INTERNATIONAL CODE COUNCIL (ICC)
Code Technology Committee (CTC)

Area of Study – Climbable Guards

February 17, 2006
Draft Interim Report of CTC Recommendations and
Public Hearing Announcement

In accordance with ICC Council Policy No. 5, the CTC held meetings to evaluate the ICC Board-approved area of study entitled Climbable Guards. The CTC will hold a public hearing on March 9, 2006 at the Wyndham O'Hare [(847) 297-1234] to allow interested and affected parties to comment on the CTC interim recommendations. It should be noted that as an interim report this does not complete this area of study. Other aspects of this area of study are still under investigation.

Scope: As noted in the CTC approved Scope & Objectives Statement, the scope of this activity is:

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

Recommendation: The CTC interim recommendation is to submit code changes to the 2006 International Building Code (IBC) and International Residential Code (IRC) in the 2006/2007 Cycle in order to resolve inconsistencies between the codes (see Page 2). CTC recommends further study on other aspects of this subject area.

Considerations:

- The CTC has reviewed injury data and studies related to falls. However, it has been determined that there is a lack of conclusive data which correlates falls with specific guard configurations. CTC intends to continue to study this issue.
- The CTC believes that some children are capable of climbing guardrails, regardless of the configuration of the guard in-fill. In an effort to determine the impact of guard configurations, further study and investigation is needed.
- CTC notes the inconsistency in language regulating guards between the IBC and IRC. Interpretive issues which may lead to inconsistent design and enforcement can be resolved without further study.

1. Proposed change to the IBC:

SECTION 1013.0 GUARDS

IBC 1013.1 Where required. Guards shall be located along open-sided walking surfaces, including mezzanines, industrial equipment platforms, stairways, ramps and landings which are located more than 30 inches above the floor or grade below. Guards shall be adequate in strength and attachment in accordance with Section 1607.7. Where glass is used to provide a guard or as a portion of the guard system, the guard shall also comply with Section 2407.

Where the glazing provided does not meet the strength and attachment requirements in Section 1607.7, guards shall also be located along glazed sides of stairways, ramps and landings that are located more than 30 inches above the floor or grade below. ~~where the glazing provided does not meet the strength and attachment requirements in Section 1607.7.~~

Exception: Guards are not required for the following locations:
1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including steps leading up to the stage and raised platforms.
3. On raised stage and platform floor areas such as runways, ramps and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating where guards in accordance with Section 1025.14 are permitted and provided.

IBC 1013.2 Height. Guards shall form a protective barrier not less than 42 inches (1067 mm) high, measured vertically above the leading edge of the stair tread nosing, adjacent walking surface or adjacent seat-board.

Exceptions:
1. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, guards whose top rail also serves as a handrail shall have a height not less than 34 inches and not more than 38 inches measured vertically from the leading edge of the stair tread nosing.
2. The height in assembly seating areas shall be in accordance with Section 1025.14.

IBC 1013.3 Opening limitations. ~~Open~~ Guards shall ~~have balusters or ornamental patterns such that a~~ not have openings which allow passage of a sphere ~~4-inch-~~ inches ~~diameter sphere~~ or more in diameter ~~cannot pass through any opening~~ up to a height of ~~34~~ 36 inches. From a height of ~~34~~ 36 inches to 42 inches (1067 mm) ~~above~~

~~the adjacent walking surfaces~~, guards shall not have openings which allow passage of a sphere ~~8~~ 5 inches or more 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 in diameter cannot pass through the opening.~~ not allow passage of a sphere 6 inches or more in diameter.
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 cannot pass through any opening.~~ not have openings which allow passage of a sphere 21 inches or more in diameter.
3. In areas which are not open 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 to pass through any opening.~~ guards shall not have openings which allow passage of a sphere 21 inches or more in diameter.
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~~ not have openings which allow passage of a sphere 4inches or more in diameter ~~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 (1067mm) above the adjacent walking surfaces, guards shall not have openings which allow passage of a sphere 8 inches or more in diameter ~~shall not pass~~.
5. Within individual dwelling units and sleeping units in Group R-2 and R-3 occupancies, ~~openings for required guards on the sides of stair treads shall not allow a sphere of 4-3/8" to pass through.~~ guards on the sides of stairs shall not have openings which allow passage of a sphere 4- 3/8 inches or more in diameter.

[Remainder of section unchanged]

2. Proposed change to the IRC:

SECTION R312 GUARDS

IRC R312.1 Guards required. ~~Porches, balconies, ramps or raised walking floor surfaces located more than 30 inches above the floor or grade below shall have guards not less than 36 inches in height. Open sides of stairs with a total rise of more than 30 inches above the floor or grade below shall have guards not less than 34 inches in height measured vertically from the nosing of the treads.~~ Guards shall be located along open-sided walking surfaces, including porches, decks, balconies, mezzanines, stairways, ramps and landings, which are located more than 30 inches above the floor or grade below.

Open sided walking surfaces including porches and decks which are enclosed with insect screening shall be provided with guards where the walking surface is located more than 30 inches above the floor or grade below.

IRC R312.2 Guard Height. Required guards at open-sided walking surfaces, porches, balconies or landings shall be not less than 36 inches high measured vertically above the adjacent walking surface or adjacent seatboard.

Exception: Required guards on open sides of stairs shall be not less than 34 inches high measured vertically above the leading edge of the tread nosing.

IRC ~~R312.2~~ R312.3 ~~Guard~~ Opening limitations. ~~Required~~ Guards ~~on open sides of stairways, raised floor areas, balconies and porches~~ shall not have openings ~~intermediate rails or ornamental closures~~ which ~~do not~~ allow passage of a sphere 4 inches or more in diameter. From a height greater than 36 inches above the adjacent walking surfaces, guards shall not have openings which allow passage of a sphere 5 inches or more in diameter

Exceptions:

1. The triangular opening s 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 cannot pass through.~~ to not allow passage of a sphere 6 inches or more in diameter.
2. ~~Openings for required guards on the open sides of stair treads stairs shall not allow passage of a sphere 43/8 inches (107mm) or more in diameter to pass through~~ Guards on the sides of stairs shall not have openings which allow passage of a sphere 4- 3/8 inches or more in diameter

Reason for changes to the IBC and IRC:

IBC 1013.1. Editorial. Laundry lists of items in the code are typically not all-inclusive. The word "including" provides this clarification in the following sections as well. This section is divided into two paragraphs with the second paragraph dealing with glass and glazing without a change in intent.

IBC 1013.2: No change in intent by the standardized text dealing with stair treads is inserted.

IBC 1013.3: The majority of the revision in this section and exception involve editorial rewording of the sentences for clarity and consistency. The technical change is to increase the height of the guard (34 to 36 inches) where an increase in opening size is permitted and also to reduce the maximum opening (8 to 5 inches) for this upper portion of the guard.

The 8 inch limitation on openings at the upper section of the guard was based on the difference between the 34 inch height being the part of the guard that protects small

children and the 42 inch height for the rest of the population. However this does not take into account that residential R-3 use groups require a minimum guard height of 36 inches. This proposal raises the height for which the 4 inch opening requirement is applicable - to coincide with the minimum guard height in residential occupancies.

The change in maximum opening size at the upper portion of the guard, from the current 8 inch sphere criteria to a 5 inch sphere, is based on providing an equivalent level of protection as that provided by the current 4 inch opening on the lower portion of the guard. As a point of reference, the following measurements of head sizes of infants are excerpted from Drawing #2 Measurement of Infants from a book entitled "The Measure of Man and Woman: Human Factors" by Alvin R. Tilley, published by John Wiley & Sons (ISBN 0-471-09955-4):

Age	Side-to-side measurement	Back-to-front measurement
12-15 months:	5"	6.5"
16-19 months:	5"	6.5"
20-23 months:	5.1"	6.8"

Additionally, many foreign countries are using a sphere standard of 125 mm which translates to 4.92 inches. This is seen in countries such as Australia, France and Germany which are presently updating their building code minimum standards. Until recently, the United States had the strictest spacing rule of 4 inches (below the specified guard height). This has changed with the changes in Canada who recently adopted a 100 mm sphere rule which is less than 4 inches (3.94 inches). However, the standard in most foreign countries remains at 4.92 inches.

IRC R312.1: This section is being divided into two sections, similar to the IBC. The first section includes the general guard requirement, and the new section (R312.2) includes the height requirements.

IRC R312.2: This new section includes the guard height requirements. It is reformatted to place emphasis on the 36" high guard required at level surfaces. There are not technical changes to the minimum height. This section does include an added phrase - "or adjacent seatboard" – intended to clarify that where there is built-in seating, the guard height is to measured from the seat itself to provide for the minimum required height where it is assumed that children may be standing.

IRC R312.3: The majority of the revision in this section and exception involve editorial rewording of the sentences for clarity and consistency. The only technical change is to limit the guard opening height above 36 inches for those guards which exceed the minimum height. Even though a guard may exceed the minimum, the guard potentially provides a climbable surface.