ICC Code Technology Committee (CTC)

Climbable Guards

ICC Code Change History
2000-2004/2005

Final Action indicated next to code change number

E16-00 - D
1003.2.12.2 (IFC 1003.2.12.2)

Proponent: Kurt Helin, Madison, WI representing himself

Revise as follows:

IBC 1003.2.12.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surfaces a sphere 8 inches (203 mm) in diameter shall not pass.

Exceptions 1-4 (No change)

Guards shall not have an ornamental pattern that would provide a ladder effect.

THIS PROPOSAL ACHIEVES TECHNICAL CONSISTENCY BETWEEN THE IBC AND IRC. THE FOLLOWING IRC TEXT IS SHOWN FOR INFORMATION PURPOSES ONLY.

IRC R316.2 Guardrail opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102 mm) or more in diameter. Required guards shall not be constructed with horizontal rails or other ornamental pattern that results in a ladder effect.

Exception: The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (153 mm) cannot pass through.

Reason: To eliminate the potential for children climbing the guard rail and falling resulting in serious injury or death.

E16-00

Committee Action: **Disapproval**

Committee Reason: The proposed text is vague and would result in nonuniform enforcement. The new 42 inch guard height requirement should better address the concern for children climbing the guard. The proposed requirement is excessive in that it would be mandatory for all occupancies.

Assembly Action: **No Motion**

E17-00 - D
1003.2.12.3 (IFC 1003.2.12.3)

Proponent: Elliott O. Stephenson, representing the Future Generations of Young Americans

Add new text as follows:

IBC 1003.2.12.3 Climbing limitations. In the building occupancies or areas specified in the following Groups those portions of guards between the heights of 4 inches (102 mm) and 34 inches (864 mm) shall consist of vertical elements, solid or semi-solid panels or of other construction that is designed to inhibit climbing by children.

ASSEMBLY GROUP A-2	Restaurants Only
ASSEMBLY GROUP A-3	Amusement Arcades, Gymnasiums, Libraries, Museums and Passenger Station

	Waiting Areas Only
ASSEMBLY GROUP A-5	All
EDUCATIONAL GROUP E	All
INSTITUTIONAL GROUP I	I-4 Child Care Facilities Only
MERCANTILE GROUP M	In Areas Intended For Occupancy By The Public Only
RESIDENTIAL GROUP R	R-1, R-2 Apartment Houses, Non Transient Boarding and Dormitories Only, R-3

THIS PROPOSAL ACHIEVES TECHNICAL CONSISTENCY BETWEEN THE IBC AND IRC. THE FOLLOWING IRC TEXT IS SHOWN FOR INFORMATION PURPOSES ONLY.

IRC R316.2 Guardrail opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102 mm) or more in diameter. Required guards shall not be constructed with horizontal rails or other ornamental pattern that results in a ladder effect.

Exception: The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (153 mm) cannot pass through.

Reason: The billion or more American Citizens who will be born during the 21st Century deserve to have building codes that recognize the special safety needs of young children. Climbable guards are an Unnecessary Hazard that need not and should not be installed at elevated locations where young children can be expected to be present. Their parents and guardians should be able to be confident that the special needs of children have been given adequate consideration by those responsible for the development and enforcement of our country's construction codes and standards.

There is adequate proof that a young child will climb a climbable guard if it is available to him or her. There is also adequate proof that the number of accidental falls and intentional jumps from balconies and porches by children in the USA each year is truly substantial. The U.S. Consumer Product Safety Commission estimates that there are 15,000 to 16,000 such injury incidents treated annually in the Emergency Facilities of the hospital of the United States.

Our new ICC International Building Code will not be recognized as consistent with its companion One and Two Family Dwelling Code unless the above proposed provisions are included in it. In addition, it will not be recognized as being consistent with the national building codes of numerous modern countries around the world that have contained equivalent provisions for a decade.

E17-00

Committee Action: **Disapproval**

Committee Reason: The phrase "that is designed to inhibit climbing by children" is vague and would lead to nonuniform enforcement. The list of occupancies is not consistent with those occupancies where children would likely be present.

Assembly Action: **No Motion**

E18-00 - D
1003.2.12.3 (IFC 1003.2.12.3)

Proponent: Jake Pauls, CPE, Consulting Services in Building Use and Safety, representing himself

Add new text as follows:

IBC 1003.2.12.3 Climbing limitation. Guards serving occupancies where children under the age of seven years are expected to be present shall be designed and constructed so as not to facilitate climbing of the guard by such children.

THIS PROPOSAL ACHIEVES TECHNICAL CONSISTENCY BETWEEN THE IBC AND IRC. THE FOLLOWING IRC TEXT IS SHOWN FOR INFORMATION PURPOSES ONLY.

IRC R316.2 Guardrail opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102 mm) or more in diameter. Required guards shall not be constructed with horizontal rails or other ornamental pattern that results in a ladder effect.

Exception: The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (153 mm) cannot pass through.

Reason: During the 1999 code hearings, an attempt was made (via E87-99) to introduce requirements for nonclimbable guards. Mostly for reasons of scoping, this was not successful. However, in the IRC there was a clear vote on the part of code officials to maintain a requirement (in R316.2) prohibiting "horizontal rails or other ornamental pattern that results in a ladder effect."

The IBC, unlike the IRC, is supposed be able to include more performance language for requirements. Nonclimbable guards is a prime example of something best dealt with in performance language so that there is maximum, *reasonable* freedom for responsible designers to provide functional guards. This is what this proposal attempts to accomplish and it is based on the ample justification provided in the work of Elliott Stephenson which is well published in the model code magazines and will not be repeated here. (If trees need to die, let it at least be for adequately high vertical pickets for guards that will serve their adult users *and* children. Note that vertical pickets are not the only solutions complying with the performance criterion.)

E18-00

Committee Action: **Disapproval**

Committee Reason: The proposed text includes vague language which would lead to nonuniform enforcement. The reason for specifying children under the age of 7 years has not been justified.

Assembly Action: **No Motion**

RB46-00 - AS

Proposed Change as Submitted:

Proponent: Anthony Leto, Chairman, Technical Committee, National Ornamental & Miscellaneous

Revise as follows:

IRC R316.2 Guardrail opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures that do not allow passage of a sphere 4 inches (102mm) or more in diameter. ~~Required guards shall not be constructed with horizontal rails or other ornamental pattern that results in a ladder effect.~~

Exception: The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere of 6 inches (153mm) cannot pass through.

THIS PROPOSAL ACHIEVES TECHNICAL CONSISTENCY BETWEEN THE IRC AND IBC. THE FOLLOWING IBC TEXT IS SHOWN FOR INFORMATION PURPOSES ONLY.

IBC 1003.2.12.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1066 mm) above the adjacent walking surfaces a sphere 8 inches (203 mm) in diameter shall not pass.

Exceptions:

1. The triangular openings formed by the riser, tread and bottom rail at the open side of a stairway shall be of a maximum size such that a sphere of 6 inches (152 mm) in diameter cannot pass through the opening.
2. At elevated walking surfaces for access to and use of electrical, mechanical, or plumbing systems or equipment, guards shall have balusters or be of solid materials such that a sphere with a diameter of 21 inches (533 mm) cannot pass through any opening.
3. In occupancies in Group I-3, F, H or S, balusters, horizontal intermediate rails or other construction shall not permit a sphere with a diameter of 21 inches (533 mm) to pass through any opening.
4. In assembly seating areas, guards at the end of aisles where they terminate at a fascia of boxes, balconies, and galleries shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 26 inches (660 mm) to 42 inches (1066 mm). From a height of 26 inches (660 mm) above the adjacent walking surfaces a sphere 8 inches (203 mm) in diameter shall not pass.

Proponent's Reason: 1) The function of a guard or guardrail is to prevent a person from inadvertently falling from an elevated location. **Guardrails cannot prevent a determined individual -- whether child or adult -- from climbing on or over them.**

2) Responding to the previously published "Committee Reason" for disapproval --"Disapproved in favor of IBC code change E87-99 which was approved as modified" -- **E87-99 was disapproved by the membership in St. Louis and therefore does not justify keeping the "ladder effect" in place.**

3) The sentence includes undefined terms that result in confusion.

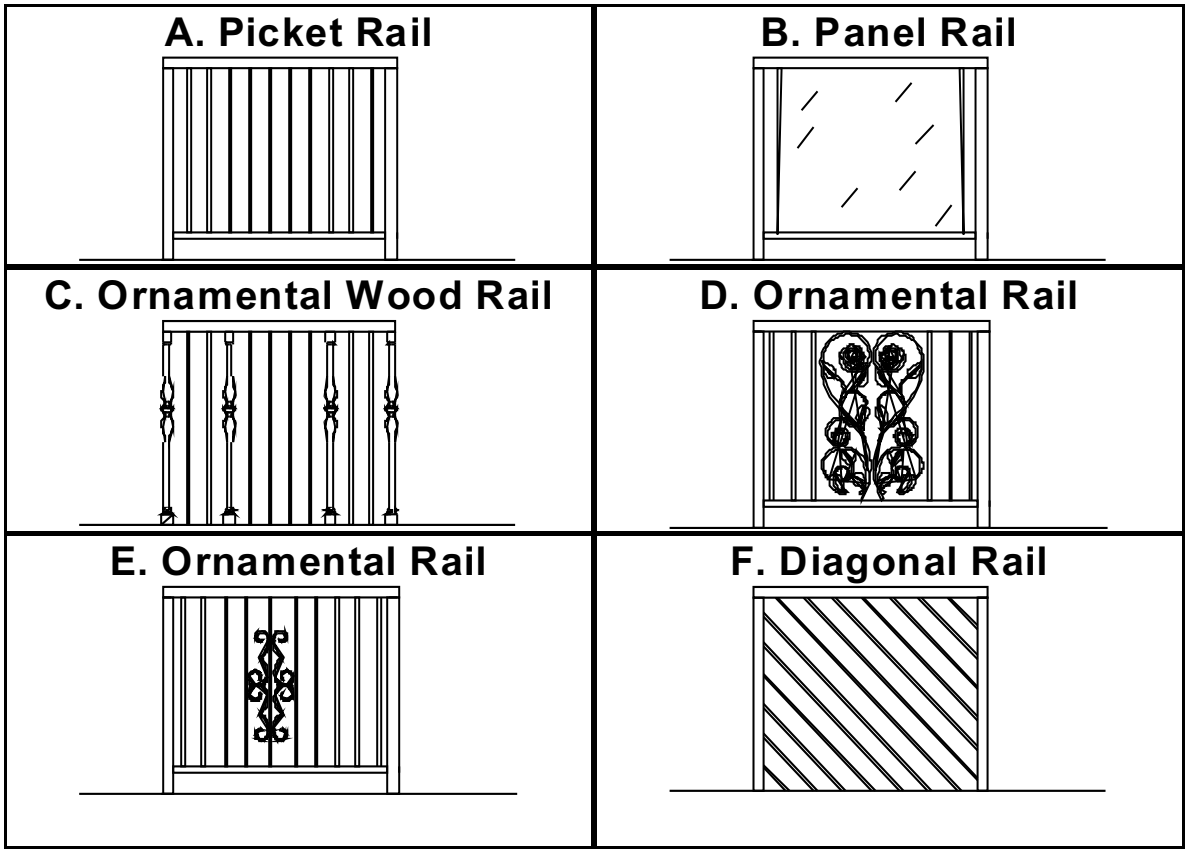
a) ***Horizontal rails* is not defined**. The dictionary defines *horizontal* as "parallel to, in the plane of, or operating in a plane parallel to the horizon or to a base line." *Rail* is then defined as "a bar extending from one post or support to another and serving as a guard or barrier." From this definition, it could be interpreted that horizontal cables are permitted.

b) ***Ladder Effect* as it relates to guard railings is never defined and is misleading**. If the intent is to address climbability, then wording to that effect should be introduced. When submitted to a personal injury attorney for comment, he noted that "if you look at a vertical picket railing sideways, it certainly appears to be a ladder." By using the term "ladder effect", we are creating the basis for unnecessary litigation.

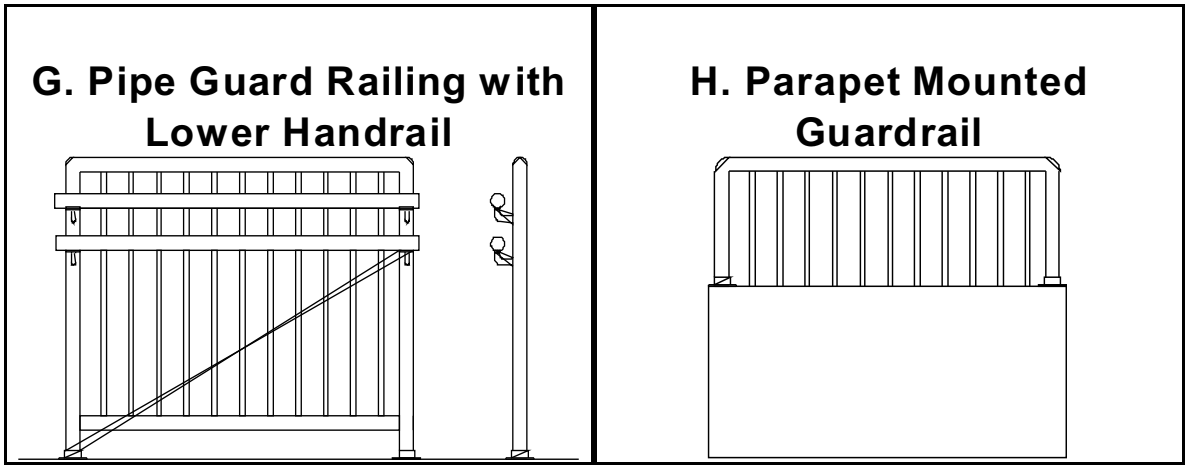
4) The code contradicts itself in the use of *ornamental*. It first requires "ornamental closures" but then disallows the use of "ornamental patterns".

In the drawings below, Drawings A & B would not be permitted under R316.2 because of the horizontal lower rails though **horizontal lower rails are required in picket and panel railings to hold the infill elements in place**. Ornamental railings shown in Drawings C, D and E are not permitted because of the ornamental patterns. Drawing F does not have *horizontal rails* but is it considered acceptable? These are questions that will arise from the current text.

(5) In the drawings below, Drawings A & B would not be permitted under R316.2 because of the horizontal lower rails though **horizontal lower rails are required in picket and panel railings to hold the infill elements in place**. Ornamental railings shown in Drawings C, D and E are not permitted because of the ornamental patterns. Drawing F does not have horizontal rails but is it considered acceptable? These are questions that will arise from the current text.



6) The IBC requires that guards be 42 inches in height and has no wording regarding the "ladder effect." Drawing F shows a situation in which a guardrail of 42 inches is provided with handrails at 37 inches for adults and 31 inches for children. While this would be acceptable in the IBC, it would not be permitted in the IRC because of the prohibition on horizontal rails.



7) The code does nothing to address the climbability of knee walls, curbs and parapet mounted guard railings. Drawing G would meet the code but presents a greater climbing hazard than Drawings A or B.

8) There is no significant statistical evidence that supports the notion that we have an "epidemic" of guard climbing injuries. While there is evidence to indicate that children are playing on guards, the number of injuries which are a documented result of children climbing over a guard and falling greater than 4 feet, is statistically non-existent. It can not be assumed that all falls from porches, balconies and guards are a direct result of climbing a guard. Also, no allowance has been made for a child's innate fear of a sudden drop in height that would prevent a child from desiring to climb a guard that has a significant drop on one side.

a) Test Data Regarding Development of Depth Perception in Children:

Fear of sudden drops in height is a fear that emerges as early as the second 6 months of life. This fear has been measured by infants' avoidance of heights, as shown on an apparatus called the "visual cliff", originally developed by Eleanor Gibson (Gibson & Walk, 1960) to assess early depth perception. An infant is placed on a narrow runway that rests on a large sheet of glass. On one side of the runway is a checkerboard pattern placed directly under the glass; on the other, the checkerboard pattern is placed 1 to 2 feet below the glass, giving the appearance of depth on that side - hence the term "visual cliff". Prior to 7 months, and before the onset of anxiety, most infants do not avoid the deep side of the glass. If their mother calls them from the deep side, they will cross to her. However, after 8 months, most infants avoid the side that has the appearance of a cliff and will cry if they are placed on that side.

Avoidance of the apparently deep side of the visual cliff is not due to a new ability to perceive depth. Younger infants perceive the difference between the deep and shallow sides, as evidenced by the fact that they show a distinct cardiac reaction when lowered face down on the deep side (Campos, Langer, & Kravitz, 1970). However, only when infants begin to crawl or creep, usually around 8 months of age, do they begin to avoid the deep side of the visual cliff.

b) United States Consumer Product Safety Commission (USCPSC)

Data was obtained from the USCPSC, National Electronic Injury Information Surveillance System (NEIISS) for the categories "Falls Involving Handrail Injuries" -- 1/1/91 to 6/2/99 and "Porch & Balcony Injuries" -- 9-7-81 to 7-15-99. A request was originally made for information on guardrail related injuries. However, searches under this keyword only brought forward data on injuries related to roadside barriers and guards. The CPSC indicated that "Falls Involving Handrail Injuries" would be the best indicator of the needed information. Also obtained were incident reports, injury reports related to window falls, pool injuries and baby gate injuries. Refer to the bibliography for a complete listing of support documents. This data is based on reports from 101 of 5,500 U.S. Hospital Emergency Departments (see Addendum for list of hospitals). Elliot O. Stephenson has suggested that a factor of 40 be applied to this sample to determine a national estimate.

Since it can be assumed that anyone over the age of ten can climb a 36-inch structure, we have chosen to focus only on the injuries which involved children under the age of 10.

i) Falls Involving Handrail Injuries:

The first sample, "Falls Involving Handrail Injuries", listed a total of 4,825 injuries -- 1,371 of those injuries involved children under the age of 10. Of this total, 708 injuries were clearly not guard climbing related and are noted in Table 1 as "Fall Against a Railing" and "Not Applicable" (e.g. falls from bed rails, falling against a rail while running, railings falling on children, adults falling while holding children, falls from railings under 2 feet, etc.). Another 26 injuries were caused by structural failure, and 87 injuries were the result of children falling *through* railings (an inappropriate rail opening).

Additionally, 136 injuries were described as falls *over* a railing. While some may want to make the assumption that these falls were the result of climbing, this is not supported by the descriptions in the report. Most of these railings were not even considered guardrails. The report includes descriptions such as: "fell over rail at ice arena," "fell over a railing at Great Adventure," "pushed over banister at school," "fell off stairway over railing," "fell over rail she was sitting on," "fell over railing in restaurant," "fell over loose deck railing," "climbing over fence barbed wire, gate opened and she fell."

Of the remaining injuries which might be related to climbing, the report lists only 40 injuries where "climbing" is actually mentioned. Of these, 26 resulted in falls of less than 4 feet (many of these occurred in retail store queue lines where children climbed onto a railing and slipped or fell backwards). Only 3 falls of more than 4 feet were directly attributed to climbing. Falls from/off a railing or sliding down a railing, accounted for 375 injuries. Again, many of the falls are noted as having occurred in queue lines and were not guardrails. Of these falls, the vast majority (349) were onto the stairs or the same level. Only 26 of these falls resulted in drops greater than 4 feet.

While most of the reports simply state "fell off railing", others mention children "walking", "sitting", or "swinging" on railings. It may be assumed that children climbed onto these railings but it can not be assumed that the guardrails were the primary means of

ascent. **Why would a child climb a guard railing when chairs, planters and patio furniture are more convenient?**

Table 1
Sample Number of Injuries Treated in U.S. Hospital
Emergency Departments and Associated with Hand railings
Tabulation by Type of Fall

Tabulation by Anthony Leto using CPSC/NEIISS for Hand railings 1-1-91 to 6-2-99

Category	Injuries	% of total
Fall Against a Railing	554	40%
Less than 4' Fall From a Railing	327	24%
Not Applicable	152	11%
Less than 4' Fall Over a Railing	109	8%
Fall Through A Railing	87	6%
Less than 4' Fall While Climbing a Railing	37	3%
Greater than 4' Fall Over a Railing	27	2%
Greater than 4' Fall From a Railing	26	2%
Fall Caused by Structural Failure	26	2%
Fall Sliding Down the Railing	22	2%
Greater than 4' Fall While Climbing a Railing	3	0%
Falling While Climbing Other	1	0%
Total	1371	100%

It is important to note that the above data only represents a "sample" of total injuries. This data is collected by the NEIISS from 101 emergency rooms across the country. We will need to make some estimates to consider this on a level of injuries per year

The table below shows that the total sample of 4,825, for the period from 1-1-91 to 6-2-99, translates to a national estimate of 183,350 for this 101-month period (using a multiplier of 40 as suggested by Elliot O. Stephenson). If we then take these figures, divide by 101 and multiply by 12, we have a sample of 573/year and a national estimate of 22,930/year. Making the same calculations for the data on children under the age of 10, we arrive at a sample count of 163/year and a national estimate of 6,516/year.

Table 2
Estimated Number of Injuries Treated in U.S. Hospital
Emergency Departments and Associated with Hand railings
Tabulation by Age Group

Falls involving handrail injuries	**From 1-1-91 to 6-2-99**	**Avg. per year**
total sample count	4,825	573
National Estimate	193,000	22,930
sample count children < 10 years	1,371	163
National Estimate	54,840	6,516

Using the percentages noted in Table 1, the national estimate of "Falls Involving Handrail Injuries" per year, for children under the age of 10 (6,190) would break down as follows:

Table 3
Annual Estimated Number of Injuries Treated in U.S. Hospital Emergency Departments
and Associated with Hand railings for Children Under the Age of 10
Tabulation by Type of Fall

Tabulation by Anthony Leto using CPSC/NEIISS for Hand railings 1-1-91 to 6-2-99

Category	Injuries	% of total
Fall Against a Railing	2606	40%
Less than 4' Fall From a Railing	1564	24%
Not Applicable	717	11%
Less than 4' Fall Over a Railing	521	8%
Fall Through A Railing	391	6%
Less than 4' Fall While Climbing a Railing	186	3%
Greater than 4' Fall Over a Railing	195	2%
Greater than 4' Fall From a Railing	130	2%
Fall Caused by Structural Failure	130	2%

Fall Sliding Down the Railing	130	2%
Greater than 4' Fall While Climbing a Railing	0	0%
Falling While Climbing Other	0	0%
Total	6,516	100%

If we total the injuries in those categories that may have been climbing related we get the following results:

Table 4
Annual Estimated Number of Injuries Treated in U.S. Hospital Emergency Departments and Associated with Hand railings for Children Under the Age of 10 Which May be Climbing Related
Tabulation by Type of Fall

Tabulation by Anthony Leto using CPSC/NEIISS for Hand railings 1-1-91 to 6-2-99

Category	Injuries
Less than 4' Fall From a Railing	1564
Less than 4' Fall While Climbing a Railing	186
Greater than 4' Fall From a Railing	130
Fall Sliding Down the Railing	130
Greater than 4' Fall While Climbing a Railing	0
Total	2,010

Table 5
Annual Estimated Number of Injuries Treated in U.S. Hospital Emergency Departments and Associated with Hand railings for Children Under the Age of 10 Which May be Climbing Related and the Fall Was Greater Than 4 Feet
Tabulation by Type of Fall

Tabulation by Anthony Leto using CPSC/NEIISS for Hand railings 1-1-91 to 6-2-99

Category	Injuries
Greater than 4' Fall From a Railing	130
Greater than 4' Fall While Climbing a Railing	0
Total	130

Of these injuries, there is no information indicating what type of guards were involved (picket, panel, wood, ornamental, cable, etc.); or whether the children climbed the guard railing, climbed furniture in the area of the guard railing, fell off the side of the guard railing, or simply pulled themselves up from the ground onto the guard railing. To assume that the guards were climbed is unfounded and prejudicial.

The national census estimate for the United States as of August 1, 1999 indicated the national population for children under the age of 10 is 37,866,000 -- 130 of which run the risk of falling greater than 4 feet while climbing a guard. Compare this to injuries related to other items.

Table 6
National Estimate for Injuries to Children CY 1997 For Various Products

Tabulation by Anthony Leto using CPSC/NEIISS Product Summary Report

	Ages 0-4	Ages 5-14
Doors	63,379	72,475
Counters or Counter Tops	13,910	6,095
Fences or Fence Posts	7,751	40,970
Window or Window Glass	11,294	21,371
Playground Climbing	11,133	59,401

There are significantly more injuries from children falling off of counter tops than there are involving guards and yet no code has been proposed limiting the "ladder effect" of drawer knobs and handles.

ii) Porch & Balcony Injuries:
A similar analysis can be done for "Porch and Balcony Injuries". The sample from the NEIISS lists a total of 283 injuries over a period of 18 years (9-7-81 to 7-15-99). Of these, 54 were under the age of 10 - a sample injury rate of about 3 children per year.

27 of the reported injuries involved children "jumping" off of porches or balconies onto the ground, onto mattresses and onto trampolines. No mention is made as to whether a guard was in place, the height of the guard, or the type of the guard. In fact, there may have been no guard in place at all.

Jumping is a willful act not an accidental fall. We must keep in mind, that guards are not in place to stop determined individuals from jumping or climbing, they are in place to prevent accidental falls.

The other porch and balcony injuries included falls from balconies by children under the age of two that more likely were caused by falling through guards than climbing guards. **The hand railing injury data shows that almost all of the fall injuries for children under the age of two were caused by falls "through" guard openings -- not climbing the guards.** All the other porch injuries do not specify how the

child fell. No mention is made of guard climbing. Of the one case which refers to climbing, it states that a 19 month old child "climbed over a wall" -- not a horizontal rail, not an ornamental pattern but a "wall".

Even if we made the erroneous assumption that all the children in this report climbed the guard and then fell, that would give us a sample size of 3 injuries per year reported by the CPSC's 101 reporting emergency rooms. Using Elliot O. Stephenson's factor of 40, this results in a **national estimate of only 120 injuries per year.**

It is clear from the data, that there is no epidemic of guard climbing related injuries, and yet, the proponents of the ladder effect claim that it is required to significantly reduce injuries to children. This is an emotional appeal with no observations, documentation, or evidence that ornamental railings are being climbed and are therefore the direct cause of a significant number of injuries.

9) The purpose of the original provision is to prevent children from climbing guards but **it does not make allowances for private homes wherein the residents do not have children.**

10) It does nothing to address the larger hazard of falling "over" guard railings and "through" guard railings that are the result of existing guards of an improper height and with improper openings.

11) It will eliminate a home owner's right to aesthetic choice in their own home and severely limit a design professional's ability to do anything other than a simple picket railing. Home renovations and historical districts such as the New Orleans' French Quarter will become sterile and predictable.

12) Proponents of the "ladder effect" refer to other countries' similar requirements but have never offered documentation that these countries have seen a significant reduction in the number of injuries to children falling off of guards.

13) When ornamental guard railings are eliminated, the tendency will be to *dress* picket railings up with the placement of planters or furniture to cover the "jail-house" look. Once this happens, children will have additional items to climb increasing the hazard.

14) Parents are using balconies and porches as "playpens". The National SAFE KIDS Campaign has published a brochure that states, "Never let children play alone on fire escapes, high porches or balconies." This would indicate that a lack of proper supervision is of greater concern than climbable guards. In actuality, many of the children who fall off of guards do so after an adult "sits" them on the top rail. **Parental supervision will do more to reduce guard-related injuries than the elimination of ornamental patterns.**

Bibliography:

"Studies in Perception and Action III (1998)"
Edited by Benoit G. Bandy, Reinard J. Booksma

"Porch and Balcony Injuries 1981 to Present"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Porch and Balcony Injuries 1981 to Present -- Death Certificate Files"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Porch and Balcony Injuries 1981 to Present -- Reported Incidents"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Handrails/Railings/Banisters -- Calendar Year 1989 to Present -- Reported Incidents"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Handrails/Railings/Banisters -- Calendar Year 1989 to Present -- Accident Investigations"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Handrails/Railings/Banisters -- Calendar Year 1989 to Present -- Death Certificate Files"
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U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Falls Involving Handrails Injuries 1991 to Present"
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U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

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U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

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National Injury Information Clearinghouse

"Window Fall Injuries 1981 to Present -- Death Certificate File"
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U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Child Swimming Pool Injuries 1995 to Present – Reported Incidents"
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U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Child Swimming Pool Deaths 1981 to Present"
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National Injury Information Clearinghouse

"Baby Gate Injuries 1981 to Present"
National Electronic Injury Information Surveillance System (NEIISS)
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National Injury Information Clearinghouse

"Baby Gate Injuries 1981 to Present – Death Certificate Files"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

Addendum A
NEISS Sample of Hospitals – by City/State8/4/99

1	D W MCMILLAN MEMORIAL HOSPITAL	BREWTON	AL
2	JACKSONVILLE HOSPITAL	JACKSONVILLE	FL
3	D C H REGIONAL MEDICAL CENTER	TUSCALOOSA	AL
4	MEDICAL PARK HOSPITAL	HOPE	AR
5	HOWARD MEMORIAL HOSPITAL	NASHVILLE	AR
6	GOOD SAMARITAN REG MEDICAL CENTER	PHOENIX	AZ
7	HUHUKAM MEMORIAL HOSPITAL	SACATON	AZ
8	UNIVERSITY MEDICAL CENTER	TUCSON	AZ
9	BREA COMMUNITY HOSPITAL	BREA	CA
10	BAY HARBOR HOSPITAL	HARBOR CITY	CA
11	JOHN C FREMONT HOSPITAL	MARIPOSA	CA
12	CHILDRENS HOSPITAL MED CENTER	OAKLAND	CA
13	HUNTINGTON MEMORIAL HOSPITAL	PASADENA	CA
14	LITTLE COMPANY OF MARY HOSP	TORRANCE	CA
15	SUTTERS SOLANO MEDICAL CENTER	VALLEJO	CA
16	CHILDRENS HOSPITAL	DENVER	CO
17	VETERANS MEMORIAL MEDICAL CENTER	MERIDEN	CT

18	LEE MEMORIAL HOSP – HTH PARK CAMPUS	FT MYERS	FL
19	LEE MEMORIAL HOSP – CLEVELAN	FT MYERS	FL
20	BON SECOURS – ST JOSEPH	PT CHARLOTTE	FL
21	NEWTON GENERAL HOSPITAL	COVINGTON	GA
22	PROMINA DOUGLAS HOSPITAL	DOUGLASVILLE	GA
23	MARTIN ARMY COMM HOSPITAL	FT BENNING	GA
24	SOUTHER REGIONAL MEDICAL CTR	RIVERDALE	GA
25	MYRTUE MEMORIAL HOSPITAL	HARLAN	IA
26	HEGG MEMORIAL HEALTH CENTER	ROCK VALLEY	IA
27	WOOD RIVER MEDICAL CENTER	SUN VALLEY	ID
28	GRAHAM HOSPITAL ASSOCIATION	CANTON	IL
29	MEMORIAL HOSPITAL	CHESTER	IL
30	MERCY HOSPITAL AND MED CENTER	CHICAGO	IL
31	HOPEDALE HOSPITAL	HOPEDALE	IL
32	WEST SUBURBAN HOSP MED CENTER	OAK PARK	IL
33	PEKIN MEMORIAL HOSPITAL	PEKIN	IL
34	ST FRANCIS MEDICAL CENTER	PEORIA	IL
35	DAVIESS COUNTY HOSPITAL	WASHINGTON	IN
36	MEDICINE LODGE MEM HOSPITAL	MEDICINE LODGE	KS
37	OUR LADY OF LAKE REG MED CENTER	BATON ROUGE	LA
38	MASSACHUSETTS GENERAL HOSPITAL	BOSTON	MA
39	HILLCREST HOSPITAL	PITTSFIELD	MA
40	DOCTORS COMMUNITY HOSPITAL	LANHAM	MD
41	SHADY GROVE ADVENTIST HOSPITAL	ROCKVILLED	MD
42	ST FRANCIS HOSPITAL	ESCANABA	MI
43	MADISON COMMUNITY HOSPITAL	MADISON HEIGHTS	MI
44	SCHEURER HOSPITAL	PIGEON	MI
45	MERRICK MEMORIAL HOSPITAL	TECUMSEH	MI
46	WYANDOTTE HOSP & MED CTR	WYANDOTTE	MI
47	ZUMBROTA COMMUNITY HOSPITAL	ZUMBROTA	MN
48	CHILDRENS MERCY HOSPITAL	KANSAS CITY	MO
49	ST FRANCIS HOSPITAL	MOUNTAIN VIEW	MO
50	DEACONESS MEDICAL CTR – CENTRAL	ST LOUIS	MO
51	MONTFORT JONES MEM HOSPITAL	KOSCIUSKO	MS
52	NORTH MISSISSIPPI MED CENTER	TUPELO	MS
53	WALTHALL COUNTY GEN HOSPITAL	TYLERTOWN	MS
54	FALLON MEDICAL COMPLEX	BAKER	MT
55	ST JOHNS LUTHERAN HOSPITAL	LIBBY	MT
56	ALAMANCE COUNTY HOSPITAL	BURLINGTON	NC
57	MOSES H CONE MEMORIAL HOSPITAL	GREENSBORO	NC
58	ST ANDREWS HOSPITAL	BOTTINEAU	ND
59	BOX BUTTE GENERAL HOSPITAL	ALLIANCE	NE
60	MARY LANNING MEMORIAL HOSPITAL	HASTINGS	NE
61	VALLEY REGIONAL HOSPITAL	CLAREMONT	NH
62	LITTLETON REGIONAL HOSPITAL	LITTLETON	NH
63	ATLANTIC CITY MED CTR – CITY DIV	ATLANTIC CITY	NJ
64	SOUTH JERSEY HOSP/BRIDGETON	BRIDGETON	NJ
65	CENTRA STATE MEDICAL CENTER	FREEHOLD	NJ
66	ST ROSE DOMINICAN HOSPITAL	HENDERSON	NV
67	BRONX-LEBANON HOSP/CONCOURSE	BRONX	NY
68	KINGS COUNTY HOSPITAL CENTER	BROOKLYN	NY
69	GENEVA GENERAL HOSPITAL	GENEVA	NY
70	BROOKHAVEN MEM HOSP MED CENTER	PATCHOGUE	NY
71	ST VINCENTS MED CTR OF RICHMOND	STATEN ISLAND	NY
72	CHILDRENS HOSPITAL	COLUMBUS	OH
73	MIAMI VALLEY HOSPITAL	DAYTON	OH
74	EAST OHIO REGIONAL HOSPITAL	MARTINS FERRY	OH
75	FAIRFAX MEMORIAL HOSPITAL	FAIRFAX	OK
76	HOLDENVILLE GENERAL HOSPITAL	HOLDENVILLE	OK
77	PIONEER MEMORIAL HOSPITAL	PRINEVILLE	OR
78	BRANDYWINE HOSP & TRAUMA CTR	COATESVILLE	PA
79	CHILDREN'S HOSPITAL OF PHILADELPHIA	PHILADELPHIA	PA
80	HOSPITAL OF THE UNIV OF PITTSBURGH	PHILADELPHIA	PA
81	CHILDRENS HOSPITAL OF PITTSBURGH	PITTSBURGH	PA
82	ST MARGARET MEMORIAL HOSPITAL	PITTSBURGH	PA
83	SUNBURY COMMUNITY HOSPITAL	SUNBURY	PA
84	WAYNESBORO HOSPITAL	WAYNESBORO	PA

85	HOSPITAL PAVIA	SAN JUAN	PR
86	FAIRFIELD MEMORIAL HOSPITAL	WINNSBORO	SC
87	ST LUKES MIDLAND REG MED CTR	ABERDEEN	SD
88	CLAY COUNTY HOSPITAL	CELINA	TN
89	JOHNSON CITY MEDICAL CTR HOSP	JOHNSON CITY	TN
90	DRISCOLL CHILDRENS HOSP	CORPUS CHRISTI	TX
91	DENTON COMMUNITY HOSPITAL	DENTON	TX
92	COOK-FORT WORTH CHLDRNS MET CT	FT WORTH	TX
93	SHANNON MEDICAL CENTER	SAN ANGELO	TX
94	WEST COMMUNITY HOSPITAL	WEST	TX
95	OREM COMMUNITY HOSPITAL	OREM	UT
96	WYTHE CNTY COMMUNITY HOSPITAL	WYTHEVILLE	VA
97	PROVIDENCE GENERAL MED CTR	EVERETT	WA
98	HARBORVIEW MEDICAL CENTER	SEATTLE	WA
99	MADIGAN ARMY MEDICAL CENTER	TACOMA	WA
100	CALUMET MEDICAL CENTER	CHILTON	WI
101	WASHAKIE MEMORIAL HOSPITAL	WORLAND	WY

Committee Action: **Approval as Submitted**

Committee Reason: Consistent with IBC. Consistent with action of Means of Egress Committee of disapproval on RB47-00, Item 2 which was subsequently withdrawn by proponent.

Assembly Action: **No Motion**

Individual Consideration Agenda

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

Public Comment:

Cindy Davis, BOCA IRC Building/Energy Code Review Committee, requests Disapproval.

Commenter's Reason: Interpretive language does not translate into unenforceable language. It is important to note that just because something in the code is interpretive, it doesn't mean that it should be taken out of the code. Interpretation of the codes is part of the reality that code officials and designers deal with on a daily basis.

The code regulates potentially unsafe conditions. It is imperative that RB 46 -00 be reviewed within that context. Does the climbability of a guard result in an unsafe condition in areas where small children are present? If yes, then the code should regulate such conditions.

The term "ladder effect" was introduced in the BOCA National Codes in the 1991 Cycle, then the 1993 edition of the code. Has the term raised questions relative to compliance? Yes. Have code officials and builders/designers been able to work through interpretive issues? Yes.

While the IRC tends to be prescriptive, this is an area where performance type language is preferred which dictates the desired result, not the design itself. This language allows for the code official to approve or reject an individual design on a case-by-case basis while at the same time affords the builder/designer the flexibility to design a system that will achieve the intended result - to abate an unsafe condition where children are present, especially in the residential environment.

RB47-00 - WP

R316.2 (IBC 1003.2.12.2, IFC 1003.2.12.2)

Proponent: Thomas B. Zuzik, Vice President, Sales & Design-Artistic Railings, Inc.

THIS PROPOSAL IS ON THE AGENDA OF THE IRC BUILDING/ENERGY AND THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Revise as follows:

1. IRC R316.2 Guardrail opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures that do not allow passage of a sphere 4

inches (102mm) or more in diameter. Required guards shall not be constructed with ~~horizontal rails or other ornamental pattern that results in a ladder effect.~~ only horizontal elements between vertical mounting posts.

Exception: The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere of 6 inches (153mm) cannot pass through.

2. IBC 1003.2.12.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4- inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1066 mm) above the adjacent walking surfaces a sphere 8 inches (203 mm) in diameter shall not pass. Required guards shall not be constructed with only horizontal elements between vertical mounting post.

Exceptions:

1. The triangular openings formed by the riser, tread and bottom rail at the open side of a stairway shall be of a maximum size such that a sphere of 6 inches (152 mm) in diameter cannot pass through the opening.
2. At elevated walking surfaces for access to and use of electrical, mechanical, or plumbing systems or equipment, guards shall have balusters or be of solid materials such that a sphere with a diameter of 21 inches (533 mm) cannot pass through any opening.
3. In occupancies in Group I-3, F, H or S, balusters, horizontal intermediate rails or other construction shall not permit a sphere with a diameter of 21 inches (533 mm) to pass through any opening.
4. In assembly seating areas, guards at the end of aisles where they terminate at a fascia of boxes, balconies, and galleries shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 26 inches (660 mm) to 42 inches (1066 mm). From a height of 26 inches (660 mm) above the adjacent walking surfaces a sphere 8 inches (203 mm) in diameter shall not pass.

Reason:

1) The function of a guard or guardrail is to prevent a person from inadvertently falling from an elevated location. **Guardrails cannot prevent a determined individual -- whether child or adult -- from climbing on or over them.**

2) The present 1999 IRC R316.2 building code is regulating ornamental design on the basis of non-factual data and is in violation of freedom of expression and choice to a private citizen in a single family home. The height, strength and opening limitations are the code issue not ornamental design.

- **a) Height is a key issue since we are preventing an accidental fall over or off an elevated area.**
- **b) Strength is a key issue since we want to make sure that the guard does not give way during the use it is intended for.**
- **c) Open space limitations are a key issue since we do not want someone to fall through the guard by accident.**
- **d) a, b and c are valid building code requirements to prevent someone from getting inadvertently injured. Ornamental pattern and ladder effect are statements intended to prevent an intentional act, not accidental. They also give no assurances and therefor are strictly an opinion not factual data to support such a code restriction. Furthermore if intentional acts are the focus of the building code then there are larger areas of concern case in point. Every window in a home should not have a windowsill lower than 36" in height from finished floor level and no window seats should be allowed. The facts show that for each child that climbs over a guard using the guard only there are 62.5 children of the same age range that fall from windows. No codes have been set against windowsill heights except for tempering, reason for no code restrictions is there are not that many cases of window falls to regulate the sill heights being changed to a 36" min height requirement and yet there are 62.5 window fall injuries to 1 guard incident. (see tables 5 & 6)**

3) Responding to the previously published "Committee Reason" for disapproval --"Disapproved in favor of IBC code change E87-99 which was approved as modified" -- **E87-99 was disapproved by the membership in St. Louis on September 15, 1999 and therefore justifies another factual reason for not keeping the "ladder effect" terminology in the present IRC R316.2 code.**

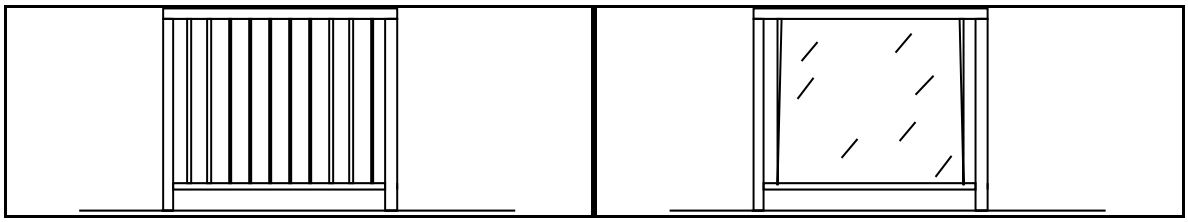
4) The sentence includes undefined terms that result in confusion.

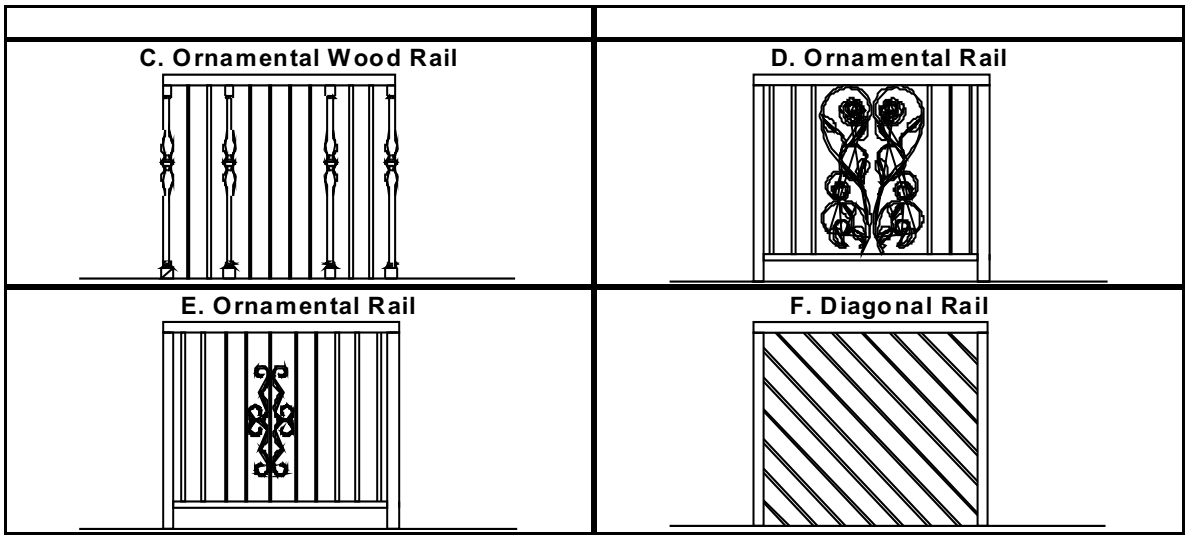
a) Ladder Effect as it relates to guard railings is never defined and is misleading. If the intent is to address climbability, then wording to that effect should be introduced. When submitted to a personal injury attorney for comment, he noted that "if you look at a vertical picket railing sideways, it certainly appears to be a ladder." By using the term "ladder effect", we are creating the basis for unnecessary litigation.

5) The code contradicts itself in the use of *ornamental*. It first requires "ornamental closures" but then disallows the use of "ornamental patterns".

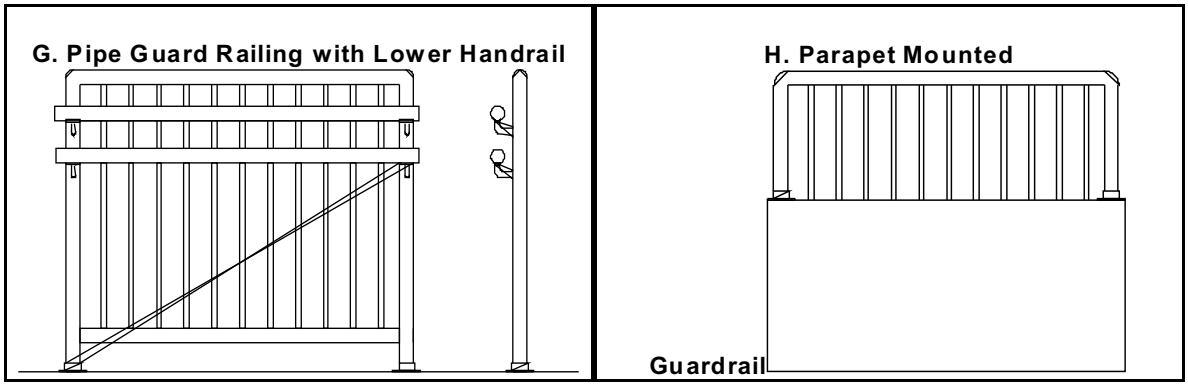
6) In the drawings below, Drawings A & B would not be permitted under R316.2 because of the horizontal lower rails though **horizontal lower rails are required in picket and panel railings to hold the infill elements in place**. Ornamental railings shown in Drawings C, D and E are not permitted because of the ornamental patterns. Drawing F does not have *horizontal rails* but is it considered acceptable? These are questions that will arise from the current text.

A. Picket Rail	B. Panel Rail





7) The IBC requires that guards be 42 inches in height and has no wording regarding the "ladder effect." Drawing G shows a situation in which a guardrail of 42 inches is provided with handrails at 37 inches for adults and 31 inches for children. While this would be acceptable in the IBC, it would not be permitted in the IRC because of the prohibition on horizontal rails.



8) **The code does nothing to address the climbability of knee walls, curbs and parapet mounted guard railings**. Drawing H would meet the code but presents a greater climbing hazard than Drawings A or B.

9) There is no significant statistical evidence that supports the notion that we have an "epidemic" of guard climbing injuries. While there is evidence to indicate that children are playing on guards, the number of injuries which are a documented result of children climbing over a guard and falling greater than 4 feet, is statistically non-existent. It can not be assumed that all falls from porches, balconies and guards are a direct result of climbing a guard. Also, no allowance has been made for a child's innate fear of a sudden drop in height that would prevent a child from desiring to climb a guard that has a significant drop on one side.

   a) **Test Data Regarding Development of Depth Perception in Children:**
   Fear of sudden drops in height is a fear that emerges as early as the second 6 months of life. This fear has been measured by infants' avoidance of heights, as shown on an apparatus called the "visual cliff", originally developed by Eleanor Gibson (Gibson & Walk, 1960) to assess early depth perception. An infant is placed on a narrow runway that rests on a large sheet of glass. On one side of the runway is a checkerboard pattern placed directly under the glass; on the other, the checkerboard pattern is placed 1 to 2 feet below the glass, giving the appearance of depth on that side - hence the term "visual cliff". Prior to 7 months, and before the onset of anxiety, most infants do not avoid the deep side of the glass. If their mother calls them from the deep side, they will cross to her. However, after 8 months, most infants avoid the side that has the appearance of a cliff and will cry if they are placed on that side.

   Avoidance of the apparently deep side of the visual cliff is not due to a new ability to perceive depth. Younger infants perceive the difference between the deep and shallow sides, as evidenced by the fact that they show a distinct cardiac reaction when lowered face down on the deep side (Campos, Langer, & Kravitz, 1970). However, only when infants begin to crawl or creep, usually around 8 months of age, do they begin to avoid the deep side of the visual cliff.

   b) **United States Consumer Product Safety Commission (USCPSC)**
   Data was obtained from the USCPSC, National Electronic Injury Information Surveillance System (NEIISS) for the categories "Falls Involving Handrail Injuries" -- 1/1/91 to 6/2/99 and "Porch & Balcony Injuries" – 9-7-81 to 7-15-99. A request was originally made for

information on guardrail related injuries. However, searches under this keyword only brought forward data on injuries related to roadside barriers and guards. The CPSC indicated that "Falls Involving Handrail Injuries" would be the best indicator of the needed information. Also obtained were incident reports, injury reports related to window falls, pool injuries and baby gate injuries. Refer to the bibliography for a complete listing of support documents. This data is based on reports from 101 of 5,500 U.S. Hospital Emergency Departments (see Addendum for list of hospitals). Elliot O. Stephenson has suggested that a factor of 40 be applied to this sample to determine a national estimate.

Since it can be assumed that anyone over the age of ten can climb a 36-inch structure, we have chosen to focus only on the injuries which involved children under the age of 10.

i) Falls Involving Handrail Injuries:

The first sample, "Falls Involving Handrail Injuries", listed a total of 4,825 injuries -- 1,371 of those injuries involved children under the age of 10. Of this total, 708 injuries were clearly not guard climbing related and are noted in Table 1 as "Fall Against a Railing" and "Not Applicable" (e.g. falls from bed rails, falling against a rail while running, railings falling on children, adults falling while holding children, falls from railings under 2 feet, etc.). Another 26 injuries were caused by structural failure, and 87 injuries were the result of children falling *through* railings (an inappropriate rail opening).

Additionally, 136 injuries were described as falls *over* a railing. While some may want to make the assumption that these falls were the result of climbing, this is not supported by the descriptions in the report. Most of these railings were not even considered guardrails. The report includes descriptions such as: "fell over rail at ice arena," "fell over a railing at Great Adventure," "pushed over banister at school," "fell off stairway over railing," "fell over rail she was sitting on," "fell over railing in restaurant," "fell over loose deck railing," "climbing over fence barbed wire, gate opened and she fell."

Of the remaining injuries which might be related to climbing, the report lists only 40 injuries where "climbing" is actually mentioned. Of these, 26 resulted in falls of less than 4 feet (many of these occurred in retail store queue lines where children climbed onto a railing and slipped or fell backwards). Only 3 falls of more than 4 feet were directly attributed to climbing.

Falls from/off a railing or sliding down a railing, accounted for 375 injuries. Again, many of the falls are noted as having occurred in queue lines and were not guardrails. Of these falls, the vast majority (349) were onto the stairs or the same level. Only 26 of these falls resulted in drops greater than 4 feet.

While most of the reports simply state "fell off railing", others mention children "walking", "sitting", or "swinging" on railings. It may be assumed that children climbed onto these railings but it can not be assumed that the guardrails were the primary means of ascent. **Why would a child climb a guard railing when chairs, planters and patio furniture are more convenient?**

Table 1
Sample Number of Injuries Treated in U.S. Hospital
Emergency Departments and Associated with Hand railings
Tabulation by Type of Fall

Tabulation by Anthony Leto using CPSC/NEIISS for Hand railings 1-1-91 to 6-2-99

Category	Injuries	% of total
Fall Against a Railing	554	40%
Less than 4' Fall From a Railing	327	24%
Not Applicable	152	11%
Less than 4' Fall Over a Railing	109	8%
Fall Through A Railing	87	6%
Less than 4' Fall While Climbing a Railing	37	3%
Greater than 4' Fall Over a Railing	27	2%
Greater than 4' Fall From a Railing	26	2%
Fall Caused by Structural Failure	26	2%
Fall Sliding Down the Railing	22	2%
Greater than 4' Fall While Climbing a Railing	3	0%
Falling While Climbing Other	1	0%
Total	1371	100%

It is important to note that the above data only represents a "sample" of total injuries. This data is collected by the NEIISS from 101 emergency rooms across the country. We will need to make some estimates to consider this on a level of injuries per year

The table below shows that the total sample of 4,825, for the period from 1-1-91 to 6-2-99, translates to a national estimate of 183,350 for this 101-month period (using a multiplier of 40 as suggested by Elliot O. Stephenson). If we then take these figures, divide by 101 and multiply by 12, we have a sample of 573/year and a national estimate of 22,930/year. Making the same calculations for the data on children under the age of 10, we arrive at a sample count of 163/year and a national estimate of 6,516/year.

Table 2
Estimated Number of Injuries Treated in U.S. Hospital
Emergency Departments and Associated with Hand railings
Tabulation by Age Group

Falls involving handrail injuries	From 1-1-91 to 6-2-99	Avg. per year

total sample count	4,825	573
National Estimate	193,000	22,930
sample count children < 10 years	1,371	163
National Estimate	54,840	6,516

Using the percentages noted in Table 1, the national estimate of "Falls Involving Handrail Injuries" per year, for children under the age of 10 (6,190) would break down as follows:

Table 3
Annual Estimated Number of Injuries Treated in U.S. Hospital Emergency Departments and Associated with Hand railings for Children Under the Age of 10
Tabulation by Type of Fall

Tabulation by Anthony Leto using CPSC/NEIISS for Hand railings 1-1-91 to 6-2-99

Category	Injuries	% of total
Fall Against a Railing	2606	40%
Less than 4' Fall From a Railing	1564	24%
Not Applicable	717	11%
Less than 4' Fall Over a Railing	521	8%
Fall Through A Railing	391	6%
Less than 4' Fall While Climbing a Railing	186	3%
Greater than 4' Fall Over a Railing	195	2%
Greater than 4' Fall From a Railing	130	2%
Fall Caused by Structural Failure	130	2%
Fall Sliding Down the Railing	130	2%
Greater than 4' Fall While Climbing a Railing	0	0%
Falling While Climbing Other	0	0%
Total	6,516	100%

If we total the injuries in those categories that may have been climbing related we get the following results:

Table 4
Annual Estimated Number of Injuries Treated in U.S. Hospital Emergency Departments and Associated with Hand railings for Children Under the Age of 10
Which May be Climbing Related
Tabulation by Type of Fall

Tabulation by Anthony Leto using CPSC/NEIISS for Hand railings 1-1-91 to 6-2-99

Category	Injuries
Less than 4' Fall From a Railing	1564
Less than 4' Fall While Climbing a Railing	186
Greater than 4' Fall From a Railing	130
Fall Sliding Down the Railing	130
Greater than 4' Fall While Climbing a Railing	0
Total	2,010

Table 5
Annual Estimated Number of Injuries Treated in U.S. Hospital Emergency Departments and Associated with Hand railings for Children Under the Age of 10 Which May be Climbing Related and the Fall Was Greater Than 4 Feet Tabulation by Type of Fall

Tabulation by Anthony Leto using CPSC/NEIISS for Hand railings 1-1-91 to 6-2-99

Category	Injuries
Greater than 4' Fall From a Railing	130
Greater than 4' Fall While Climbing a Railing	0
Total	130

Of these injuries, there is no information indicating what type of guards were involved (picket, panel, wood, ornamental, cable, etc.); or whether the children climbed the guard railing, climbed furniture in the area of the guard railing, fell off the side of the guard railing, or simply pulled themselves up from the ground onto the guard railing. To assume that the guards were climbed is unfounded and prejudicial.

The national census estimate for the United States as of August 1, 1999 indicated the national population for children under the age of 10 is 37,866,000 -- 130 of which run the risk of falling greater than 4 feet while climbing a guard. Compare this to injuries related to other items.

Table 6
National Estimate for Injuries to Children CY 1997 For Various Products

Tabulation by Anthony Leto using CPSC/NEIISS Product Summary Report

	Ages 0-4	Ages 5-14
Doors	63,379	72,475
Counters or Counter Tops	13,910	6,095
Fences or Fence Posts	7,751	40,970
Window or Window Glass	11,294	21,371
Playground Climbing	11,133	59,401

There are significantly more injuries from children falling off of counter tops than there are involving guards and yet no code has been proposed limiting the "ladder effect" of drawer knobs and handles.

ii) Porch & Balcony Injuries:
A similar analysis can be done for "Porch and Balcony Injuries". The sample from the NEIISS lists a total of 283 injuries over a period of 18 years (9-7-81 to 7-15-99). Of these, 54 were under the age of 10 - a sample injury rate of about 3 children per year.

27 of the reported injuries involved children "jumping" off of porches or balconies onto the ground, onto mattresses and onto trampolines. No mention is made as to whether a guard was in place, the height of the guard, or the type of the guard. In fact, there may have been no guard in place at all.

Jumping is a willful act not an accidental fall. We must keep in mind, that guards are not in place to stop determined individuals from jumping or climbing, they are in place to prevent accidental falls.

The other porch and balcony injuries included falls from balconies by children under the age of two that more likely were caused by falling through guards than climbing guards. **The hand railing injury data shows that almost all of the fall injuries for children under the age of two were caused by falls "through" guard openings -- not climbing the guards.** All the other porch injuries do not specify how the child fell. No mention is made of guard climbing. Of the one case which refers to climbing, it states that a 19 month old child "climbed over a wall" -- not a horizontal rail, not an ornamental pattern but a "wall".

Even if we made the erroneous assumption that all the children in this report climbed the guard and then fell, that would give us a sample size of 3 injuries per year reported by the CPSC's 101 reporting emergency rooms. Using Elliot O. Stephenson's factor of 40, this results in a **national estimate of only 120 injuries per year.**

It is clear from the data, that there is no epidemic of guard climbing related injuries, and yet, the proponents of the ladder effect claim that it is required to significantly reduce injuries to children. This is an emotional appeal with no observations, documentation, or evidence that ornamental railings are being climbed and are therefore the direct cause of a significant number of injuries.

10) The purpose of the original provision is to prevent children from climbing guards but **it does not make allowances for private homes wherein the residents do not have children.**

11) It does nothing to address the larger hazard of falling "over" guard railings and "through" guard railings that are the result of existing guards of an improper height and with improper openings.

12) **It will eliminate a home owner's right to aesthetic choice in their own home** and severely limit a design professional's ability to do anything other than a simple picket railing. Home renovations and historical districts such as the New Orleans' French Quarter will become sterile and predictable.

13) Proponents of the "ladder effect" refer to other countries' similar requirements but have never offered documentation that these countries have seen a significant reduction in the number of injuries to children falling off of guards.

14) When ornamental guard railings are eliminated, the tendency will be to *dress* picket railings up with the placement of planters or furniture to cover the "jail-house" look. Once this happens, children will have additional items to climb increasing the hazard.

15) **Parents are using balconies and porches as "playpens".** The National SAFE KIDS Campaign has published a brochure that states, "Never let children play alone on fire escapes, high porches or balconies." This would indicate that a lack of proper supervision is of greater concern than climbable guards. In actuality, many of the children who fall off of guards do so after an adult "sits" them on the top rail. **Parental supervision will do more to reduce guard-related injuries than the elimination of ornamental patterns.**

Bibliography:

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"Porch and Balcony Injuries 1981 to Present"
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"Porch and Balcony Injuries 1981 to Present -- Death Certificate Files"
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U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Porch and Balcony Injuries 1981 to Present -- Reported Incidents"
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U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Handrails/Railings/Banisters -- Calendar Year 1989 to Present – Reported Incidents"
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U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Handrails/Railings/Banisters -- Calendar Year 1989 to Present – Accident Investigations"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Handrails/Railings/Banisters -- Calendar Year 1989 to Present – Death Certificate Files"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Falls Involving Handrails Injuries 1991 to Present"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Falls Involving Handrails Injuries 1981 to Present – Reported Incidents"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Falls Involving Handrails Injuries 1981 to Present – Death Certificate Files"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Guardrail Injuries 1981 to Present"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Product Summary Report"
National Electronic Injury Surveillance System
U.S. Consumer Product Safety Commission
All Products -- CY 1997

"Window Fall Injuries 1981 to Present"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Window Fall Injuries 1981 to Present -- Death Certificate File"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Child Swimming Pool Injuries 1995 to Present – Reported Incidents"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Child Swimming Pool Deaths 1981 to Present"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Baby Gate Injuries 1981 to Present"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

"Baby Gate Injuries 1981 to Present – Death Certificate Files"
National Electronic Injury Information Surveillance System (NEIISS)
U.S. Consumer Product Safety Commission
National Injury Information Clearinghouse

Addendum A
NEISS Sample of Hospitals -- by City/State 8/4/99

1	D W MCMILLAN MEMORIAL HOSPITAL	BREWTON	AL
2	JACKSONVILLE HOSPITAL	JACKSONVILLE	FL
3	D C H REGIONAL MEDICAL CENTER	TUSCALOOSA	AL
4	MEDICAL PARK HOSPITAL	HOPE	AR
5	HOWARD MEMORIAL HOSPITAL	NASHVILLE	AR
6	GOOD SAMARITAN REG MEDICAL CENTER	PHOENIX	AZ
7	HUHUKAM MEMORIAL HOSPITAL	SACATON	AZ
8	UNIVERSITY MEDICAL CENTER	TUCSON	AZ
9	BREA COMMUNITY HOSPITAL	BREA	CA
10	BAY HARBOR HOSPITAL	HARBOR CITY	CA
11	JOHN C FREMONT HOSPITAL	MARIPOSA	CA
12	CHILDRENS HOSPITAL MED CENTER	OAKLAND	CA
13	HUNTINGTON MEMORIAL HOSPITAL	PASADENA	CA
14	LITTLE COMPANY OF MARY HOSP	TORRANCE	CA
15	SUTTERS SOLANO MEDICAL CENTER	VALLEJO	CA
16	CHILDRENS HOSPITAL	DENVER	CO
17	VETERANS MEMORIAL MEDICAL CENTER	MERIDEN	CT
18	LEE MEMORIAL HOSP – HTH PARK CAMPUS	FT MYERS	FL
19	LEE MEMORIAL HOSP – CLEVELAN	FT MYERS	FL
20	BON SECOURS – ST JOSEPH	PT CHARLOTTE	FL
21	NEWTON GENERAL HOSPITAL	COVINGTON	GA
22	PROMINA DOUGLAS HOSPITAL	DOUGLASVILLE	GA
23	MARTIN ARMY COMM HOSPITAL	FT BENNING	GA
24	SOUTHER REGIONAL MEDICAL CTR	RIVERDALE	GA
25	MYRTUE MEMORIAL HOSPITAL	HARLAN	IA
26	HEGG MEMORIAL HEALTH CENTER	ROCK VALLEY	IA
27	WOOD RIVER MEDICAL CENTER	SUN VALLEY	ID
28	GRAHAM HOSPITAL ASSOCIATION	CANTON	IL
29	MEMORIAL HOSPITAL	CHESTER	IL
30	MERCY HOSPITAL AND MED CENTER	CHICAGO	IL
31	HOPEDALE HOSPITAL	HOPEDALE	IL
32	WEST SUBURBAN HOSP MED CENTER	OAK PARK	IL
33	PEKIN MEMORIAL HOSPITAL	PEKIN	IL
34	ST FRANCIS MEDICAL CENTER	PEORIA	IL
35	DAVIESS COUNTY HOSPITAL	WASHINGTON	IN
36	MEDICINE LODGE MEM HOSPITAL	MEDICINE LODGE	KS
37	OUR LADY OF LAKE REG MED CENTER	BATON ROUGE	LA
38	MASSACHUSETTS GENERAL HOSPITAL	BOSTON	MA
39	HILLCREST HOSPITAL	PITTSFIELD	MA
40	DOCTORS COMMUNITY HOSPITAL	LANHAM	MD
41	SHADY GROVE ADVENTIST HOSPITAL	ROCKVILLED	MD
42	ST FRANCIS HOSPITAL	ESCANABA	MI
43	MADISON COMMUNITY HOSPITAL	MADISON HEIGHTS	MI
44	SCHEURER HOSPITAL	PIGEON	MI
45	MERRICK MEMORIAL HOSPITAL	TECUMSEH	MI
46	WYANDOTTE HOSP & MED CTR	WYANDOTTE	MI
47	ZUMBROTA COMMUNITY HOSPITAL	ZUMBROTA	MN
48	CHILDRENS MERCY HOSPITAL	KANSAS CITY	MO
49	ST FRANCIS HOSPITAL	MOUNTAIN VIEW	MO
50	DEACONESS MEDICAL CTR – CENTRAL	ST LOUIS	MO
51	MONTFORT JONES MEM HOSPITAL	KOSCIUSKO	MS
52	NORTH MISSISSIPPI MED CENTER	TUPELO	MS
53	WALTHALL COUNTY GEN HOSPITAL	TYLERTOWN	MS
54	FALLON MEDICAL COMPLEX	BAKER	MT
55	ST JOHNS LUTHERAN HOSPITAL	LIBBY	MT
56	ALAMANCE COUNTY HOSPITAL	BURLINGTON	NC
57	MOSES H CONE MEMORIAL HOSPITAL	GREENSBORO	NC
58	ST ANDREWS HOSPITAL	BOTTINEAU	ND
59	BOX BUTTE GENERAL HOSPITAL	ALLIANCE	NE
60	MARY LANNING MEMORIAL HOSPITAL	HASTINGS	NE
61	VALLEY REGIONAL HOSPITAL	CLAREMONT	NH
62	LITTLETON REGIONAL HOSPITAL	LITTLETON	NH
63	ATLANTIC CITY MED CTR – CITY DIV	ATLANTIC CITY	NJ
64	SOUTH JERSEY HOSP/BRIDGETON	BRIDGETON	NJ

65	CENTRA STATE MEDICAL CENTER	FREEHOLD	NJ
66	ST ROSE DOMINICAN HOSPITAL	HENDERSON	NV
67	BRONX-LEBANON HOSP/CONCOURSE	BRONX	NY
68	KINGS COUNTY HOSPITAL CENTER	BROOKLYN	NY
69	GENEVA GENERAL HOSPITAL	GENEVA	NY
70	BROOKHAVEN MEM HOSP MED CENTER	PATCHOGUE	NY
71	ST VINCENTS MED CTR OF RICHMOND	STATEN ISLAND	NY
72	CHILDRENS HOSPITAL	COLUMBUS	OH
73	MIAMI VALLEY HOSPITAL	DAYTON	OH
74	EAST OHIO REGIONAL HOSPITAL	MARTINS FERRY	OH
75	FAIRFAX MEMORIAL HOSPITAL	FAIRFAX	OK
76	HOLDENVILLE GENERAL HOSPITAL	HOLDENVILLE	OK
77	PIONEER MEMORIAL HOSPITAL	PRINEVILLE	OR
78	BRANDYWINE HOSP & TRAUMA CTR	COATESVILLE	PA
79	CHILDREN'S HOSPITAL OF PHILADELPHIA	PHILADELPHIA	PA
80	HOSPITAL OF THE UNIV OF PITTSBURGH	PHILADELPHIA	PA
81	CHILDRENS HOSPITAL OF PITTSBURGH	PITTSBURGH	PA
82	ST MARGARET MEMORIAL HOSPITAL	PITTSBURGH	PA
83	SUNBURY COMMUNITY HOSPITAL	SUNBURY	PA
84	WAYNESBORO HOSPITAL	WAYNESBORO	PA
85	HOSPITAL PAVIA	SAN JUAN	PR
86	FAIRFIELD MEMORIAL HOSPITAL	WINNSBORO	SC
87	ST LUKES MIDLAND REG MED CTR	ABERDEEN	SD
88	CLAY COUNTY HOSPITAL	CELINA	TN
89	JOHNSON CITY MEDICAL CTR HOSP	JOHNSON CITY	TN
90	DRISCOLL CHILDRENS HOSP	CORPUS CHRISTI	TX
91	DENTON COMMUNITY HOSPITAL	DENTON	TX
92	COOK-FORT WORTH CHLDRNS MET CT	FT WORTH	TX
93	SHANNON MEDICAL CENTER	SAN ANGELO	TX
94	WEST COMMUNITY HOSPITAL	WEST	TX
95	OREM COMMUNITY HOSPITAL	OREM	UT
96	WYTHE CNTY COMMUNITY HOSPITAL	WYTHEVILLE	VA
97	PROVIDENCE GENERAL MED CTR	EVERETT	WA
98	HARBORVIEW MEDICAL CENTER	SEATTLE	WA
99	MADIGAN ARMY MEDICAL CENTER	TACOMA	WA
100	CALUMET MEDICAL CENTER	CHILTON	WI
101	WASHAKIE MEMORIAL HOSPITAL	WORLAND	WY

RB39-01 - D
R316.2

Proposed Change as Submitted:

Proponent: Anthony Leto, representing National Ornamental and Miscellaneous Metals Association

Delete and substitute as follows:

IRC ~~R316.2 (Supp) Guardrail opening limitations.~~ ~~Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102 mm) or more in diameter.~~

R316.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4-inch diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass.

THIS PROPOSAL ACHIEVES TECHNICAL CONSISTENCY BETWEEN THE IRC AND IBC. THE FOLLOWING IBC TEXT IS SHOWN FOR INFORMATION PURPOSES ONLY.

IBC 1003.2.12.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4-inch diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass.

Exceptions:

1. The triangular openings formed by the riser, tread and bottom rail at the open side of a stairway shall be of a maximum size such that a sphere of 6 inches (152 mm) in diameter cannot pass through the opening.

2. At elevated walking surfaces for access to and use of electrical, mechanical, or plumbing systems or equipment, guards shall have balusters or be of solid materials such that a sphere with a diameter of 21 inches (533 mm) cannot pass through any opening.

3. In occupancies in Group I-3, F, H or S, balusters, horizontal intermediate rails or other construction shall not permit a sphere with a diameter of 21 inches (533 mm) to pass through any opening.

4. In assembly seating areas, guards at the end of aisles where they terminate at a fascia of boxes, balconies, and galleries shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass.

Proponent's Reason:
1. This change will create uniformity between the IRC 316.2 and IBC 1003.2.12. definitions of "opening limitations."

2. The IRC has previously defined guard height as "not less than 36 inches." In many residential applications, guards are now routinely raised to 42 inches on balconies and platforms which matches with the IBC guard height requirement.

3. The reason for an opening limitation is to prevent small children from accidentally falling through a guard. This limitation is much more critical in the lower portion of a guard than in the upper portion.
4. Conformance with the IBC will enable greater design flexibility without increasing fall hazard.

Committee Action: **Disapproved**

Committee Reason: The 42 inches limitation appears not to be correct and applicable to this change. The committee does not want to write the code based on the proponent's suggestion for a committee modification. There is no substantiation for the 8 inch diameter sphere.

Assembly Action: **No Motion**

Individual Consideration Agenda

This item is on the agenda for individual consideration because the public hearing actions result in a technical inconsistency between the International Residential Code and the associated ICC International Code.

RB40-01 - Item 1 AS/Item 2 D
R316.2 (IBC 1003.2.12.2)

Proposed Change as Submitted:

Proponent: Thomas B. Zuzik, Jr., Artistic Railings, Inc.

THIS PROPOSAL IS ON THE AGENDA OF THE IRC BUILDING/ENERGY AND THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Revise as follows:

1. IRC R316.2 (Supp) Guardrail opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102mm) or more in diameter.

Exceptions:

1. The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches(152 mm) cannot pass through.
2. Openings for required guards on the sides of stair treads shall not allow a sphere 4-3/8 inches (107 mm) to pass through.

2. IBC 1003.2.12.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass.

Exceptions:

1. The triangular openings formed by the riser, tread and bottom rail at the open side of a stairway shall be of a maximum size such that a sphere of 6 inches (152 mm) in diameter cannot pass through the opening.

2. At elevated walking surfaces for access to and use of electrical, mechanical, or plumbing systems or equipment, guards shall have balusters or be of solid materials such that a sphere with a diameter of 21 inches (533 mm) cannot pass through any opening.

3. In occupancies in Group I-3, F, H or S, balusters, horizontal intermediate rails or other construction shall not permit a sphere with a diameter of 21 inches (533 mm) to pass through any opening.

4. In assembly seating areas, guards at the end of aisles where they terminate at a fascia of boxes, balconies, and galleries shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass.

5. Openings for required guards on the sides of stair treads shall not allow a sphere 4-3/8 inches (107 mm) to pass through.

Proponent's Reason:

1) With a tread depth of 10 inches, R316.2 requires three vertical balusters to be installed per tread to meet the present 4-inch sphere requirements. By increasing the present sphere requirement to 4-3/8 inches for stair treads only, you will now be able to just install two balusters per step. This increase will allow stairs to have a baluster spacing of 4-1/4 inches, rather than the 2-3/4 inch spacing that is commonly present when three balusters are installed per step. The stair and the platform will now look aesthetically more pleasing, rather than the drastic differences between platforms being installed at 3-7/8 inches and steps at 2-3/4 inches.

2) This exception is intended to allow homeowners more choices and freedom of choices for their own homes and is intended for R-3 and R-2 residential homes only.

3) Mr. William W Stewart, representing Steward-Schaberg Architects presented a similar change as RB289-99 and I add this quote from proposal RB289-99.

"There is a 99 percent probability that an 10-12 month old child cannot pass through a 4-3/8 inch opening. There is a 99.8 probability that a 12-17 month old child cannot pass through a 4-3/8 inch opening. While the code should anticipate that children of all ages might be unattended on all level walking surfaces it need not provide for unsupervised 12 month old children on stairs. The principal risk to a 12-month old on a stair is the risk of falling down the stair not that of squeezing through the guard. The Building Code already considers the user when it comes to guards on stairs when it allows a 21-inch opening in uses that are strictly adult work situations.

This 3/8 inch increase in the opening limitation will give considerable design flexibility. If the landing balusters are spaced for the four inch opening limitation it will look odd to reduce that to 2-3/4 inches (a 31 percent reduction in open spaces) on the stairs. It will not look odd to change the open space to 4-3/8 inches. It will also save money. A St. Louis stair builder estimates that cost saving will be about $25 per tread or $350 per stair in a home with a 8-foot ceiling."

4) This exception does not change the main paragraph presently in R316.2. It leaves the content of the main paragraph alone for a layman to work with the 4 inch sphere requirements. At the same time, it will allow professionals who work with and understand building code requirements and EXCEPTIONS, the ability to customize the design requirements for those clients requesting non-standard highly ornamental guards.

5) Additional reasons can be viewed at www.artisticrail.com/codes.htm.

Item 1 (IRC)
Committee Action: **Approved as Submitted**

Committee Reason: Based on proponent's published reason.

Assembly Action: **No Motion**

Item 2 (IBC)
Committee Action: **Disapproved**

Committee Reason: There is insufficient justification to revise the guard spacings from the current 4 inch limit. Also there should not be a separate guard spacing criteria for stairways in relation to guards on balconies or raised floor areas.

Assembly Action: **No Motion**

Individual Consideration Agenda

This item is on the agenda for individual consideration because the public hearing actions resulted in a technical inconsistency between the International Residential Code and the associated ICC International Code and a public comment was submitted.

Public Comment 1:

Michael T. Wichman, Sr., CBO, Chairman, SBCCI IRC B/E Code Action Committee, requests Disapproval of Item 1.

Commenter's Reason: There is no proven need to change this section. Looks and savings in cost is not, in my opinion a valid reason. This proposal was rejected by the IBC Committee and if not changed in the IRC a conflict will result.

Public Comment 2:

Allen Zepper, Minnesota Building Officials, requests Disapproval of Item 1.

Commenter's Reason: This proposal was disapproved by the IBC Means of Egress Committee because there was no new documentation presented that indicated that the new spacing requirement was safe and that there should not be differing requirements for guardrails based on location. Approval by the IRC committee results in a conflict between the two codes. It appears that the proposal was approved to accommodate a specific stair design and a specific size baluster. This opens the door to further amendment when challenged by other baluster manufacturers. Furthermore, the regulation will create confusion for contractors and for enforcement personnel.

Analysis: The following combinations of actions would achieve technical consistency between the IBC and the IRC:
Item 1 AS Item 2 AS
or
Item 1 D Item 2 D

RB41-01 - D
R316.2

Proponent: Thomas B. Zuzik, Jr., Artistic Railings, Inc.

Revise as follows:

IRC R316.2 (Supp) Guardrail opening limitations. Required guards ~~on open sides of stairways, raised floor areas, balconies and porches~~ shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102 mm) or more in diameter through any opening up to a height of 34 inches (864 mm) above the adjacent walking surface. From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surface, a sphere 8 inches (203 mm) or more in diameter shall not pass through, when a 42-inch high guard is required.

THIS PROPOSAL ACHIEVES TECHNICAL CONSISTENCY BETWEEN THE IRC AND IBC. THE FOLLOWING IBC TEXT IS SHOWN FOR INFORMATION PURPOSES ONLY.

IBC 1003.2.12.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4-inch diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass."

Exceptions:

1. The triangular openings formed by the riser, tread and bottom rail at the open side of a stairway shall be of a maximum size such that a sphere of 6 inches (152 mm) in diameter cannot pass through the opening.

2. At elevated walking surfaces for access to and use of electrical, mechanical, or plumbing systems or equipment, guards shall have balusters or be of solid materials such that a sphere with a diameter of 21 inches (533 mm) cannot pass through any opening.

3. In occupancies in Group I-3, F, H or S, balusters, horizontal intermediate rails or other construction shall not permit a sphere with a diameter of 21 inches (533 mm) to pass through any opening.

4. In assembly seating areas, guards at the end of aisles where they terminate at a fascia of boxes, balconies, and galleries shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass.

Reason:

1) Deletion of "on open sides of stairways, raised floor areas, balconies and porches" because it is listed as areas to have guards in R316.1, which is the paragraph before R316.2 on the same page in the IRC code book.

2) This change will also create uniformity between IRC 316.2 and IBC 1003.2.12. definitions of "opening limitations."

3) The height, strength and opening limitations define a guard. In allowing for more of an open space at the top quarter section of a guard, we allow for greater visibility through the guard when a person is sitting down in a residential balcony or equivalent area of requirement, when requiring 42-inch high guards be in place.

   a) Height is a key issue since we are preventing an accidental fall over or off an elevated area, while on the walking surface.
   b) Strength is a key issue since we want to make sure that the guard is strong enough for the prevention of an accidental fall from the walking surface of the use it is intended for.
   c) Open space limitations are a key issue since we do not want someone to fall through the guard by accident while on the area of the walking surface it is separating from the open side or sides of the elevated walking surface.

4) Additional reasons can be viewed at www.artisticrail.com/codes.htm.

E13-02 - D
1003.2.12.1 (IFC 1003.2.12.1)

Proponent: Gilbert Gonzales, Murray City Corporation; representing Utah Chapter of ICBO

Revise as follows:

1003.2.12.1 (Supp) Height. Guards shall form a protective barrier not less than 42 inches (1067 mm) high, measured vertically above the leading edge of the tread, adjacent walking surface or adjacent seatboard.

Exceptions:

1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R- 2, both as applicable in Section 101.2, guards whose top rail also serves as a handrail shall have a height not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from the leading edge of the stair tread nosing.
2. For occupancies in Group R-3 and within individual dwelling units in occupancies in Group R-2, both as applicable in Section 101.2, guards shall form a protective barrier not less than 36 inches (914 mm) high.

~~2.~~3. The height in assembly seating areas shall be in accordance with Section 1008.12.

1003.2.12.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass. For occupancies in Group R-3 and within individual dwelling units in occupancies in Group R-2, as applicable in Section 102.2, required guards shall not be constructed with horizontal rails or other ornamental pattern that results in a ladder effect.

Exceptions: 1. thru 4. (No change)

Reason: There are one and two family dwellings which will not fall within the scope of the IRC for certain aspects of their construction. The nonstructural requirements for these should be no different than the home next door that is constructed under the IRC. The proposed change is for consistency with IRC Sections R316.1 which allows 36" guards and R316.2 which prohibits guards with a ladder effect.

Staff Analysis: The "ladder effect" provisions have been removed from IRC Section R316.2 in the supplement by code change RB 46-00.

E13-02

Committee Action: **Disapproved**

Committee Reason: There is no technical reason why guard heights should be different in Group R-3 occupancies than any other occupancy. The proposed text that requires a guard to be "an effective barrier" is vague and would be subject to nonuniform interpretation and enforcement.

Assembly Action: **Approved as Modified- Motion Failed**

E134-02 - AM
1003.2.12.2 (IFC 1003.2.12.2)

Proponent: Rene' Beliveau, City of Golden Building Division; representing The CO Chapter of ICC and The CO Chapter of Plumbing and Mechanical Officials

Revise as follows:

1003.2.12.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass.

Exceptions:

1 and 2 (No change)

3. In areas which are not accessible to the public within occupancies in Group I-3, F, H or S, balusters, horizontal intermediate rails or other construction shall not permit a sphere with a diameter of 21 inches (533 mm) to pass through any opening.
4. (No change)

Reason: As this section currently reads, all elevated areas within these occupancies need only be protected by guards with openings of up to 21 inches. This exception was originally incorporated in the building codes for areas within commercial and industrial occupancies where the public is not invited or permitted. This restriction removed the dangers associated with small children and the need to design guards to protect them from falling through. This revised language corrects this hazardous situation and clearly limits the application of this exception to those areas, within these occupancies, which are **not** accessible to the public. Without this revision, elevated areas within these occupancies (such as parking garages, stairs, waiting areas, customer service areas, office areas, or other similar public access areas will not be required to be adequately protected.

E134-02

Committee Action: **Approved as Modified**

Modify proposal as follows:

Modify Section 1003.2.12.2,Exception 3 of the proposal to replace the proposed word “accessible” with the word “open”.

Committee Reason: Approved based on the reason statement. Areas which are open to the public should have guard openings limited to those specified in Section 1003.2.12.2. The modification makes the intent of the added text clear and removes any misunderstanding with the accessibility requirements.

Assembly Action: **No Motion**

E7-03/04 - D
1002.1 (IFC 1002.1)

Proposed Change as Submitted:

Proponent: Elliott D. Stephenson, representing The Young Children of America

Add new definition as follows:

1002.1 Definitions.

CLIMBABLE GUARD. A guard having horizontal or vertical elements or of some other design that provides one or more toe holds, either as an integral part of the design or attached thereto, located in that portion of the guard more than 6 inches (152 mm) above the adjacent walking surface and more than 6 inches (152 mm) below the top of the guard.

Reason: It has been demonstrated that the previous reference to the term “Ladder Effect” has not been satisfactory in defining what constitutes a climbable guard and that a more specific definition was needed in order for building designers and building officials to determine if a guard could be readily climbed by a young child or not. It is believed that a suitable definition needs to be included in the *International Building Code* and that the recommended provisions would accomplish that objective.

Unless provisions to limit the construction or installation of climbable guards in the public areas of buildings in which young children can be expected to be present, it is the opinion of this proponent that the *International Building Code* should be considered to be second or third class as far as its consideration of the safety needs of the most important segment of American society, our young children, are concerned. Many counties around the world have recognized those needs and have included provisions in their respective National Building Codes intended to inhibit the climbing of guards by children.

If we continue to permit the unlimited hazard of climbable guards in our schools, motels, hotels, child care centers, waiting areas in transportation terminals, malls, entertainment and recreation facilities, we are leaving a truly sorry and unnecessary legacy for the 400 million or more Americans will will be born during the 21st century.

Cost Impact: None

Committee Action: **Disapproved**

Committee Reason: The definition is open for interpretation. For example: Is a ‘toe hold’ with shoes or barefoot? Is the ‘walking surface’ the surface adjacent to the guard at the high side or the low side?

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Elliot O. Stephenson, representing The Young Children of American, requests Approval as Submitted.

Commenter's Reason: When I submitted the proposed definition of a Climbable Guard and the other related changes to the IBC I knew they would be controversial and be energetically opposed by representatives of certain organizations active in the ICC code revision process. My primary purpose in their submission was to establish an initial set of provisions indented to inhibit the climbing of guards by young children that could be amended by its opponents during future code revision hearings when proof of their justification was provided.

Essential provisions intended to reduce the climbing of guards need to be included in the 2006 Editions of IBC and IRC for the following reasons. I am not an attorney nor a Legal Counsel serving a city or county, but it is my belief that if a building official who participated in the Nashville Codes Forum or receives copies of one of the magazines published by BOCA, ICBO or the SBCCI every two months has not reported to his or her City Council or Board of Supervisors that the two codes contain no provisions whatsoever for climbable guards prior to their adoption of one or both of the two codes, he or she may be negligent in not doing so. He or she should not take the responsibility for such a significant decision alone.

I also believe that most city's or county's Legal Counsels would respond to his or her inquiry about the possible assumption of personal liability of a Building Official who has not reported the situation to his or her city or county leaders by stating the following or its equivalent. "It's up to the jury in a Civil case in the event a child is injured or killed in a fall in a new building to determine the answer. It's possible you would be because you had prior knowledge that readily climbable guards are unsafe for young children." If my jurisdictions' Legal Counsel made such a statement to me I certainly would promptly notify my bosses of the situation and tell them I would assist them in the preparation of needed code revisions if they so desired.

I have proven that at least twenty percent of falls and jumps FROM or ONTO a balcony, porch, banister or railing involve some aspect of climbing prior to the actual fall or jump. It is probably close to 25 or 30 percent. These facts are in sharp contrast to the statements and documents made or presented to the ICC committees by representatives of NOMMA and the AIA. Their analysis of the NEISS Records have been incomplete, misleading and erroneous and their evaluations of the seriousness of the guard climbing problem is quite meaningless. A copy of my evaluation and the NEISS reports upon which it is based have been submitted to both the President and the CEO of the ICC.

Public Comment 2:

Elliot O. Stephenson, representing The Young Children of American, requests Approval as Modified by this Public Comment.

Modify proposal by adding the following definitions:

FOOTHOLD. Holds in guards are clear openings more than 2 inches (51 mm in width at which support for a foot or shoe is provided.

TOEHOLD. Toeholds in or on guards are clear openings more than ½ inch (12.7 mm) in width or protrusions, indentations, cutouts or attachments exceeding ¼ inch (6.4 mm) in depth or protrusion.

Commenter's Reason: It is believed that a specification type of definition to determine when a guard is climbable is superior to one based upon performance requiring the building official to make a judgement call as previous definitions have required.

The addition of appropriate definitions in Chapter 2 of the IBC to describe climbable guards is believed to be essential. If experience reveals that the ¼ inch proposed allowance for protrusions, indentations and attachments is excessive, it can be reduced to a lesser value. It is believed the ¼ inch allowance is appropriate as a starting point.

I have proven that at least twenty percent of falls and jumps from or onto a balcony, porch, banister or railing involve some aspect of climbing prior to the actual fall or jump. It is probably close to 25 or 30 percent. These facts are in sharp contrast to the statements and documents made or presented to the ICC committees by representatives of NOMMA and the AIA. Their analysis of the NEISS records have been incomplete, misleading and erroneus and their evaluations of the seriousness of the guard climbing problem is quite meaningless. A copy of my evaluation and the NEISS reports upon which it based have been submitted to both the President and the CEO of the ICC.

For too long the needs of the very young citizens of America have suffered from the inadequate or lack of consideration that building designers have given to their special safety needs. This is evident from the fact there are presently millions of unsafe guards existing throughout the country. It is estimated that 15,000 to 16,000 children under five years in age are injured in falls and jumps from elevated locations in buildings and from banisters and railings in the United States each year. It will be a sorry legacy that we leave to future generations of Americans if something is not promptly done about the guard climbing problem.

I believe it is essential that provisions intended to reduce the climbing of guards be included in the 2006 Editions of the IBC and IRC for the following reasons. I am not an attorney nor a legal counsel serving a city or county, but it is my belief that if a building official who participated in the Nashville Codes Forum, or receives copies of one of the magazines published by BOCA, ICBO or SBCCI every two months, has not reported to his or her city council or board of supervisors that the two codes contain no provisions whatsoever for climbable guards. Prior to their adoption, of one or both of the codes, he or she may be negligent in not doing so. He or she should not take the responsibility for such a significant decision alone.

I also believe that most city's or county's legal counsels would respond to his or her inquiry about the possible assumption of personal liability of a building official who has not reported the situation to his or her city of county leaders by stating the following or its equivalent: "It's up to the jury in a civil case in the event a child is injured or killed in a fall in a new building to determine the answer. It's possible you would be, because you had prior knowledge that readily climbable guards are unsafe for young children." If my jurisdiction's legal counsel made such a statement to me, I certainly would promptly notify my bosses of the situation and tell them I would assist them in the preparation of needed code revisions if they so desired.

E7-03/04

Committee Action: **Disapproved**

Committee Reason: The definition is open for interpretation. For example: Is a 'toe hold' with shoes or barefoot? Is the 'walking surface' the surface adjacent to the guard at the high side or the low side?

Assembly Action: **None**

E63-03/04 - D
1012.1 (IFC 1012.1)

Proposed Change as Submitted:

Proponent: Elliott D. Stephenson, representing The Young Children of America

Revise as follows:

1012.1 Where required. Guards shall be located along open-sided walking surfaces, mezzanines, industrial equipment platforms, stairways, ramps and landings which are located more than 30 inches (762 mm) above the floor or grade below. Climbable guards shall not be constructed nor installed at locations where there is more than 60 inches (1524 mm) above the floor or grade below unless protected on the accessible side by securely attached panels of glass, rigid or semi-rigid plastic panels or other approved materials between the height of 6 inches (152 mm) above the adjacent walking surface and 6 inches (152 mm) below the top of the guard. Guards shall be adequate in strength and attachment in accordance with Section 1607.7. Guards shall also be located along glazed sides of stairways, ramps and landings that are located more than 30 inches (762 mm) above the floor or grade below where the glazing provided does not meet the strength and attachment requirements in Section 1607.7.

Exception: (No change to current text)

Reason: When the difference in height between the adjacent walking surface and the floor or grade below is 60 inches a child falling over after climbing a guard will have approximately 8 feet to fall, often resulting in only minor and non-life threatening injuries. But when the fall height is larger than that amount, the increase in velocity of the impact and the kinetic energy involved often results in more serious injuries to the child. A 20 foot fall, for example, may be fatal.

The argument that young children can push light furniture or some other object against a guard and therefore it is useless to consider doing anything about the problem of climbable guards it not a valid one. Parents can be alerted to the need for attention to such actions by children. In addition, furniture and other loose items are not usually found on exit walkways and other public areas and certainly not on stairway landings.

The vast majority of falls and jumps from guards that result in injuries to children under five years in age, approximately 15,000 in the United States each year according to the US Consumer Protection Safety Commission, occur in residential occupancies, mainly in homes.

Climbable guards at elevated locations in our homes and other residential occupancies is a legacy we should not leave for future generations of Americans. In this proponent's opinion, it is absurd to consider our ICC Building Codes as reflecting modern technology and thinking when we give no thought to the true costs of injuries to our children. Many other countries around the world include provisions in their national building codes intended to inhibit the climbing of guards by children but ours totally ignore the matter.

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

Committee Action: **Disapproved**

Committee Reason: The justification only speaks about homes, however, the proposed text would be applicable to all building types. The definition for 'climbable guards' was disapproved by the committee in Code Change E7-03/04. The language is over restrictive and subject to a broad range of interpretations.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Elliott O. Stephenson, representing The Young Children of America, requests Approval as Submitted.

Commenter's Reason: Same as mentioned in 1012.1 - For additional reasons, please see the Proposed Definition of Climbable Guards in Chapter 2.

Public Comment 2:

Elliott O. Stephenson, representing The Young Children of America, requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

1012.1 Where required. Guards shall be located along open-sided walking surfaces, mezzanines, industrial equipment platforms, stairways, ramps and landings which are located more than 30 inches (762 mm) above the floor or grade below. Guards shall be adequate in strength and attachment in accordance with Section 1607.7. Guards shall also be located along glazed sides of stairways, ramps and landings that are located more than 30 inches (762 mm) above the floor or grade below where the glazing provided does not meet the strength and attachment requirements in Section 1607.7.

When the potential distance of fall from the floor upon which a guard is constructed or installed exceeds 60 inches (1624 mm) above the finish grade or floor below in the public areas of the following occupancies, the guard shall have no toeholds or footholds more than 6 inches (152 mm) above the adjacent floor finish.

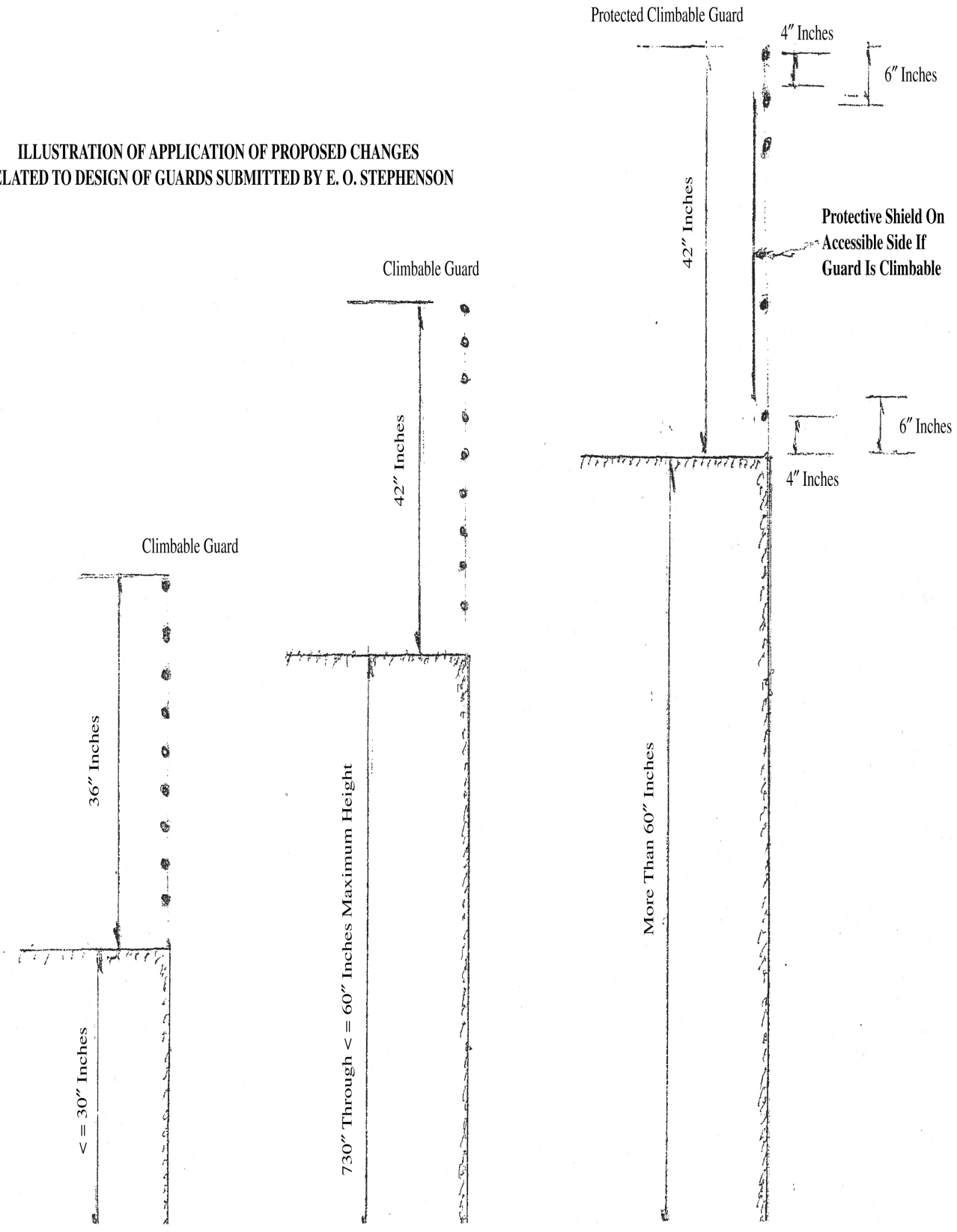
Assembly Group A-2	Restaurants only
Assembly Group A-3	Amusement arcades, gymnasiums, libraries, museums, and waiting areas in transportation terminals only
Assembly Group A-5	All
Educational Group E	All
Institutional Group I-4	Child care facilities only
Mercantile Group M	Department stores and malls only
Residential Group R	R-1, R-2 apartment houses, non-transient boarding houses, dormitories and non-transient hotels and motels only

Exceptions: (No change to current text)

Commenter's Reason: It is of critical importance that the building officials of America recognize that unless provisions limiting the construction or installation of climbable guards in our apartment houses, motels, malls, schools, child care centers, entertainment and recreational facilities and other buildings in which young children can be expected to be present are included in the IBC, there will be no control whatsoever of that serious problem facing the 400 million or more children to be born in the United States during the 21st century. What a sorry legacy we will leave them if proper action is not promptly taken to remedy the situation.

Numerous countries around the world have taken action to limit the use of climbable guards in buildings and, if we don't act, the ICC *International Building Code* should be considered, in the opinion of this proponent, to be second class with respect to its consideration of the needs

ILLUSTRATION OF APPLICATION OF PROPOSED CHANGES RELATED TO DESIGN OF GUARDS SUBMITTED BY E. O. STEPHENSON



for improved safety of children in buildings.

E64-03/04 - D
1012.1.1 (IFC 1012.1.1)

Proposed Change as Submitted:

Proponent: Elliott D. Stephenson, representing The Young Children of America

Add new text as follows:

1012.1.1 Limitations on climbable guards. Unless protected on its accessible side by securely attached panels of glass, rigid or semi-rigid plastic panels or other approved material between the height of 6 inches (152 mm) above the adjacent walking surface and 6 inches (152 mm) below the top of the guard, a climbable guard shall not be constructed nor installed in those areas of the following occupancies in which children can be expected to be present.

Assembly Group A-1: Motion Picture Theaters
Assembly Group A-2: Restaurants
Assembly Group A-3: Amusement arcades, gymnasiums, libraries, museums and passenger station waiting rooms
Assembly Group A-4: Arenas, skating rinks and swimming pools
Assembly Group A-5: Amusement park structures, bleachers and grandstands
Assembly Group E: All
Assembly Group I: Child care facility and day care facility
Assembly Group M: Malls
Assembly Group R-1: Hotels and motels
Assembly Group R-2: Apartment houses

Reason: The building occupancies listed in the proposed new Section 1012.1.1 are those in which entire families or portions thereof may be present, including two, three and four year old children. It is unnecessary to construct or install climbable guards in the public areas of such buildings and they should be prohibited.

Parents and guardians of young children should be able to rely upon the building regulatory authorities considering the fact it is virtually impossible to oversee and control the movement and actions of young children every instant they occupy such buildings and doing everything reasonably possible to insure the safety of each member of the family.

For too long the needs of the very young citizens of America have suffered from the inadequate or lack of consideration that building designers and owners have to their special safety needs. This is evident from the fact there are presently millions of unsafe guards existing throughout the country. It's estimated that 15,000 to 16,000 children under five years in age are injured in falls and jumps from elevated locations in the United States each year.

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

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved for consistency with the committee's action on Code Change E63-03/04.

Assembly Action: **None**

Individual Consideration Agenda

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

Elliot O. Stephenson, representing The Young Children of America requests Approval as Submitted.

Commenter's Reason: Same as submitted in 1012.1.1 - For additional reasons, please see the Proposed Definition of Climbable Guards in Chapter 2.

E65-03/04 - D
1012.2 (IFC 1012.2)

Proposed Change as Submitted:

Proponent: Gilbert Gonzales, Murray City, Utah, representing Utah Chapter ICC

Revise as follows:

1012.2 Height. Guards shall form a protective barrier not less than 42 inches (1067 mm) high, measured vertically above the leading edge of the tread, adjacent walking surface or adjacent seatboard.

Exceptions:

1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, both as applicable in Section 101.2, guards whose top rail also serves as a handrail shall have a height not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from the leading edge of the stair tread nosing.
2. For occupancies in Group R-3 and within individual dwelling units in occupancies in Group R-2, both as applicable in Section 101.2, guards shall form a protective barrier not less than 36 inches (914 mm) high.
3. ~~2.~~ The height in assembly seating areas shall be in accordance with Section 1024.14.

Reason: There are one and two family dwellings which will not fall within the scope of the IRC for certain aspects of the their construction. The nonstructural requirements for these should be no different than the home next door that is constructed under the IRC.

Cost Impact: None

Committee Action: **Disapproved**

Committee Reason: Justification was not provided why guards should be lower in residential occupancies over other occupancies.

Assembly Action: **None**

Individual Consideration Agenda:

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

Public Comment:

Gilbert Gonzales, Murray City Corp., representing Utah Chapter of ICC, requests Approval as Submitted.

Commenter's Reason: The committee's reason for disapproval was no justification was provided why guards should be lower in residential occupancies over other occupancies. The justification is "IRC Section R312.1 Guards required. Porches, balconies or raised floor surfaces located more than 30 inches (762mm) above the floor or grade below shall have guards not less than 36 inches (914mm) in height". There are one and two family dwellings which will not fall within the scope of the IRC for certain aspects of the construction. The nonstructural requirements for these should be no different than the home next door that is constructed under the IRC.

E66-03/04 - D
1012.3 (IFC 1012.3)

Proposed Change as Submitted:

Proponent: Elliott D. Stephenson, representing The Young Children of America

Revise as follows:

1012.3 Opening limitations. ~~Open guards shall have balusters or ornamental patterns such that a 4-inch-diameter (102 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm). From a height of 34 inches (864 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, a sphere 8 inches (203 mm) in diameter shall not pass.~~ The elements of guards shall be of such a design that a 4 inch (102 mm) diameter sphere cannot pass through any openings.

Exceptions:

1. through 4. (No change to current text)

Reason: Recent climbing tests have clearly revealed that the existing allowance of an 8 inch high opening in the upper portion of a 42 inch high guard represents a serious hazard to young children. Agile 2 year olds and many 3 year olds can climb through a 6 or 8 inch high opening in such a guard. In order to provide a reasonable level of safety, the height of the opening needs to be limited to 4 inches.

Any alleged improved appearance of a guard based on a 7 or 8 inch high opening below its top rail does not justify the installation of such guards at locations where young children can be expected to be present. It simply represents an additional unnecessary hazard facing our children and their parents.

Cost Impact: None

Committee Action: **Disapproved**

Committee Reason: The current requirements allow for design flexibility. Toddlers are typically shorter than the 36" high level with the 4" opening limitations. Recent climbing studies mentioned in the reason statement were not provided to the committee.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Elliott O. Stephenson, representing The Young Children of America requests Approval as Submitted.

Commenter's Reason: See original reason.

RB20-03/04 - D
R202

Proposed Change as Submitted:

Proponent: Elliott O. Stephenson, the Young Children of America

Add new text as follows:

SECTION R202
DEFINITIONS

CLIMBABLE GUARD. A guard having horizontal or vertical elements or of some other design that provides one or more toe holds, either as an integral part of the design or attached thereto, located in that portion of the guard more than 6 inches (153 mm) above the adjacent walking surface and more than 6 inches (153 mm) below the top of the guard.

Reason: The home of a family, whether it is owned or rented, should be a sanctuary from unnecessary safety hazards to the extent that it is reasonably possible. Guards constructed or installed at the open side of balconies, porches and stairway landings should not be designed so as to invite young children to climb them.

The argument that nothing can be done to prevent young children from placing a chair or other easily climbable furniture next to a guard and that it is therefore impossible to solve the problem is not valid. Parents can be alerted to such hazards and in apartment buildings and other multi-family structures, exit balconies and landings are not furnished.

Parents and guardians of young children should be able to rely upon the building regulatory authorities considering the fact it is virtually impossible to oversee and control the movement and actions of young children every instant they occupy buildings and doing everything reasonably possible to insure the safety of each member of a family regardless of age.

For too long the needs of the very young citizens of America have suffered from the inadequate or lack of consideration that building designers have to their special safety needs. This is evident from the fact there are presently millions of unsafe guards existing throughout the country. It's estimated that 15,000 to 16,000 children under five years in age are injured in falls and jumps from elevated locations in buildings in the United States each year. It will be a sorry legacy that we leave to future generations of young children if nothing is done.

An essential feature of adequate provisions in the ICC Codes applicable to buildings or anything else is the inclusion of needed definitions of terms.

Cost Impact: None

Committee Action: **Disapproved**

Committee Reason: There is no definition of what constitutes a toe hold. There is no criteria for the spacing of the elements of a guard that would permit it to be climbable. The proposal would be subject to non-uniform enforcement due to subjective language.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Elliott O. Stephenson, representing The Young Children of America, requests Approval as Submitted.

Commenter's Reason: When I submitted RB20-03/04 and the remaining two related proposed changes to the ICC Residential Building Code, RB91-03/04 and RB94-03/04, I knew they would be controversial and be energetically opposed by representatives of certain organizations active in the ICC code revision process. My primary purpose in their submission was to establish an initial set of provisions intended to inhibit the climbing of guards by young children that could be amended by its opponents during future code revision hearings when proof of their justification was provided.

Two of the remaining reasons, I believe, it is essential provisions intended to reduce the climbing of guards needs to be included in the 2003 Editions of the two ICC codes are the following. I am not an attorney nor a legal counsel serving a city or county but it is my belief that if a building official who participated in the Nashville Codes Forum or receives copies of one of the magazines published by BOCA, ICBO or the SBCCI every two months has not reported to his or her City Council or Board of Supervisors that the two codes contain no provisions whatsoever prior to their adoption of one or both of the two codes, he or she may be negligent in not doing so. He or she should not take the responsibility for such a significant decision alone.

I also believe that most city's or county's legal counsels would respond to his or her inquiry about the possible assumption of personal liability of a building official who has not reported the situation to his or her city or county leaders by stating the following or its equivalent. It's up to the jury in a civil case in the event a child is injured or killed in a fall in a new building to determine the answer. It's possible you would be because you had prior knowledge that readily climbable guards are unsafe for young children." If my jurisdiction's legal counsel made such a statement to me I certainly would promptly notify my bosses of the situation and tell them I would assist them in the preparation of needed code revisions if they so desired.

I have proven that at least twenty percent of falls and jumps FROM or ONTO a balcony, porch, banister or railing involve some aspect of climbing prior to the actual fall or jump. It is probably close to 25 or 30 percent. These facts are in sharp contrast to the statements and documents made or presented to the ICC Committees by representatives of NOMMA and the AIA. Their analysis of the NEISS Records have been incomplete, misleading and erroneous and their evaluations of the seriousness of the guard climbing problem is quite meaningless. A copy of my evaluation and the NEISS reports upon which it is based have been submitted to both the President and the CEO of the ICC.

Public Comment 2:

Elliott O. Stephenson, representing The Young Children of America, requests Approval as Modified by this Public Comment.

Modify proposal by adding the following definitions:

FOOTHOLD. Holds in guards are clear openings more than 2 inches (51 mm in width at which support for a foot or shoe is provided.

TOEHOLD. Toeholds in or on guards are clear openings more than ½ inch (12.7 mm) in width or protrusions, indentations, cutouts or attachments exceeding 1/4 inch (6.4 mm) in depth or protrusion.

Commenter's Reason: It is believed that a specification type of definition to determine when a guard is climbable is superior to one based upon performance requiring the building official to make a judgement call as previous definitions have required.

The addition of appropriate definitions in Chapter 2 of the IRC to describe climbable guards is believed to be essential. If experience reveals that the 1/4 inch proposed allowance for protrusions, indentations and attachments is excessive, it can be reduced to a lesser value. It is believed the 1/4 inch allowance is appropriate as a starting point.

The home of a family, whether it is owned or rented, should be a sanctuary from unnecessary safety hazards to the extent that it is reasonably possible. Guards constructed or installed at that open sides of balconies, porches and stairway landings should not be designed so as to invite young children to climb them.

The argument that nothing can be done to prevent young children from placing a chair or other easily climbable furniture next to a guard and that it is therefore impossible to solve the problem is not valid. Parents can be alerted to such hazards and in apartment buildings and other multi-family structures, exit balconies and stairway landings are not furnished.

Parents and guardians of young children should be able to rely upon the building regulatory authorities considering the fact it is virtually impossible to oversee and control the movement and actions of young children every instant they occupy buildings and doing everything reasonably possible to insure the safety of each member of a family regardless of age.

For too long the needs of the very young citizens of America have suffered from the inadequate or lack of consideration that building designers have given to their special safety needs. This is evident from the fact there are presently millions of unsafe guards existing throughout the country. It is estimated that 15,000 to 16,000 children under five years in age are injured in falls and jumps from elevated locations in buildings and from banisters and railings in the United States each year. It will be a sorry legacy that we leave to future generations of Americans if something is not promptly done about the guard climbing problem.

I believe it is essential that provisions intended to reduce the climbing of guards be included in the 2006 Editions of the IBC and IRC for the following reasons: I am not an attorney nor a legal counsel serving a city or county, but it is my belief that if a building official who participated in the Nashville Codes Forum, or receives copies of one of the magazines published by BOCA, ICBO or SBCCI every two months, has not reported to his or her city council or board of supervisors that the two codes contain no provisions whatsoever for climbable guards. Prior

to their adoption of one or both of the codes, he or she may be negligent in not doing so. He or she should not take the responsibility for such a significant decision alone.

I also believe that most city's or county's legal counsels would respond to his or her inquiry about the possible assumption of personal liability of a building official who has not reported the situation to his or her city or county leaders by starting the following or its equivalent: "It's up to the jury in a civil case in the event a child is injured or killed in a fall in a new building to determine the answer. it's possible you would be, because you had prior knowledge that readily climbable guards are unsafe for young children." If my jurisdiction's legal counsel made such a statement to me, I certainly would promptly notify my bosses of the situation and tell them I would assist them in the preparation of needed code revisions if they so desired.

RB91-03/04 - D
R312.1

Proposed Change as Submitted:

Proponent: Elliott O. Stephenson, representing The Young Children of America

Revise as follows:

R312.1 Guards required. Porches, balconies or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below shall have guards or less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.

Such guards more than 60 inches (1529 mm) above the floor or grade below shall be not less than 42 inches (1069 mm) in height and shall not be climbable.

Exception: Climbable guards may be constructed or installed when protected on the accessible side by securely attached panels of glass, rigid or semi-rigid plastic panels or other approved materials between the height of 6 inches (153 mm) above the adjacent walking surface and 6 inches (153 mm) below the top of the guard.

Porches and decks which are enclosed with insect screening shall be provided with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

Reason: Many building officials have told me they do not believe the 36 inch height allowance for guards in dwellings is adequate and that it should be 42 inches, the same as required in other building occupancies. This proponent happens to agree with them. In order to have this matter fully reviewed and considered during the 2003 IRC code development process this proposal is submitted.

Numerous climbing tests conducted by this proponent and by researchers in other countries have clearly shown that agile 2 year old children and many 3 year olds can readily climb over a 36 inch high guard. It has also been shown that adults can easily fall over guards of such limited height.

It is not necessary to allow 36 inch high guards in dwellings. In those few instances in which an owner wishes to improve the view from his or her balcony by limiting the height of a guard, it is possible to insert a panel of glass or rigid plastic or the 4 inches of the guard below its top nail can be left open without substantially reducing its safety.

Cost Impact: None

Committee Action: **Disapproved**

Committee Reason: No data was presented on how to prevent climbing over guards. The proposal lacks sufficient justification. The provisions addressing a "climbable guard" were removed from this section in a previous code change cycle due to concerns of uniform enforcement/interpretation and there is inadequate justification to put it back in.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Elliott O. Stephenson, representing The Young Children of America, requests Approval as Submitted.

Commenter's Reason: The home of a family, whether it is owned or rented, should be a sanctuary from unnecessary safety hazards to the extent that it is reasonably possible. Guards constructed or installed at the open side of balconies, porches and stairway landings should not be designed so as to invite young children to climb them.

The argument that nothing can be done to prevent young children from placing a chair or other easily climbable furniture next to a guard and that it is therefore impossible to solve the problem is not valid. Parents can be alerted to such hazards and in apartment buildings and other multi-family structures, exit balconies and landings are not furnished.

Parents and guardians of young children should be able to rely upon the building regulatory authorities considering the fact it is virtually impossible to oversee and control the movement and actions of young children every instant they occupy buildings and doing everything reasonably possible to insure the safety of each member of a family regardless of age.

For too long the needs of the very young citizens of America have suffered from the inadequate or lack of consideration that building designers have to their special safety needs. This is evident from the fact there are presently millions of unsafe guards existing throughout the country. It's estimated that 15,000 to 16,000 children under five years in age are injured in falls and jumps from elevated locations in buildings in the United States each year. It will be a sorry legacy that we leave to future generations of young children if nothing is done.

An essential feature of adequate provisions in the ICC Codes applicable to buildings or anything else is the inclusion of needed definitions of terms.

Public Comment 2:

Elliott O. Stephenson, representing The Young Children of America, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

R312.1 Guards required. Porches, balconies or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below shall have guards or less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.

Such guards more than 60 inches (1529 mm) above the floor or grade below shall be not less than 42 inches (1069 mm) in height and shall not be climbable

> **Exception:** Climbable guards may be constructed or installed when protected on the accessible side by securely attached panels of glass, rigid or semi-rigid plastic panels or other approved materials between the height of 6 inches (153 mm) above the adjacent walking surface and 6 inches (153 mm) below the top of the guard.

Porches and decks which are enclosed with insect screening shall be provided with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

R312.2 Guardrail opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102 mm) or more in diameter.

> **Exceptions:**
> 1. The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (152 mm) cannot pass through.
> 2. Openings for required guards on the sides of stair treads shall not allow a sphere 4-3/8 inches (107 mm) to pass through.

<u>When the potential distance of a fall from the floor upon which a guard is constructed or installed exceeds 60 inches (1524 mm) above the finish grade or floor below, the guard shall have no Toe-holds nor Foot-holds more than 6 inches (152 mm) above the adjacent floor finish.</u>

Commenter's Reason: There is no justification whatsoever for the existence of climbable guards when the potential height of a fall by a child climbing it exceeds 7 or 8 feet. Young children often completely recover from a fall of a few feet but when the height of a fall is 10 or 12 feet or more, serious injuries, including broken bones and concussions, become frequent.

For too long the young children of America have been severely neglected in the development and enforcement of our building codes. It has only been during the past decade that the size of permitted openings in guards has been reduced to 4 inches, providing a major improvement in the degree of safety for the 400 million or more children who will be born in the United States during the 21st Century. It is now time for the next step to be taken to further improve their safety in our homes and other buildings in which they can be expected to be present.

Is the present situation going to be another sorry legacy that we Americans will be leaving for future generations to contend with? Many other countries around the world have already taken actions to include in their respective National Building Codes provisions intended to limit the installation of climbable guards and it appears the United States is standing alone in its failure to adequately resolve this matter.

In my article "Climbable Guards - Special Enemy of the World's Children," published by BOCAI, ICBO and the SBCCI during 2001 and 2002, I have proven that at least 20 percent of falls and jumps by children 10 years in age and younger treated in the emergency facilities at 101 hospitals during a certain time period have involved climbing prior to the fall or jump itself. This was accomplished by comparing the number of total falls and jumps to those recorded as falls and jumps "<u>FROM</u>", "<u>OFF OF</u>" or "<u>ONTO</u>" a banister or railing. Falls origination as "<u>OVER</u>" a

banister or railing were not considered as climbing because in some cases the injured child was described as simply "LEANING OVER" a banister or railing. Falls "ONTO" a banister or railing are frequently "Straddle Falls" and can result in serious and painful injuries to the genital area of a child.

A subsequent review of NEISS Reports for the same time period but applicable to children six years in age and younger instead of ten years and younger has recently been conducted by the author and the same 20 percent climbing factor has been found to exist. Copies of both sets of NEISS Reports and their analysis have been sent to the Chief Executive Officer of the ICC for the organization's independent evaluation. It is the opinion of this writer that the actual percentage of falls and jumps involving some aspect of climbing prior to the actual fall itself is closer to 25 or 30 percent because such incidents are not commonly witnessed by competent observers.

Some have argued that to include the needed provisions in our homes is useless because movable objects located on the balconies, such as furniture, planters and other climbable things can be moved to a position next to a guard. In this writer's opinion, this is a matter of the education of parents to the potential problem of loose items on a balcony. There are many agencies in the United States that are capable of promoting such an education program, including the American Academy of Pediatrics, the National Safe Kids Campaign and its local coalitions now active in many areas of the country, as well as the US Consumer Product Safety Commission. Various states also have agencies prepared to assist in such an effort.

RB94-03/04 - D
R312.3

Proposed Change as Submitted:

Proponent: Elliott Stephenson, representing The Young Children of America

Add new text as follows:

R312.3 Climbable guards to be protected. Unless protected on the accessible side by securely attached panels of glass, rigid or semi-rigid plastic or other approved material between the height of 6 inches (153 mm) above the floor level on which it is constructed or installed in a dwelling when the difference in levels between floors or between the floor and grade exceeds 60 inches (153 mm).

Reason: There is no justification whatsoever for the existence of climbable guards when the potential height of fall by a child climbing it exceeds 7 or 8 feet. Young children often completely recover from a fall of a few feet but when the height of the fall is 10 or 12 feet or more, serious injuries, including broken bones and concussions, become frequent.

For too long the young children of America have been severely neglected in the development and enforcement of our building codes. It has only been during the past decade that the size of permitted openings in guards has been reduced to 4 inches, providing a major improvement in the degree of safety for the 400 million or more children who will be born in the United States during the 21st Century. It is now time for the next step to be taken to further improve their safety in our homes and other buildings in which they can be expected to be present.

The accompanying sketch will clarify the intent of the proposed changes to the *International Residential Code*.

Cost Impact: None

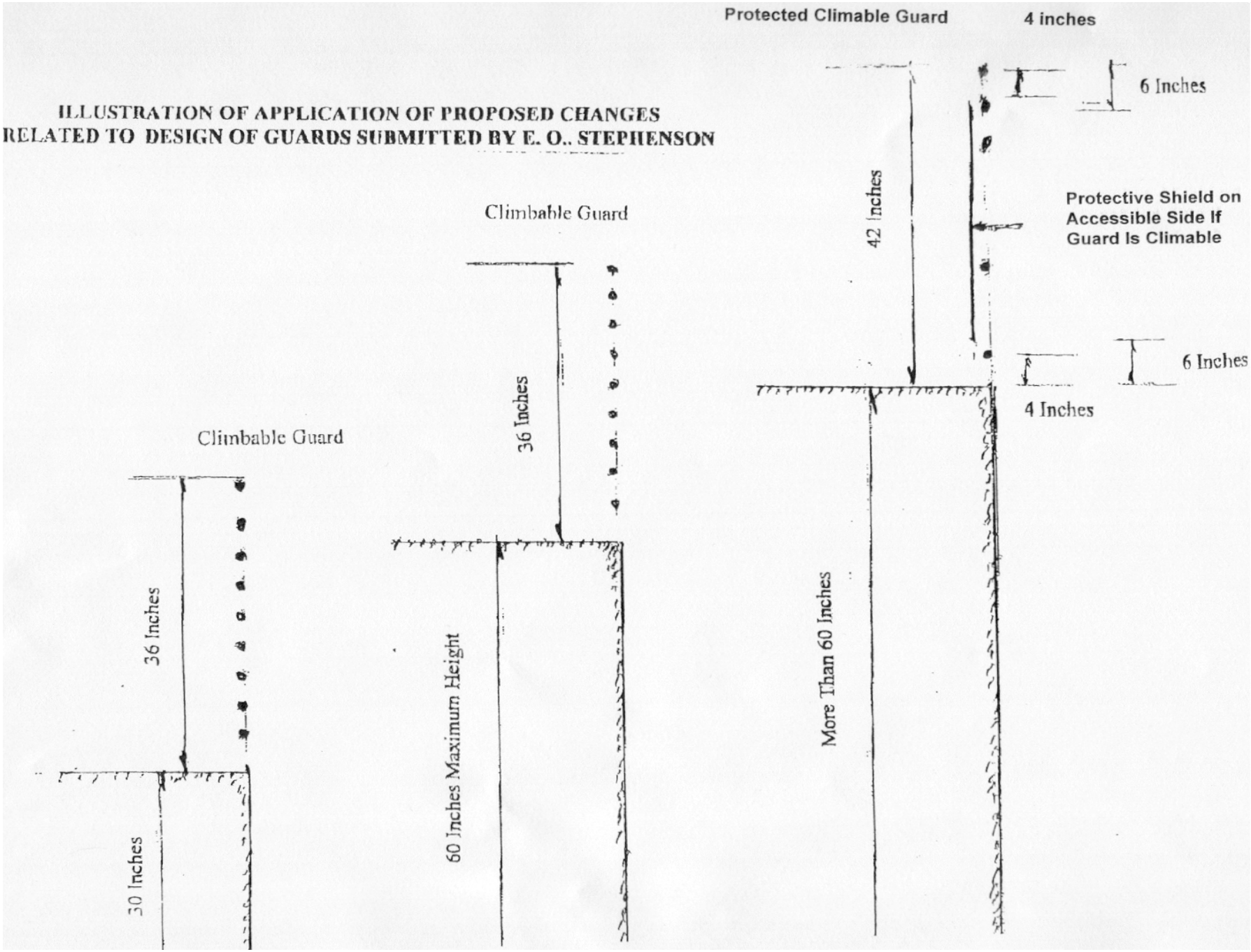


ILLUSTRATION OF APPLICATION OF PROPOSED CHANGES
RELATED TO DESIGN OF GUARDS SUBMITTED BY E. O.. STEPHENSON
Climbable Guard
36 Inches
30 Inches
Climbable Guard
36 Inches
60 Inches Maximum Height
Protected Climable Guard
4 inches
6 Inches
42 Inches
Protective Shield on
Accessible Side If
Guard Is Climable
6 Inches
4 Inches
More Than 60 Inches

Committee Action: **Disapproved**

Committee Reason: This change would lead to subjective enforcement. This is consistent with the action taken on RB20-03/04. The proposed text is grammatically incorrect.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Elliott O. Stephenson, representing The Young Children of America, requests Approval as Submitted.

Commenter's Reason: The home of a family, whether it is owned or rented, should be a sanctuary from unnecessary safety hazards to the extent that it is reasonably possible. Guards constructed or installed at the open side of balconies, porches and stairway landings should not be designed so as to invite young children to climb them.

The argument that nothing can be done to prevent young children from placing a chair or other easily climbable furniture next to a guard and that it is therefore impossible to solve the problem is not valid. Parents can be alerted to such hazards and in apartment buildings and other multi-family structures, exit balconies and landings are not furnished.

Parents and guardians of young children should be able to rely upon the building regulatory authorities considering the fact it is virtually impossible to oversee and control the movement and actions of young children every instant they occupy buildings and doing everything reasonably possible to insure the safety of each member of a family regardless of age.

For too long the needs of the very young citizens of America have suffered from the inadequate or lack of consideration that building designers have to their special safety needs. This is evident from the fact there are presently millions of unsafe guards existing throughout the country. It's estimated that 15,000 to 16,000 children under five years in age are injured in falls and jumps from elevated locations in buildings in the United States each year. It will be a sorry legacy that we leave to future generations of young children if nothing is done.

An essential feature of adequate provisions in the ICC Codes applicable to buildings or anything else is the inclusion of needed definitions of terms.

2004/2005 Cycle: No code changes.