

Deck Railing Post Codes and Connections

Do your guardrail post installation techniques meet the building code?

What load must a deck railing post be designed to support?
See which common post mounting details fail and why.

Learn simple installation details and hardware choices that provide safe, secure posts.

Presented by: Mike Guertin www.mikeguertin.com

Presentations made possible by generous support from:



Deck Post / Rail Connections

IRC 2009 Table R 301.5

Footnote 'd' 200-lb load "A single concentrated load applied in any direction at an point along the top."

Footnote 'f' 50-lb load "Guard in-fill components, balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 lbs on an area equal to 1 square foot....."

International Building Code (IBC) Section 1714 utilizes a safety factor of 2.5 for testing minimum structural capacities.

In effect, guardrails must support 500 lbs. concentrated load and in-fill must support 125 lbs. sq ft load.

How are your rails constructed to meet the code?

Common Post Details don't meet the building code.

4x4 bolted to rim joist

4x4 lag screwed to rim joist

What is the force on the bolts, rim joist and 4x4?

$200 \text{ lbs} \times 44 \frac{3}{4} \text{ in (length of post - force point at top to bottom of rim)} = 8,950 \text{ inch lbs at bottom of post/rim}$

$8,950 \text{ inch lbs} \div 5 \frac{1}{4} \text{ in (distance from bottom of rim joist to center of bolt)} = 1,705 \text{ lbs force at bolt.}$

What is rim connected to and how?

Usually just nails so there is little holding rim board to floor joists. These can pull out even though the railing post stays bolted to rim.

JLC magazine February 2005 Virginia Tech [Loferski and Woeste] Test of Deck Post Connections

200 lb live load requirement (code) + safety factor 2.5 (code) = 500 lb capacity to meet code.

Lag screw failed at 178 (ave)

½ in. bolt failed at 237 lb (ave)

Deck Post Connection Solutions:

Transfer load to joists using hardware

Deck Loc Bracket

Simpson Strongtie DTT2Z connector

USP DTB-TZ connector

Details:

Post to Rim – Joist in line

Post to Rim – Between joists

Corner Post

Post to Rim – Parallel to deck framing

Issues:

Notching posts?

Deck Rail In-Fill

No prescriptive attachment requirements

50 lb. per 1 square foot area load. 125 lb. safety test load

Guardrail Attachment

RailLok

Structural Screw

Baluster Attachment

Inside rather than outside rails.

Resources:

www.deckmagazine.com

Free Subscription

<http://www.awc.org/Publications/DCA/DCA6/DCA6.pdf> Prescriptive Residential Wood Deck Construction Guide