

“The Ladder Effect” in the International Building Code

Through the years there has been much discussion about the safety level of horizontal components (infills and decorative patterns) on guardrails due to a perceived “ladder effect” created by said components. Indeed, the first edition of the International Code Council’s (herein referred to as ICC) Residential Building Code (herein referred to as IRC) issued in the year 2000 included wording which restricted use of horizontal components of guardrails. However, after extensive research and discussion performed by the technical arm of the ICC, the “ladder effect” wording was removed in the first IRC supplement issued in 2001. Since this time, no wording referring to “ladder effect” has returned to any coding documentation. Also important to note is the fact the the ICC’s commercial code (herein referred to as the IBC) never contained any wording restricting the use of horizontal components in guardrails.

The exact wording of the various editions of the IRC can be seen below. Note the pertinent text in red:

IRC 2000 edition (The only code released containing the “ladder effect” terminology)

R316.2 Guard 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) 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 (152mm) cannot pass through.

IRC 2001 Supplement (Note the absence of the “ladder effect” terminology)

R316.2 Guard 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 (152mm) cannot pass through.
2. Openings for required guards on the sides of stair treads shall not allow a sphere 4-3/8 inches (107mm) to pass through.

Current IRC 2012 (Note the continued absence of the “ladder effect” terminology)

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

Exceptions:

1. The triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a guard, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. Guards on the open side of stairs shall not have openings which allow passage of a sphere 43/8 inches (111 mm) in diameter.

Please note: Even with the above changes to the International Residential codes, every code jurisdiction is different, and some may still be relying on the earlier 2000 code interpretation. Therefore, it is important for architects, fabricators, contractors, and home owners to confirm local codes as related to the railing products they choose to install.