

Better Deck Post Sizing

by Glenn Mathewson

For years, 4x4 posts had been used to support decks with little thought to how much load the posts were carrying or how tall the deck was. That changed in 2015, when Section R507.8, a prescriptive method for sizing deck posts, was included in the 2015 International Residential Code. Prescriptive design is a cookbook for construction that eliminates the need for a design professional. However, like a cookbook compared with a chef, it's limited in what it offers. The design tables for deck-post height included in both the 2015 and 2018 editions of the IRC were indeed limiting, as Table R507.8 was a one-size-fits-all prescription, with the maximum heights of 4x4 to 6x6 posts based on the greatest possible area of deck that could be generated with IRC joist-span and deck-beam design tables. This resulted in every deck having an 8-foot height limit when supported by 4x4 posts, based on loads coming from a two-ply 2x12 beam with 2x12 joists 12 inches on-center and cantilevering past the beam more than 4 feet. It was a good start to deck code, but desperately needed to be expanded and made more flexible (**Figure 1**).

The 2021 edition of the IRC does just that. Three different categories of wood species with similar specific gravities are included, allowing southern pine posts to extend taller than redwood or cedar posts, for example. The previous tables were based on only a 40-lb. live load, but the new one includes three snow loads: 50, 60, and 70 lb. In regions where a 60-lb. live load is required by the local code, the 70-lb. snow load column is an equivalent (**Figure 2**).

In 2018, 8x8 posts were added to the table and are included in the 2021 version as well, but they are limited to 14 feet in



The new deck-post sizing table in the 2021 IRC offers more flexibility in deck-post design than earlier 2015 and 2018 versions of the table, as shown below.

height. In no cases does the table allow a height of greater than 14 feet for either 8x8 or 6x6 posts, but this is not because of

**TABLE R507.8
DECK POST HEIGHT^a**

DECK POST SIZE	MAXIMUM HEIGHT ^a
4 × 4	8'
4 × 6	8'
6 × 6	14'

For SI: 1 foot = 304.8 mm.

a. Measured to the underside of the beam.

**TABLE R507.4
DECK POST HEIGHT^a**

DECK POST SIZE	MAXIMUM HEIGHT ^{a, b} (feet-inches)
4 × 4	6-9 ^c
4 × 6	8
6 × 6	14
8 × 8	14

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm,
1 pound per square foot = 0.0479 kPa.

a. Measured to the underside of the beam.

b. Based on 40 psf live load.

c. The maximum permitted height is 8 feet for one-ply and two-ply beams.

The maximum permitted height for three-ply beams on post cap is 6 feet 9 inches.

Figure 1. In both the 2015 (above) and 2018 (right) versions of the IRC's deck-post sizing table, the maximum height of a 4x4 post is limited to 8 feet, regardless of loads.

Table R507.8. Excerpted from the 2015 International Residential Code. Copyright 2014; Table R507.4, excerpted from the 2018 International Residential Code. Copyright 2017. Washington, D.C.: International Code Council. Reproduced with permission. All rights reserved. www.ICCSAFE.org

**TABLE R507.4
DECK POST HEIGHT**

LOADS (psf) ^a	POST SPECIES ^c	POST SIZE ^d	TRIBUTARY AREA (ft ²) ^{e,h}							
			20	40	60	80	100	120	140	160
			MAXIMUM DECK POST HEIGHT ^f (feet-inches)							
40 live load	Southern pine	4 × 4	14-0	13-8	11-0	9-5	8-4	7-5	6-9	6-2
		4 × 6	14-0	14-0	13-11	12-0	10-8	9-8	8-10	8-2
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Douglas fir ^e Hem-fir ^e Spruce-pine-fir ^e	4 × 4	14-0	13-6	10-10	9-3	8-0	7-0	6-2	5-3
		4 × 6	14-0	14-0	13-10	11-10	10-6	9-5	8-7	7-10
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood ^f Western cedars ^f Ponderosa pine ^f Red pine ^f	4 × 4	14-0	13-2	10-3	8-1	5-8	NP	NP	NP
		4 × 6	14-0	14-0	13-6	11-4	9-9	8-4	6-9	4-7
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	13-7	9-7
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
50 ground snow load	Southern pine	4 × 4	14-0	12-2	9-10	8-5	7-5	6-7	5-11	5-4
		4 × 6	14-0	14-0	12-6	10-9	9-6	8-7	7-10	7-3
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	13-4
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Douglas fir ^e Hem-fir ^e Spruce-pine-fir ^e	4 × 4	14-0	12-1	9-8	8-2	7-1	6-2	5-3	4-2
		4 × 6	14-0	14-0	12-4	10-7	9-4	8-4	7-7	6-11
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	12-10
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood ^f Western cedars ^f Ponderosa pine ^f Red pine ^f	4 × 4	14-0	11-8	9-0	6-10	3-7	NP	NP	NP
		4 × 6	14-0	14-0	12-0	10-0	8-6	7-0	5-3	NP
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	10-8	2-4
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
60 ground snow load	Southern pine	4 × 4	14-0	11-1	8-11	7-7	6-7	5-10	5-2	4-6
		4 × 6	14-0	14-0	11-4	9-9	8-7	7-9	7-1	6-6
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	12-9	11-2
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Douglas fir ^e Hem-fir ^e Spruce-pine-fir ^e	4 × 4	14-0	10-11	8-8	7-3	6-2	5-0	3-7	NP
		4 × 6	14-0	13-11	11-2	9-7	8-4	7-5	6-8	5-11
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	12-2	10-2
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood ^f Western cedars ^f Ponderosa pine ^f Red pine ^f	4 × 4	14-0	10-6	7-9	4-7	NP	NP	NP	NP
		4 × 6	14-0	13-7	10-9	8-9	7-0	4-9	NP	NP
		6 × 6	14-0	14-0	14-0	14-0	14-0	9-9	NP	NP
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
70 ground snow load	Southern pine	4 × 4	14-0	10-2	8-2	6-11	5-11	5-2	4-4	3-4
		4 × 6	14-0	12-11	10-5	8-11	7-10	7-1	6-5	5-10
		6 × 6	14-0	14-0	14-0	14-0	14-0	12-9	10-11	8-7
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Douglas fir ^e Hem-fir ^e Spruce-pine-fir ^e	4 × 4	14-0	10-1	7-11	6-6	5-3	3-7	NP	NP
		4 × 6	14-0	12-10	10-3	8-9	7-7	6-8	5-10	4-11
		6 × 6	14-0	14-0	14-0	14-0	14-0	12-2	9-9	5-9
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood ^f Western cedars ^f Ponderosa pine ^f Red pine ^f	4 × 4	14-0	9-5	6-5	NP	NP	NP	NP	NP
		4 × 6	14-0	12-6	9-8	7-7	5-3	NP	NP	NP
		6 × 6	14-0	14-0	14-0	14-0	10-8	NP	NP	NP
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

NP = Not Permitted.

a. Measured from the underside of the beam to the top of footing or pier.

b. 10 psf dead load. Snow load not assumed to be concurrent with live load.

c. No. 2 grade, wet service factor included.

d. Notched deck posts shall be sized to accommodate beam size in accordance with Section R507.5.2.

e. Includes incising factor.

f. Incising factor not included.

g. Area, in square feet, of deck surface supported by post and footings.

h. Interpolation permitted. Extrapolation not permitted.

Figure 2. The deck-post sizing table in the 2021 IRC allows posts to be sized according to species and the design loads on the deck. For accurate sizing, builders will need to determine the tributary area supported by the post.

Table R507.4. Excerpted from the 2021 International Residential Code. Copyright 2020. Washington, D.C.: International Code Council. Reproduced with permission. All rights reserved. www.ICCSAFE.org

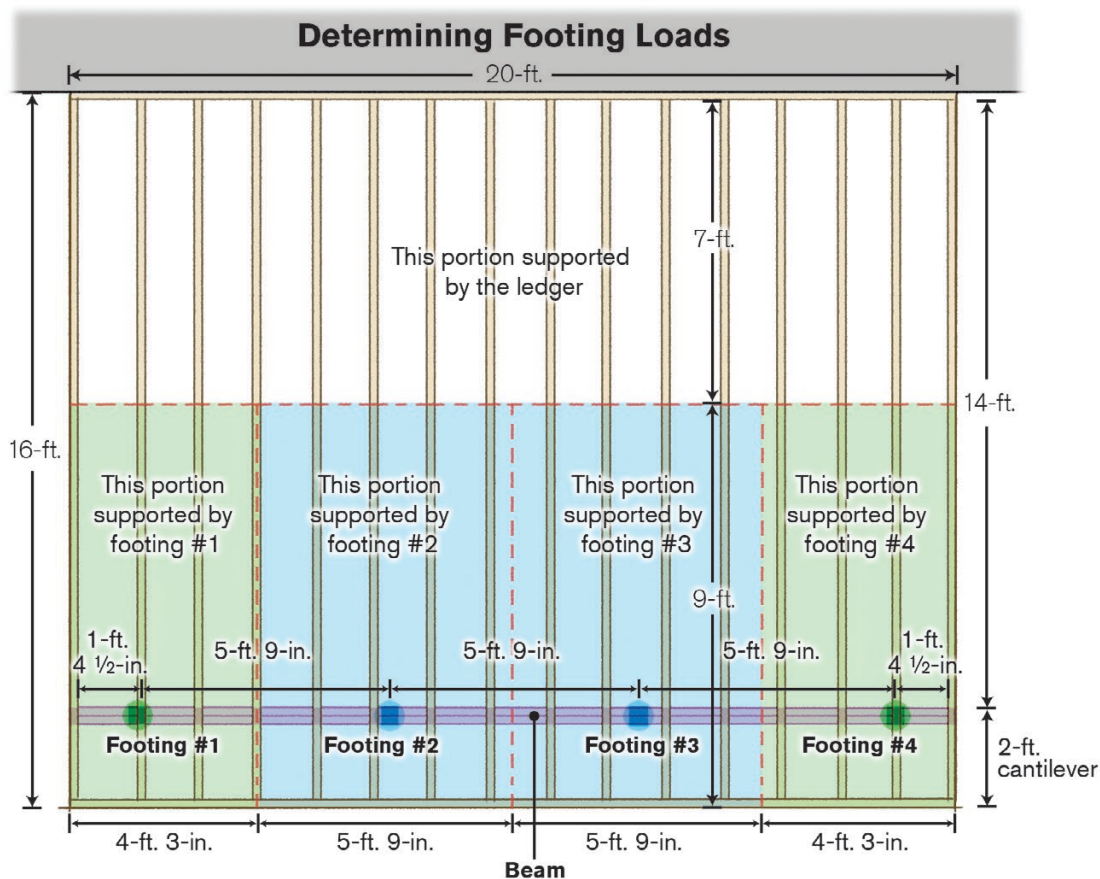


Figure 3. The tributary area supported by a post is half the length of the beam on either side of the post multiplied by half the joist length to the next support, such as the ledger on the house or another beam, plus the entire distance the joists cantilever past the beam. Above, each footing represents the location of a support post.

limitations in the post. Rather, it has to do with the greater risk of lateral loads at that height and the general limitations of prescriptive design.

The best parts of the new table are the rows for various tributary areas, allowing each post to be sized on the actual loads it supports and not a worse case. Tributary area is the area of deck supported by a post, and, for rectangular decks, it's simply half the joist span distance plus the length of the joist cantilever (if applicable), multiplied by half the beam span (**Figure 3**). For a center post, you sum the half beam spans on each side before multiplying. If the joists are of differing lengths, simply connect a line across the mid-span of each joist and practice some geometry to find the area

over the post: $(\text{base} \times \text{height})/2$.

The smallest area provided in the table is 20 square feet, but in every condition the posts are limited to the ultimate 14-foot limit, so a smaller area is unnecessary. Columns continue in 20-square-foot increments up to 160 square feet. However, footnote h of the table allows for interpolation, which means an exact area between column values can yield an exact maximum height (search "interpolation between columns" for a formula). Another benefit of this table is that while joist and beam design from the IRC design tables can generate only about 120 square feet of area, the additional columns up to 160 square feet in this table allow for prescriptively designed posts to support engineered

lumber beams and joists that can span farther than the three-ply 2x12 the IRC offers. Section R301.1.3 makes it clear that engineered design can be used with prescriptive design.

The 2021 IRC is the latest edition and many building authorities have not yet adopted it. However, even if you're working under the 2015 or 2018 editions, there is no reason the prescriptive methods in the 2021 IRC could not be approved as an alternative. If you find your posts limited in height by the older editions, talk with your building authority and ask them to approve the latest IRC. ♦

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