be up to 30 ft. in some buildings with highly injurious or fatal consequences. Alternatively, grab bars may be part of a hatch opening guard system bolted to the curb.

The requirement would also apply to fixed ladder roof hatch access and where exemptions to the IBC Code are permitted.

ANSI A14.3 – 2008 Section 5.3.4.3 states the following: "5.3.4.3 Hatch opening shall be provided with a means to facilitate access and exit from a fixed ladder i.e. grab bars or other such items that can be grasped by the climber".

Horizontal Grab Bars: A peer-reviewed article in Human Factors & Ergonomics Journal published October 2009 entitled "Hand-Handhold Coupling: Effect of Handle Shape, Orientation and Friction on Breakaway Strength" can be viewed on www.FallSafety.com "Ladder Improvements" showing the ineffective use of vertical grab bars in controlling a fall, and the successful use of horizontal grab bars during a free fall.

Two pictures of alternative horizontal grab bars for roof hatch access are attached for a commercial building roof hatch. Ladder grab bars have been recognized for decades in industry by OSHA and ANSI known simply as "grab bars". Since 1971, OSHA 1910.27(b)(5) and (d)(4) only has "grab bars" in mind for fixed ladders which are typically 12 inches long, ¾" - one inch diameter, bolted or welded at each end and 1.5-4" space to grab where a fixed ladder is used. I am proposing that these ladder grab bars only be placed horizontally above each other spaced one foot apart as is found on a ladder. Side rails are always vertically arranged which when grasped is a hazard when you fall more than approx. six inches because the hand slides as shown in the University of Michigan ladder report UM_CPWR_Final1.pdf. CPWR (Center for Protection of Worker Rights) dispenses NIOSH grants for research. Another reference is the US Corps of Engineers EM385-1-1 (2003) (mandatory) Appendix Fixed Ladder and

Stairs J3(h) “Openings shall be provided with elevated horizontal grab bars to facilitate access and exit from upper levels”, J4(d) Horizontal grab bars shall be provided to facilitate grip in case of a fall”.

I also understand the use of the term “grab bar” since 1990 approx. for bathroom safety rails in the building code and to which no reference is made in this proposal.

ANSI (American National Standards Institute) has used the term “grab bars” for ladder holding stability (when rungs and side rails were not available) since 1956 in the A14.3 fixed ladder standard, as defined in section 2 as follows: "2.14 Grab Bars are individual handholds placed adjacent to or as an extension above ladders for the purpose of providing access beyond the limits of the ladder", and “6.3 shall extend at least 3ft 6 inches above the access/egress level” and “6.4 Grab Bar diameters shall be the equivalent of ladder round-rung diameters”

Fixed ladder grab bars are addressed in proposed OSHA standard 1910.23(c)(21), and alternating tread type stairs are addressed in ANSI A1264.1-2007 section 6 and also proposed OSHA Standard 1910.25(f) and Fig. D3 (4 10 90). OSHA/DOL is the Occupational Safety & Health Administration/Department of Labor.

Horizontal grab bars can be part of protective guardrails arranged around the roof opening for access to and from the alternating tread device or fixed ladder. See examples below.

Final Action: AS AM AMPC____ D