

# Code Technology Committee

## Area of Study – Climbable Guards

### 2009/2012 Cycle

#### Code changes related to the CTC area of study noted above

The following are code changes related to the CTC Climbable Guards Area of Study that will be considered at the 2009/2012 Code Development Hearings in Baltimore.

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## E100–09/10

**1002.1, 1013.2 (IFC [B] 1002.1, 1013.2); IRC R202, R312.2**

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

**THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC MEANS OF EGRESS COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.**

### PART I – IBC MEANS OF EGRESS

#### 1. Add new definition 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.

**FIXED SEATING.** Furniture or fixture designed and installed for the use of sitting and secured in place including bench-type seats and seats with or without back or arm rests.

#### 2. Revise as follows:

**1013.2 (IFC [B] 1013.2) Height.** Required guards shall not be less than 42 inches (1067 mm) high, measured vertically ~~above the~~ as follows:

1. From the adjacent walking surfaces,
2. From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches of a required guard, the guard height shall provide a minimum 42 inches measured diagonally between the top of the guard and the nearest edge of the seat surface or
3. On stairs, from the line connecting the leading edges of the tread treads nosings, and
4. On ramps, from the ramp surface at the guard.

#### Exceptions:

1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.

2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the *guard* also serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
3. The *guard* height in front row assembly seating areas ~~complying shall be in accordance with~~ Section 1028.14.
4. Along *alternating tread devices* and ship ladders, *guards* whose top rail also serves as a *handrail*, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

## PART II – IRC BUILDING/ENERGY

### 1. Add new definition as follows:

#### SECTION R202 DEFINITIONS

**FIXED SEATING.** Furniture or fixture designed and installed for the use of sitting and secured in place including bench-type seats and seats with or without back or arm rests.

### 2. Revise as follows:

**R312.2 Height.** Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches high measured vertically ~~above the~~ as follows:

1. From the adjacent walking surface,
2. From a seat surface of adjacent fixed seating, with or without arm or back rests, within 22 inches of the required guard, the guard height shall provide a minimum 36 inches measured diagonally between the top of the guard and the nearest edge of the seat surface or
3. On stairs, from the line connecting the leading edges of the tread ~~treads~~ nosings and
4. On ramps, from the ramp surface at the guard.

#### **Exceptions:**

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

**Reason:** The 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 “Climbable Guards”. The scope of the activity is noted as:

The study of climbable guards will focus on determining the need for appropriate measures to prevent or inhibit an individual from utilizing the elements of a guard system, including rails, balusters and ornamental patterns, to climb the guard, thereby subjecting that person to the falling hazard which the guard system is intended to prevent.

The purposes of this proposal are to address several items raised last cycle during consideration of code change E85-07/08 which was approved. In particular, this proposal clarifies what constitutes “fixed seating” and proposes a horizontal distance between an object that reduces the “effective” height of a required guard rather than placing total reliance on the term “adjacent”.

**Definition:** The definition of “fixed seating” provides for a common understanding where the term is used. This was a concern that was raised in Public Comment #2 to E85 which was not successful.

**Item #2:** The concern addressed in this revision is that of fixed seating, with or without arm rests and with or without back rests including bench seating located within 22” of the guard. This seating provides a potential standing surface which as a result reduces the effective height of the guard. For seating within 22” of the guard, the guard height is to be measured diagonally from the nearest edge of the seat to the top of the guard. This measurement method is currently utilized in Section 1028.14.3. The guard would be required to extend past the “last” seat in a row so that the guard top is 42” above the edge of the last seat.

The distance of 22” utilized in this exception has been determined by CTC to be a reasonable distance for the purpose described.

**Item #3:** The current text is modified to indicate that the line is to be between the tread nosings. In the case of a single riser, hence a

single nosing, a minimum tread depth of 11 inches on the lower walking surface establishes the slope.

Item #4: The guard height at the edge of a ramp is to be measured at the guard without consideration for the ramp slope as the dimensional change in the guard height is relatively insignificant. With a ramp slope towards the guard of 1/12, the highest point 22" from the guard is 1.83 inches above the ramp surface at the guard. If the ramp slope is 1/8, at 22" from the guard, the ramp surface is 2.75 inches above the ramp surface at the guard.

IBC Exception 3: The provisions for guard reduction for front row seating are primarily intended to accommodate the sight line for seated occupants- see section 1028.14.2. The seating within 22 inches of the guards elsewhere would necessitate an increase in the required guard height as indicated in Item #2.

**PART I – IBC MEANS OF EGRESS**

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

**PART II – IRC BUILDING/ENERGY**

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

ICCFILENAME:Heilstedt-E3-1013.2

**E101–09/10**  
**1013.2 (IFC [B] 1013.2)**

**Proponent:** John Woestman, The Kellen Company, representing the Composite Lumber Manufacturers Association (CLMA)

**Revise as follows:**

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

**Exceptions:**

1. For occupancy Group R-3 not more than three stories above grade in height and individual dwelling units in occupancy Group R-2 not more than three stories above grade in height with separate means of egress, required guards shall not be less than 36 inches (914 mm) high measured vertically above the adjacent walking surfaces, adjacent fixed seating or the line connecting the leading edges of the treads.
- 2.4. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
- 3.2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
- 4.3. The height in assembly seating areas shall be in accordance with Section 1028.14.
- 5.4. Along alternating tread devices and ship ladders, guards whose top rail also serves as a handrail, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread nosing.

**Reason:** This proposal revises the IBC such that guards for one or two family occupancies not more than three stories above-grade in height and individual dwelling units in occupancy Group R-2 not more than three stories above-grade in height with a separate means of egress (i.e. townhouses) may be constructed to the same height requirements as the IRC. This disconnect between the IBC and the IRC has become quite visible in a large jurisdiction that adopted the IBC, but not the IRC, and has been applying the IBC to one and two family dwellings and to townhouses.

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

**Analysis:** The corresponding section in the International Residential Code is Section R312.2.

## E102-09/10 1013.2 (IFC [B] 1013.2)

**Proponent:** Kerwin Lee, AIA, CASp, Rolf Jensen & Associates

### Revise as follows:

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

### Exceptions:

1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
3. The height in assembly seating areas shall be in accordance with Section 1028.14.
4. Along alternating tread devices and ship ladders, guards whose top rail also serves as a handrail, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread nosing.
5. In other than Group E occupancies, guards along stairways shall not be less than 34 inches (864mm) in height above the leading edge of the tread, where the stairway reverse direction at an intermediate landing and the opening between successive flights is 8 inches (203mm) or less, measured horizontally.

**Reason:** This language is taken from the National Building code. The code does not specifically address if a guard is required in a standard stair that switches back on itself. If the opening between the stair runs is 8 inches or less a guard should not be required. (Section 1013.3 limits openings to 8 inches above 34 inches when the opening is 34 inches or more above the surface). Normally these types of stairs are used for egress only and people do not stop along the stair. Once on the stair run, the user continues to the landing and next run of stairs. The need for a guard is not necessary in these situations. The exception to the exception is with E occupancies where children are present.

**Cost Impact:** No anticipated cost impact for construction.

## E147-09/10 1028.14.2 (IFC [B] 1028.14.2)

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

### Revise as follows:

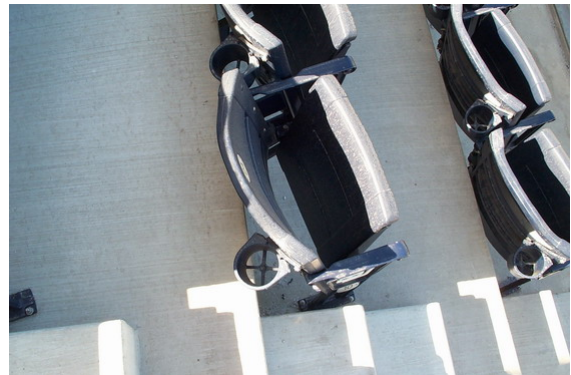
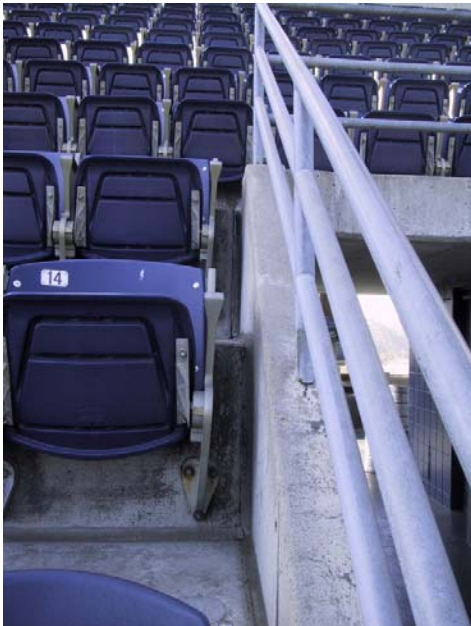
**1028.14.2 (IFC [B] 1028.14.2) Sightline-constrained guard heights.** Unless subject to the requirements of Section 1028.14.3, a fascia or railing system in accordance with the *guard* requirements of Section 1013 and having a minimum height of 26 inches (660 mm) measured vertically above the adjacent walking surfaces, adjacent bench seat or the line connecting the leading edges of the treads shall be provided where the floor or footboard elevation is more than 30 inches (762 mm) above the floor or grade below and the fascia or railing would otherwise interfere with the sightlines of immediately adjacent seating. At *bleachers*, a *guard* must be provided where required

by ICC 300.

**Exception:** The height of the guard shall not be required to be measured vertically above an adjacent automatic or self-rising chair.

**Reason:** This proposal addresses several things, first it brings clarity to confusion that was created by a change that occurred in the 2009 IBC. The term "seatboard" was replaced with the term "fixed seating" in the 2009 IBC Section 1013.2 on how the height of guards are measured with the stated reason "to clarify the measurement, using common terminology". With respect to assembly seating, the term "fixed seating" does not offer greater clarity, instead it offers significantly more confusion. For example, how do you measure the height of the guard adjacent fixed seats when they are self-rising chairs? (Refer to photographs below.) In assembly seating, fixed seats refers to chairs that are secured to the structure, not that they provide a walking surface. The aisle accessway provisions of Section 1028.10 specifically address the clear width between rows of seats where there is automatic or self-rising chairs and chairs with seats that do not move. Therefore, the clarity provided other occupancies unfortunately increased confusion pertaining to assembly seating. Section 1028.14 needs to include how to measure the height of guards so that clarity can be provided assembly seating and still offer other occupancies the clarity needed for them in Section 1013.2. Please note that this proposal does not include any change to Section 1013.2, only to Section 1028.14.

Following are two photographs of self-rising chairs and one of bench seats. The fixed bench seating could serve as a walking surface, however the self-rising chairs are not easily used as a walking surface. 2007 ICC 300 measures vertically above the leading edge of the tread, adjacent walking surface or adjacent bench seat. This proposal maintains how the height of the guard is measured by 1013.2 with the exception of replacing the term "fixed seat" with the term "bench seat" to coordinate with ICC 300 and to enhance clarity that guard height needs to be measured vertically above such seats. Also, the term "bench seat" rather than "seatboard" is commonly used for this type of seating in assembly seating project specifications. An exception was added for self-rising chairs since these seats are not easily used as a walking surface and there is no well defined way to measure these chairs.



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

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

ICCFILENAME:Roether-E9-1028.14.2

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

**Proponent:** Rick Davidson, City of Maple Grove, MN

### Revise as follows:

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

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

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

### Exceptions:

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

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

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

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

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

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

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

ICCFILENAME: DAVIDSON-RB-7-R312.1



# RB52-09/10

## R312.3

**Proponent:** Tiffani Kerlik, Louisville, NE, representing self

**Revise as follows:**

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

**Exceptions:**

1. The triangular openings at the open side of a stair, formed by the riser, tread and bottom rail of a *guard*, shall not allow passage of a sphere ~~6 inches~~ 4 inches (153 mm) in diameter.
2. *Guards* on the open sides of stairs shall not have openings which allow passage of a sphere ~~4 3/8 inches~~ 2 ½ inches (111 mm) in diameter.

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











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

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

ICCFILENAME: Kerlik-RB-1-R312.3