JLCLIVE Residential Construction Show

Deck Stairs 101

STAIR PLANNING, STRINGER CALCULATIONS AND LAYOUT

Stair Codes and Planning
Calculating Treads and Risers
Types of Stringers
Marking out Stringers
Fabricating Stringers
Installing Stairs

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Stair Planning

Location of stairs matters

Against building means window concerns. PDB article July / August 2007

Building Code for Stairs: IRC 2009 R311.7.4

Rise and Run.

7 ¾ in. rise, 10 in. run

Stringers

2x12 stock

Limits of stringer run by IRC

Cut stringers

5 in. minimum body remaining after cutting

Max span (run) 7 ft horizontal for SYP, 6 ft horizontal other species

Minimum 3 cut stringer, maximum of 18 in. between.

Uncut stringers (housed, blocked, bracket)

Max span (run) 16 ft 6 in horiz. for SYP, 14 ft horiz. for other species

Stair width

36 in minimum, 31 ½ in below handrail level, 27 in minimum double handrail

Riser

Riser opening cannot permit a 4 in. sphere to pass. Riser must be 1x or more

Treads

Treads must have nosing between ¾ in and 1 ¼ in. beyond riser board

When riser boards not needed – nosing not required.

Curvature / bevel limits (9/16 in. radius or ½ in. bevel max. along top)

Calculating risers and treads

Construction Master

Reset riser default to 7 ¾ in.

Reset tread default to 10 in.

Reset fractional resolution (Conv Stor then + or – to change)

Enter total rise (grade at landing to finish deck level)

Example: 45 Inch 1 / 2 Rise
Stair = R-HT 7 19/32 inch (riser height) [7 9/16]
Stair = RSRS 6 (riser quantity)
Stair = R+/- 1/16 inch (remainder)
Stair = T-WD 10 inch (tread width)

Determine diagonal measurement for rise / run combination

Enter riser height at Rise then press Stair then Diag

Types of stringers

Cut, Housed, Blocked, Bracketed, Other proprietary systems

Marking out stringers:

Step Off

Framing square with nuts – accuracy limited by eased edge of 2x12

Framing square with clamped on board – easy and more accurate.

Diagonal point to point – construction master result

Bottom cut adjustment for tread thickness at foot of stringer

Cut stringers, blocked stringers and bracket stringers:

Deduct thickness of tread because tread lines indicate bottom of tread

Housed stringers: No deduction needed; tread lines mark top of tread

Riser cut adjustment at top of stringer

Deduct thickness of riser stock and trim off top cut on stringer.

Fabricating Stringers

Cut Stringers: Drill hole at inside corners. No overcutting / runout

Housed Stringers: NOTE: Can only use with structural 2x treads

Router Jig / Pattern to match tread position. Pattern cutting bit – top bearing

Depth of cut – 3/8 in to 5/8 in. Route out 'below' tread line

Staircase Angle Brackets: NOTE: Can only use with structural 2x treads

Mount according to manufacturer instructions

2x4 Blocked Stringers: NOTE: Can only use with structural 2x treads

Follow AFPA method: 2x4 'ledgers' full tread depth fastened with 4 – 10d nails or 4 - #8 screws

Assembling Stairs

Cut Stringers: 2 – 8d nails or #8 screws through tread into each stringer

Housed Stringers: Screw through stringer into tread (**FastenMaster HeadLok Screws**)

Staircase Angle Brackets: Mount according to manufacturer instructions

2x4 Blocked Stringers: Follow AFPA. Fasten treads with 2 - #8 screws or 2 – 8d nails

Head Mounting Systems

Solid dropped header with variable pitch hangers

Stringers cut 1 riser short of finish deck level

Solid, supported header / beam mounted beneath 'rim' board

Variable pitch hangers mount each stringer to header / beam

Rim joist with Variable pitch hangers

Stringers cut to match finish deck level

Variable pitch hangers mount each stringer to rim board

Through bolt to 4x4

Can use with either top tread flush with finish deck level OR dropped one riser

2 - 2 ½ in. bolts through rim board

2 – 2 ½ in. bolts through each stringer

What not to do

Regular joist hanger with notch,

Angle brackets mounted on side of stringer

Piece of plywood or 2x blocking nailed to rim board

Other???

Landing - Foot attachment

2009 IRC R311.7.5 Landings for stairways

"Every landing shall have a minimum dimension of 36 inches measured in the direction of travel."

4x4 on footing to frost or min 12 in below grade.

Cleat mounted to landing slab and notches in each stringer

Individual mounting hardware for each stringer

RESOURCES:

American Forest and Paper Asso. Prescriptive Residential Deck Construction Guide
http://www.awc.org/Publications/DCA/DCA6/DCA6-09.pdf

Professional Deck Builder magazine View Past Articles !! http://www.deckmagazine.com

PDB magazine Safety Glazing for Safer Decks http://www.deckmagazine.com/pdf/2007/0707/0707stru.pdf

PDB magazine Housed Stringers for Exterior Stairs http://www.deckmagazine.com/pdf/2007/0701/0701hous.pdf