

Residential Decks



The Minnesota State Building Code and Richfield City Code provide minimum standards for creating an environment of health and safety for all Richfield residents.

Building permits

Building permits are required for any deck that is attached or adjacent to a building, or that is 30 inches or more above grade. A complete application includes:

- A signed, completed building permit application form.
- Two copies of a site plan drawn to scale, indicating the lot dimensions, setback measurements to property lines and location and area of the proposed deck and stairs.
- Two copies of plans drawn to scale, including the following information:
 - a. Size and depth of footing
 - b. Size and spacing of posts with connectors to post and beams
 - c. Type of lumber
 - d. Size of beams
 - e. Size and spacing of joists
 - f. Type of deck boards used
 - g. Height of deck from grade
 - h. Detail flashing and house connection
 - i. Height and design of guards and spindles
 - j. Size of deck and if stairs are attached
 - k. Distance to property lines

Inspections

- Call to schedule a footing inspection after holes are dug but prior to placing concrete, a framing inspection when deck is less than 36" above grade and a final inspection when deck is complete. Call (612) 861-9860.
- Before digging, call the Gopher State One Call excavation notification center at (651) 454-0002 to locate utilities. All public utilities (gas, electric, phone, cable TV, etc.) will be located free of charge.

Setbacks

Decks must be setback the following distances from the property line:

	R District	R-1 District
Front yard	30	30
Rear yard	25	25
Side yard (interior)	5	10
Side yard (street side)	12	15

[See next page for setback exceptions]

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Exceptions:

A deck may extend into the setback area if it meets the following size requirements:

- Front and rear yards -- deck extends 6 feet or less
 - deck is no more than 30 inches off the ground
 - deck is no closer than 24 feet from the front property line

- Side yards
 - deck extends 36 inches or less
 - deck is no more than 30 inches off the ground
 - deck is no closer than 4 feet from the property line

Frost Footings

Footings must be at least 42 inches deep, flared to 12 inches at the bottom. (Note: Diameter of footings must be designed adequate for loads and future porch additions). See footing size chart of this handout.

Required Wood

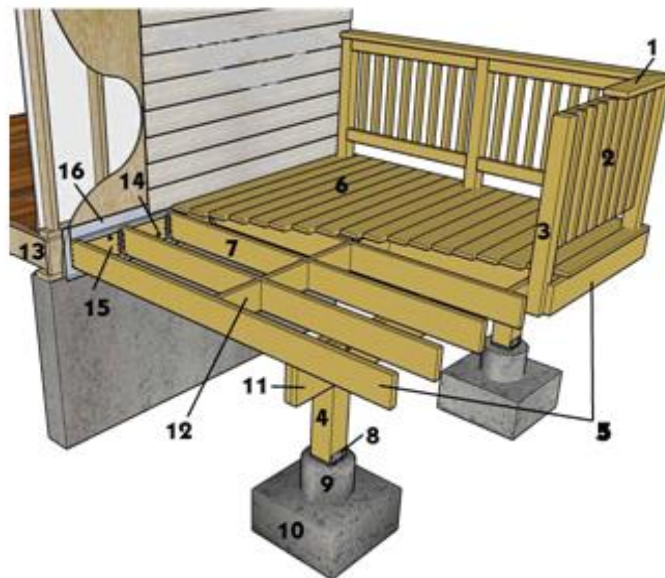
All wooden members of decks exposed to the weather must be approved pressure-preservative-treated or wood of natural resistance to decay (heartwood, or redwood, or cedar). Embedded material shall be suitable for ground contact use and identifiable at the framing inspection.

Flashing

All connections between deck and dwelling must be waterproofed. Any cuts in exterior wall finish must be flashed with approved flashing.

TERMINOLOGY

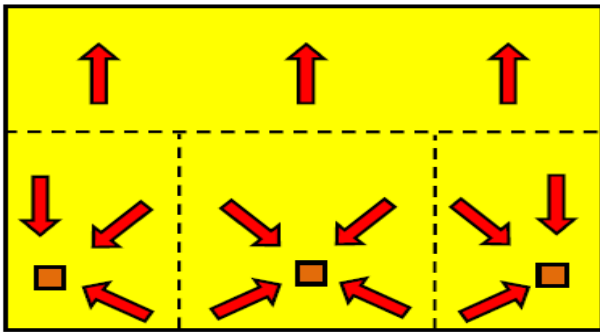
1. RAIL TOP CAP
2. BALLUSTERS
3. RAIL POST
4. SUPPORT POST
5. RIM OR BAND JOIST
6. DECKING
7. JOISTS
8. POST BASE CONNECTOR
9. PIER
10. FOOTING
11. DROP BEAM
12. BLOCKING
13. HOUSE JOIST
14. ½" BOLTS
15. LEDGER BOARD
16. FLASHING



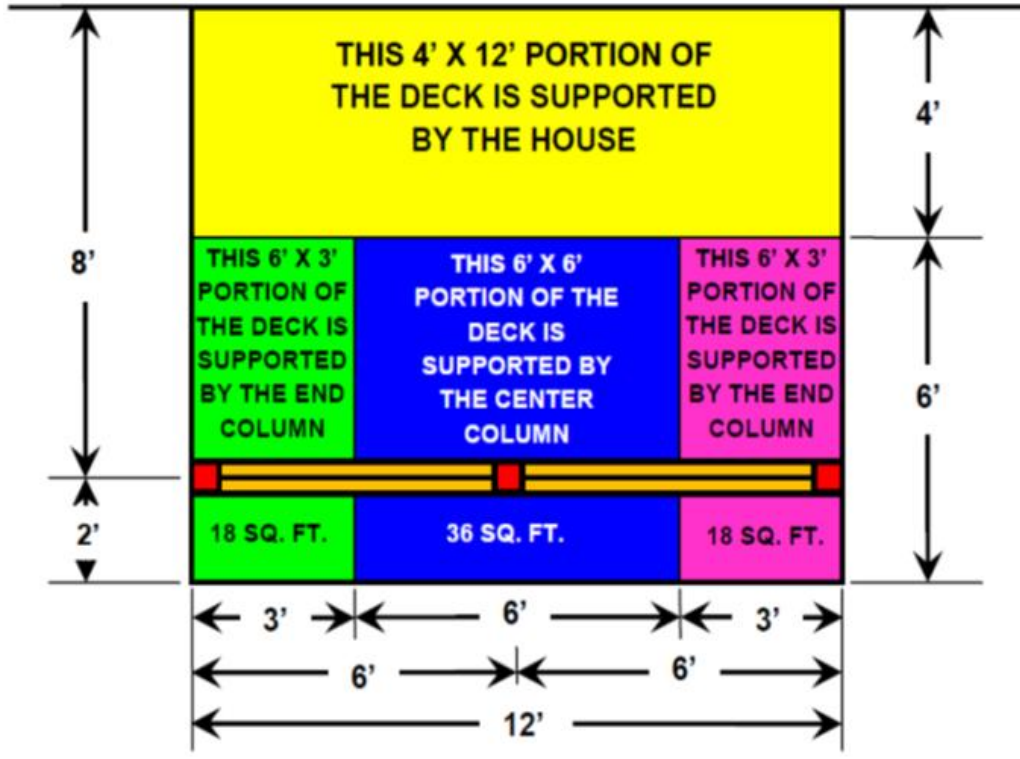
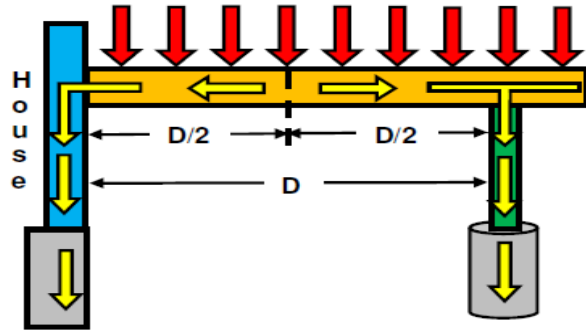
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UNDERSTANDING LOAD PATHS



Loads are assumed to be uniform across the floor



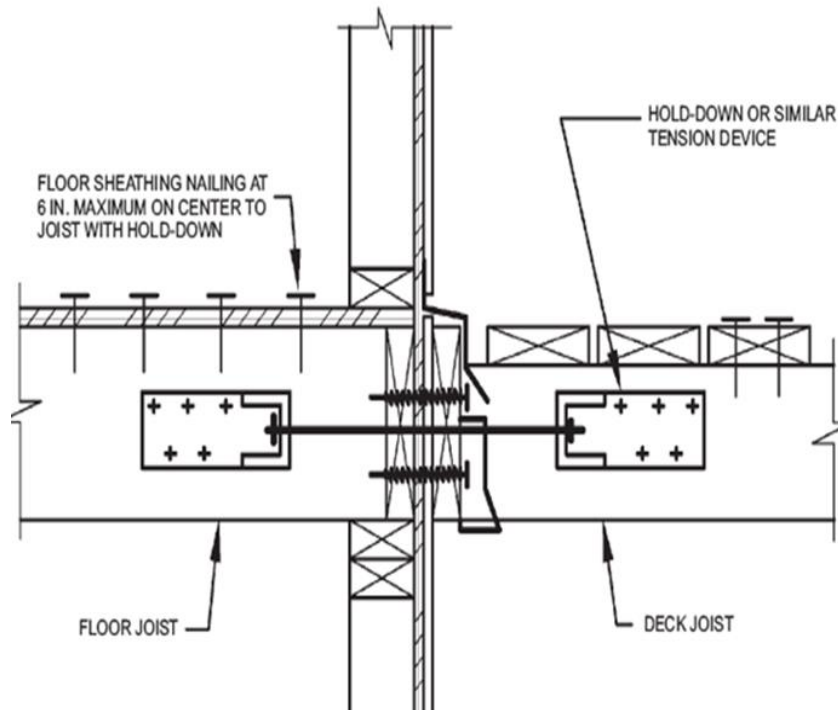
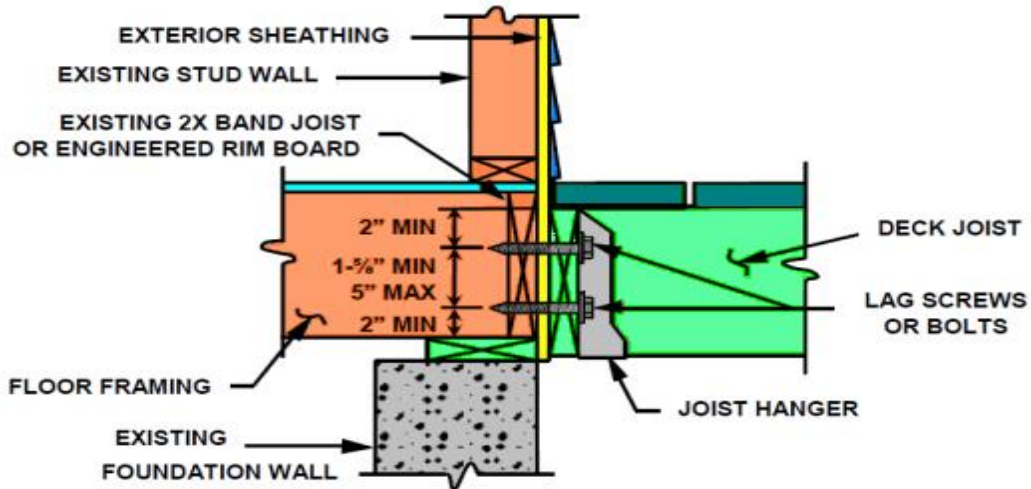
Calculated load capacity of Round footing size for 2000 PSF soil bearing capacity

Dia. inch	12	13	14	15	16	17	18	20	24
Sq. inch	113.10	132.73	153.94	176.72	201.06	226.98	254.47	314.16	452.39
Sq. feet	0.79	0.92	1.07	1.23	1.40	1.58	1.77	2.18	3.14
Bearing Capacity	1571	1844	2138	2454	2793	3153	3534	4363	6283
Footing Thickness	8	8	8	8	12	12	12	12	12

Design of 40 pounds per square feet (psf) live loads and 10 psf dead load, L/360 deflection multiplied by square foot of deck area to size footings

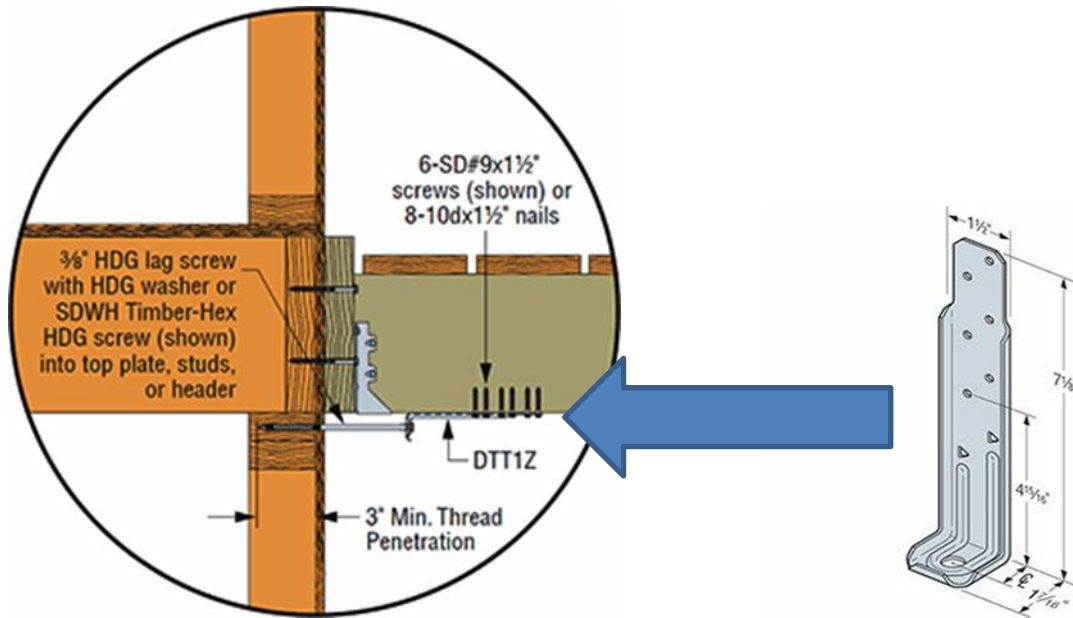
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**POSITIVELY ANCHORED FOR VERTICAL LOADS
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS**



EXAMPLE OF DECK ATTACHMENT FOR LATERAL LOADS

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ALTERNATE EXAMPLE OF LATERAL DECK LOAD CONNECTOR

Where decks are supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. This attachment shall not be accomplished by the use of toenails or nails subject to withdrawal.

There may be other alternate designs available but will need to be specified on the plans and reviewed for approval.

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TABLE R507.2
FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER AND
A 2-INCH-NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST^{c, f, and g}
(Deck live load = 40 psf, deck dead load = 10 psf)

JOIST SPAN	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
Connection details	On-center spacing of fasteners^{d and e}						
½ inch diameter lag screw with 15/32 inch maximum sheathing ^a	30	23	18	15	13	11	10
½ inch diameter bolt with 15/32 inch maximum sheathing	36	36	34	29	24	21	19
½ inch diameter bolt with 15/32 inch maximum sheathing and ½ inch stacked washers ^{b, h}	36	36	29	24	21	18	16

- a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
 b. The maximum gap between the face of the ledger board and face of the wall sheathing shall be ½ inch.
 c. Ledgers shall be flashed to prevent water from contacting the house band joist.
 d. Lag screws and bolts shall be staggered in accordance with Section R507.2.1.
 e. Deck ledger shall be minimum 2 × 8 pressure-preservative-treated No. 2 grade lumber, or other approved materials as established by standard engineering practice.
 f. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1-inch-thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.
 g. A minimum 1 × 9½ Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2-inch nominal band joist.
 h. Wood structural panel sheathing, gypsum board sheathing or foam sheathing not exceeding 1 inch in thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be 1 inch.

TABLE 507.2
PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS
MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS

	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger^a	2 inches^d	¼ inch	2 inches^b	1 ⅝ inches^b
Band Joist^c	¾ inches	2 inches	2 inches^b	1 ⅝ inches^b

- a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.2.1(1).
 b. Maximum 5 inches.
 c. For engineered rim joists, the manufacturer's recommendations shall govern.
 d. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.2.1(1).

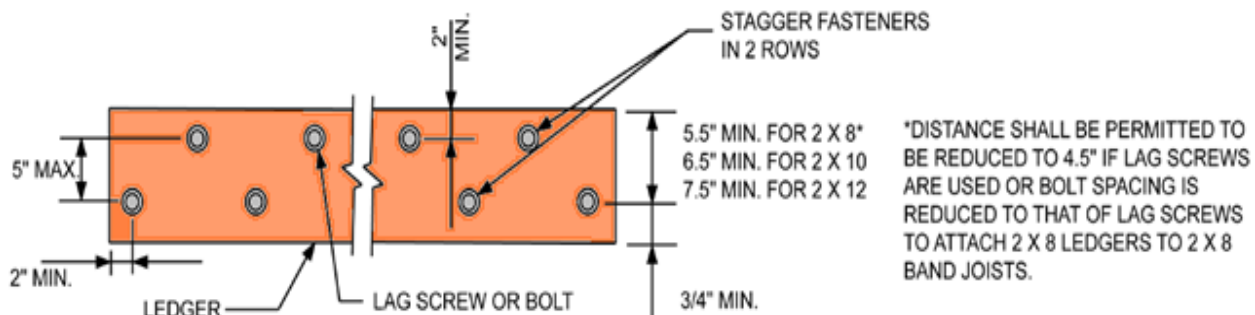


FIGURE R507.2.1(1)
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS

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BEAMS

BEAM SPANS (Wet Service) (Center of one column to center of next) (Source AF&PA; rev. 8-17-10)								
Species	Beam Size	Joist Spans						
		6'	8'	10'	12'	14'	16'	18'
Southern Pine	2-2X6	7'1"	6'2"	5'6"	5'0"	4'8"	4'4"	4'1"
	2-2X8	9'2"	7'11"	7'1"	6'6"	6'0"	5'7"	5'3"
	2-2X10	11'10"	10'3"	9'2"	8'5"	7'9"	7'3"	6'10"
	2-2X12	13'11"	12'0"	10'9"	9'10"	9'1"	8'6"	8'0"
	3-2X6	8'7"	7'8"	6'11"	6'3"	5'10"	5'5"	5'2"
	3-2X8	11'4"	9'11"	8'11"	8'1"	7'6"	7'0"	6'7"
	3-2X10	14'5"	12'10"	11'6"	10'6"	9'9"	9'1"	8'7"
	3-2X12	17'5"	15'1"	13'6"	12'4"	11'5"	10'8"	10'1"
Cedar, Redwood, Ponderosa Pine	2-2X6	5'5"	4'8"	4'2"	3'10"	3'6"	3'1"	2'9"
	2-2X8	6'10"	5'11"	5'4"	4'10"	4'6"	4'1"	3'8"
	2-2X10	8'4"	7'3"	6'6"	5'11"	5'6"	5'1"	4'8"
	2-2X12	9'8"	8'5"	7'6"	6'10"	6'4"	5'11"	5'7"
	3-2X6	7'4"	6'8"	6'0"	5'6"	5'1"	4'9"	4'6"
	3-2X8	9'8"	8'6"	7'7"	6'11"	6'5"	6'0"	5'8"
	3-2X10	12'0"	10'5"	9'4"	8'6"	7'10"	7'4"	6'11"
	3-2X12	13'11"	12'1"	10'9"	9'10"	9'1"	8'6"	8'1"

COLUMNS

MAXIMUM POST HEIGHT IN FEET															
SPECIES	SIZE	SQUARE FEET OF DECK SUPPORTED													
		36	48	60	72	84	96	108	120	132	144	156	165	180	192
SOUTHERN PINE	4X4	10	10	10	9	9	8	8	7	7	6	6	6	6	6
	4X6	14	14	13	12	11	10	10	9	9	8	8	8	7	7
	6X6	17	17	17	17	17	17	17	17	16	16	15	14	13	13
REDWOOD CEDAR	4X4	10	10	9	8	7	7	6	6	5	4				
	4X6	14	13	12	11	10	9	8	8	7	7	7	6	6	5
	6X6	17	17	17	17	17	16	13	7						

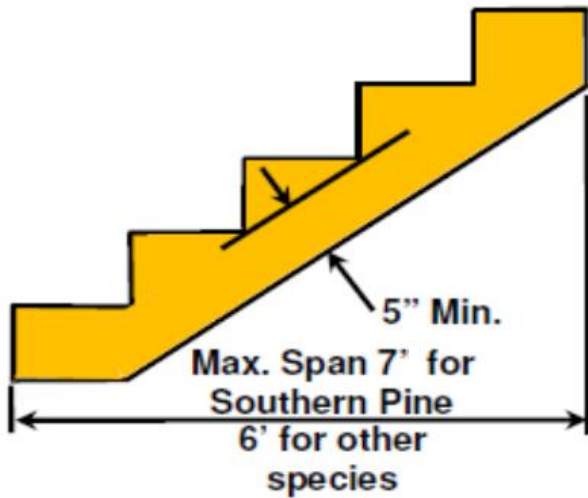
MAXIMUM JOIST SPAN

JOIST SPACING ⁱ (Source AF&PA; as amended 6/01/2013)						
JOIST SIZE	SOUTHERN PINE			WESTERN CEDAR/PONDEROSA PINE		
	12" oc	16" oc	24" oc	12" oc	16" oc	24" oc
2X6	9'11"	9'0"	7'7"	8'10"	8'0"	6'10"
2X8	13'1"	11'10"	9'8"	11'8"	10'7"	8'8"
2X10	16'2"	14'0"	11'5"	14'11"	13'0"	10'7"
2X12	18'0"	16'6"	13'6"	17'5"	15'1"	12'4"

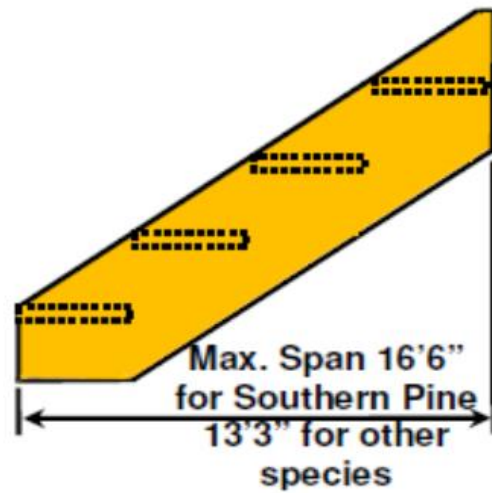
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STAIR STRINGER SPANS

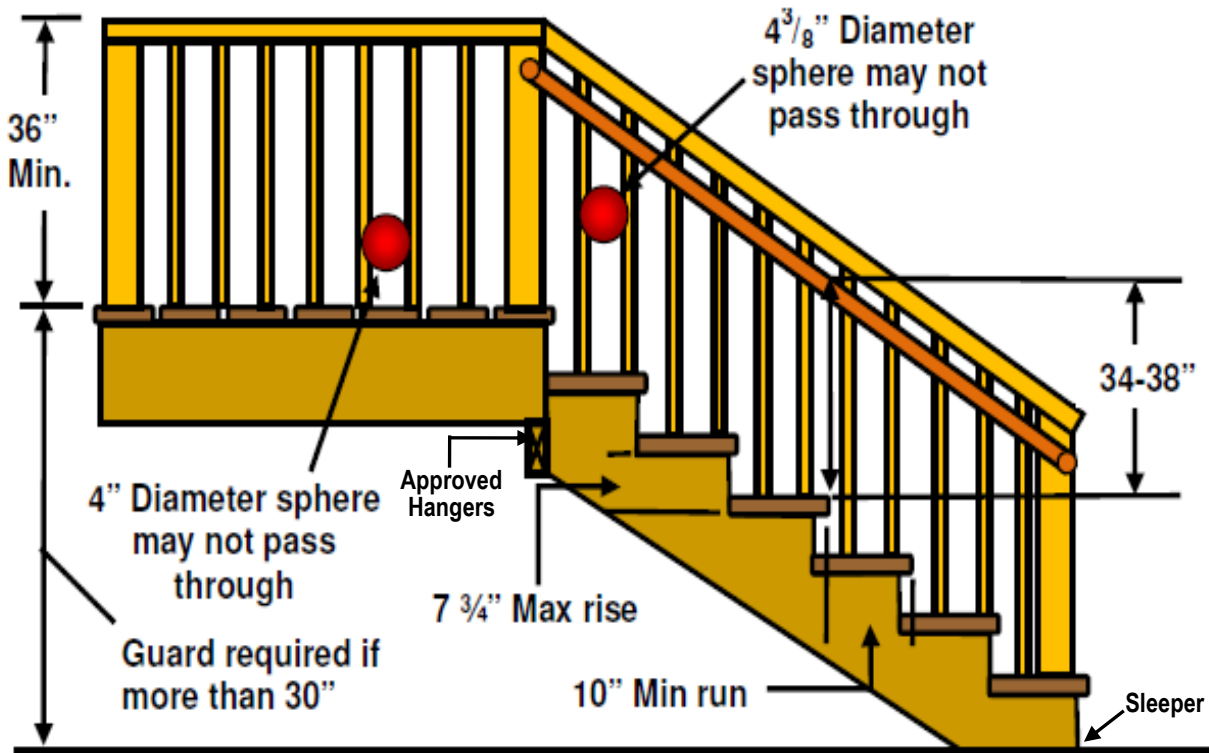
LANDINGS OR COLUMNS AND BEAMS MAY BE USED TO SHORTEN STRINGER SPANS



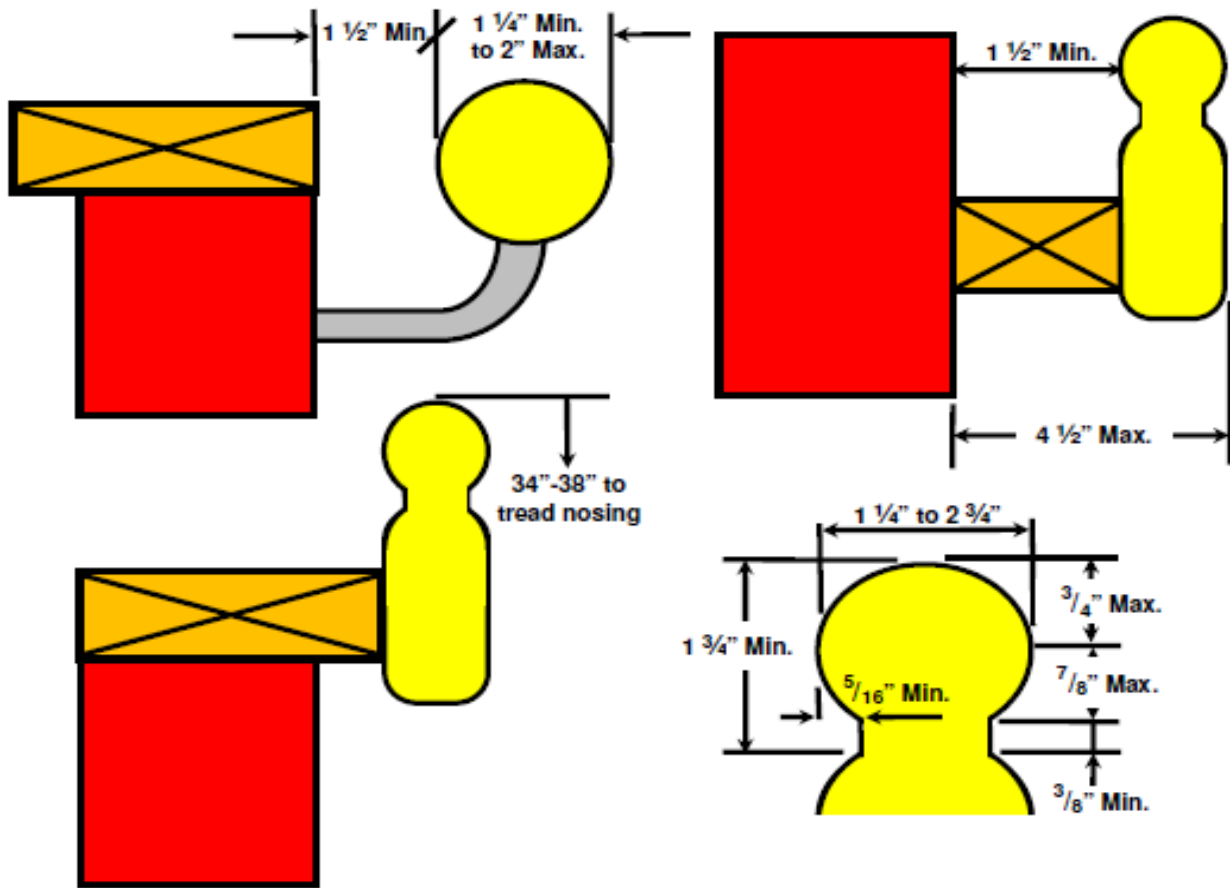
CUT STRINGER



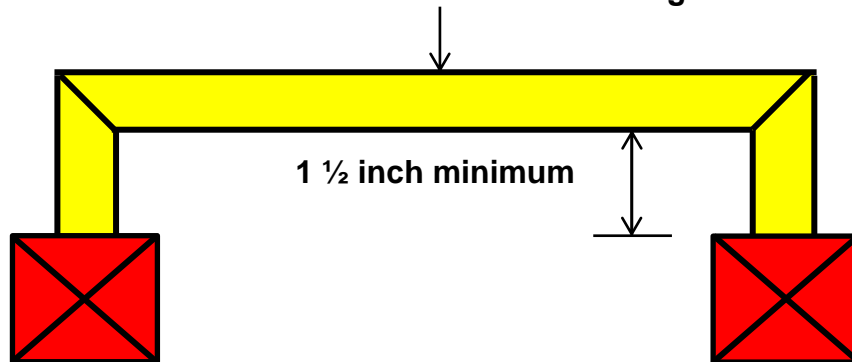
SOLID STRINGER



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Top view of handrail returned to posts from bottom to top of stair flight
Measured 34" to 38" from nosing



COMPOSITES AND OTHER DECK AND RAILING PRODUCTS

THIS HANDOUT DOES NOT COVER DECK OR RAILING PRODUCTS MADE OF COMPOSITES, ALUMINUM, STEEL, GLASS OR ANY OTHER MAN MADE PRODUCTS. THOSE PRODUCTS MAY BE USED IF THE MANUFACTURER HAS A RESEARCH REPORT FROM THE INTERNATIONAL CODE COUNCIL (ICC) OR OTHER APPROVED TESTING AGENCY AND THE PRODUCTS ARE INSTALLED IN STRICT ACCORDANCE WITH THAT REPORT. THESE PRODUCTS NEED TO BE IDENTIFIED ON THE PLANS AND REPORTS AVAILABLE TO THE INSPECTOR AT THE FRAMING INSPECTION.

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