



# DECKS

This handout is intended only as a guide and is based in part on the 2020 Minnesota State Building Code, Monticello City ordinances, and good building practice. While every attempt has been made to insure the correctness of this handout, no guarantees are made to its accuracy or completeness. Responsibility for compliance with applicable codes and ordinances falls on the owner or contractor. For specific questions regarding code requirements, refer to the applicable codes or contact the Building Department.

## BUILDING PERMITS

Building permits are required for decks with one exception: Freestanding decks up to 200 square feet, if they are not more than 30" above grade and joists bear directly on precast pier blocks without beams or posts, then no permit required.

Building permits are not required for patios made of concrete or pavers.

Building permits can be obtained from the Building Department by filling out an application and submitting your building plans. Building permits are typically processed within 7 business days from receipt of complete application/plans.

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## PERMIT EXPIRATION

If you suspend work on your deck for more than one hundred eighty (180) days from permit issuance or your last inspection, your permit may expire. If unforeseen circumstances delay construction, contact the Building Department **before** your permit expires.

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## PLAN

Your plans must depict exactly how you plan to build the deck. You must submit plans with the permit application.

Plans must be neat and be of a scale of at least  $\frac{1}{4}'' = 1'$ . Plans are reviewed for code compliance and a copy is returned to the applicant with notes to identify required corrections. **PLEASE REVIEW THE PLANS WHEN YOU PICK THEM UP SO THAT YOU WILL BE AWARE OF ANY CORRECTIONS NEEDED.**

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## INSPECTIONS

1. Call minimum 24 hours in advance for inspections.
2. Have address, permit number, and type of inspection (ex. footing) ready
3. Let scheduler know if you wish an exact time
4. Footing Inspection - Holes dug, loose material/water removed. **City approved plans and inspection card on-site.**
5. Final Inspection - All work complete and all stairs, handrails, and guards in place. **Plans and inspection card on-site. Installation instructions for composite decking on site.**
6. If work is approved, the inspector will sign the inspection card and you may proceed with the next step
7. If corrections are noted, a correction notice will be left on the site. If a re-inspection is required it will be noted on the notice.

Please do not hesitate to call the Building Department at 763-295-3060 if you have questions. If necessary, we will be happy to meet with you on the site to help resolve any concerns or problems.

## DECK PLAN DETAILS

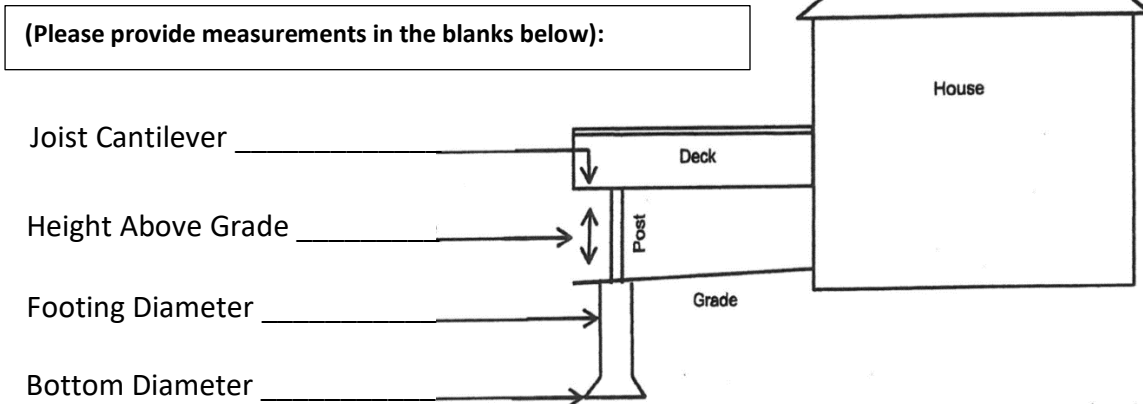
(fill in the blanks)

Deck Width: \_\_\_\_\_ Joist Length: \_\_\_\_\_

Beam Size: \_\_\_\_\_ Joist Size: \_\_\_\_\_

Post Size: \_\_\_\_\_ Joist Spacing: \_\_\_\_\_

Post Spacing: \_\_\_\_\_ Number of Posts: \_\_\_\_\_



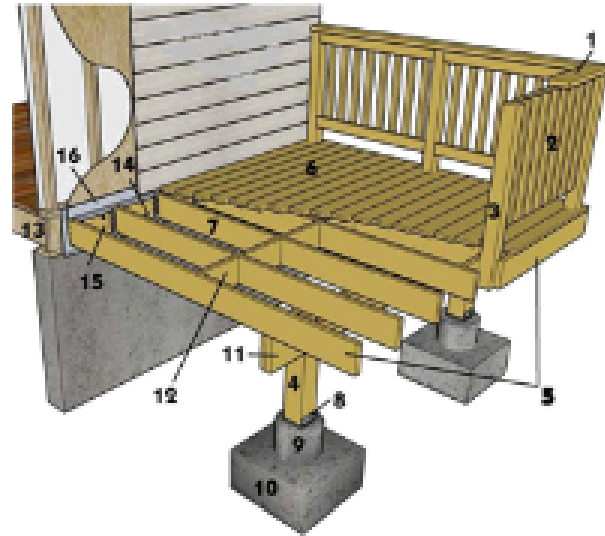
## APPLICATION CHECKLIST:

Address: \_\_\_\_\_

- | Yes                      | No                       |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 1. Is a future porch being considered?   |
| <input type="checkbox"/> | <input type="checkbox"/> | 2. Will there be a hot tub or spa on the deck?                                 |
| <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the deck attached to a house cantilever? If yes, provide special design. |
| <input type="checkbox"/> | <input type="checkbox"/> | 4. Is a guardrail required (over 30 inches above grade)?                       |
| <input type="checkbox"/> | <input type="checkbox"/> | 5. Is a handrail required on the stairs (4 or more risers)?                    |
| <input type="checkbox"/> | <input type="checkbox"/> | 6. Does the deck site plan show distance to property lines and buildings?      |
| <input type="checkbox"/> | <input type="checkbox"/> | 7. Using composite deck materials? If yes, identify _____                      |

# 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. 1/2" BOLTS
15. LEDGER BOARD
16. FLASHING



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## THINK YOU MIGHT ENCLOSE YOUR DECK IN THE FUTURE?

Deck plans are approved on the assumption that the deck will be used only as a deck for the life of the structure. Because footing sizes, setbacks, structural supports, and a host of other deck components are different for enclosed porches than for decks, it is important that you indicate on your plans the desire to convert the deck at a future date. You should then design your deck to carry future loads and meet setbacks and other rules.

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## ZONING REGULATIONS

Decks are permitted as an addition to a dwelling as a freestanding structure. Decks must be at least six feet from a side lot line and fifteen feet from a rear property line in most zoning districts. Setbacks are routinely checked as a part of the plan review and again at the time of the footing inspection. **Easements, wetland buffers and other lot restrictions may require greater setbacks than permitted by the zoning ordinance.** The most restrictive setback applies. Questions regarding zoning regulations should be directed to the Building Department at 763.295.3060.

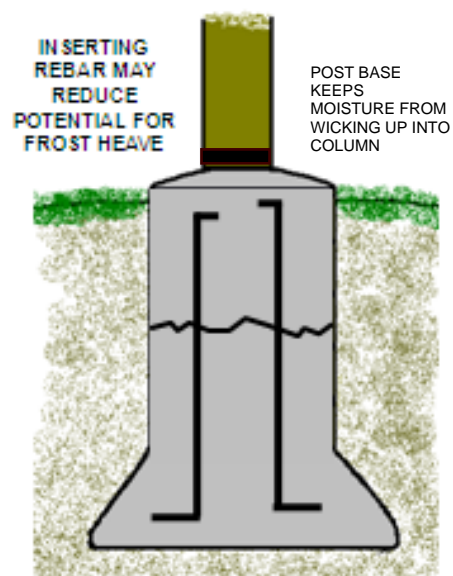
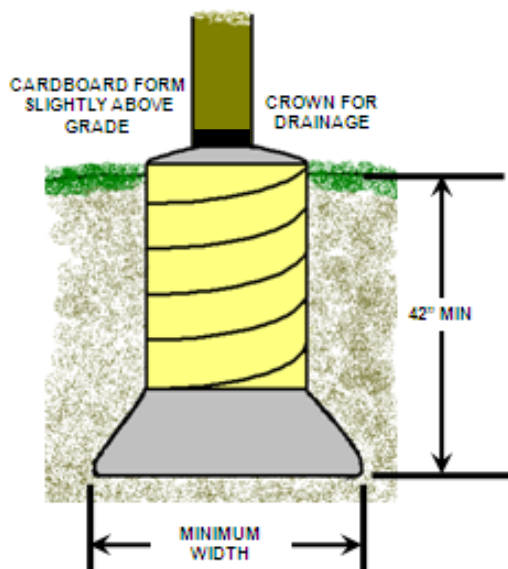
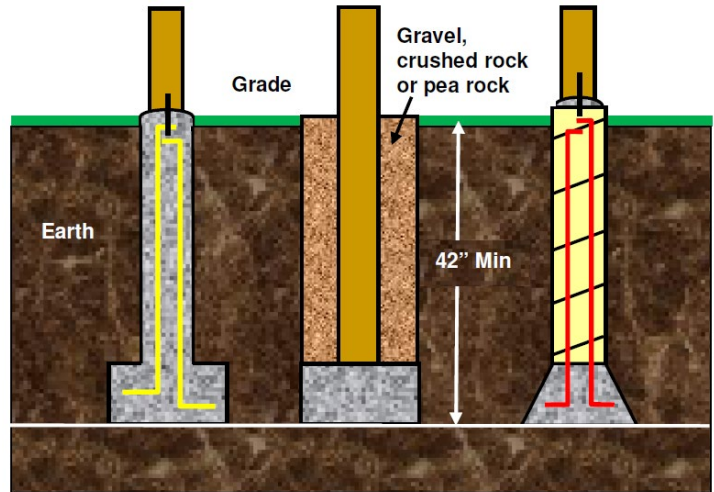
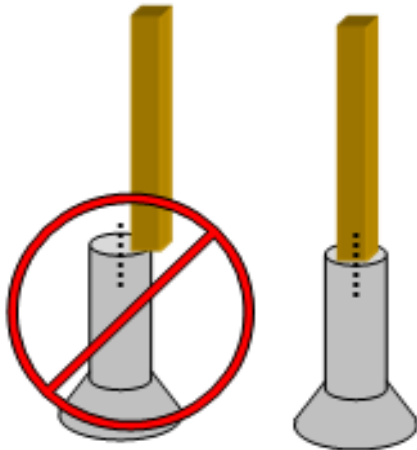
## SURVEY MARKER EXAMPLES



# Footings

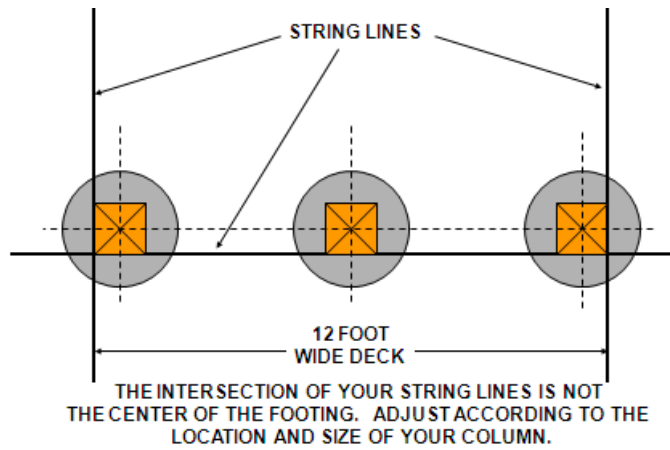
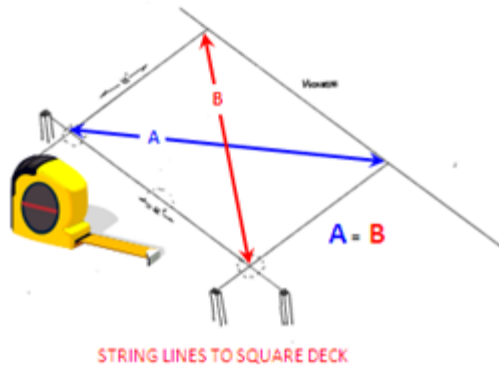
Required footing sizes are determined by calculating the area of the deck supported by each footing. Loads shall be assumed to be equally shared between the supporting elements.

**THE REQUIRED AREA OF THE COLUMN SHOULD FULLY BEAR ON THE FOOTING**

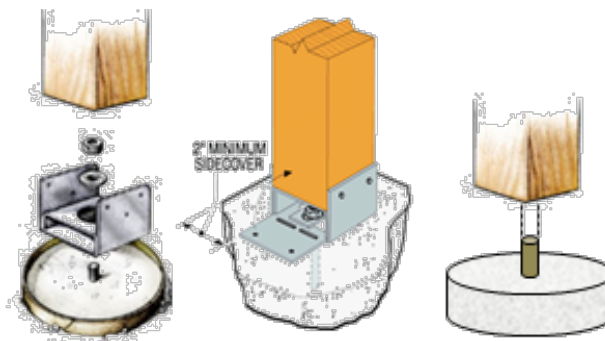


Footings supporting a 4x4 column must be not less than 6-inch diameter. Post footings supporting columns larger than 4x4 must be 8-inch diameter or larger. The bottom of post footings may be “belled” to achieve the desired minimum bearing area. The base of the footing must be at least 42 inches below finished grade. Rebar is recommended. Center the column on the footing secured by a pin or connector. Posts embedded in the ground must be 60% C.C.A. or equal. Using a cardboard tube will simplify holding the top of the footing above finished grade to provide protection of the wood post from lawn mowers and trimmers.

## WHERE DO I PUT MY FOOTINGS?



## ANCHORING POST BASE



## DECK FRAMING

### Ledger Board

*Make sure the ledger is securely attached to the dwelling. Install flashing at top, caulk sides and bottom.*

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 <sup>c, f, and g</sup> (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'
<b>Connection details</b>	<b>On-center spacing of fasteners<sup>d and e</sup></b>						
1/2 inch diameter lag screw with 15/32 inch maximum sheathing <sup>a</sup>	30	23	18	15	13	11	10
1/2 inch diameter bolt with 15/32 inch maximum sheathing	36	36	34	29	24	21	19
1/2 inch diameter bolt with 15/32 inch maximum sheathing and 1/2 inch stacked washers <sup>b, h</sup>	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 1/2 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 x 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 x 9 1/2 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.

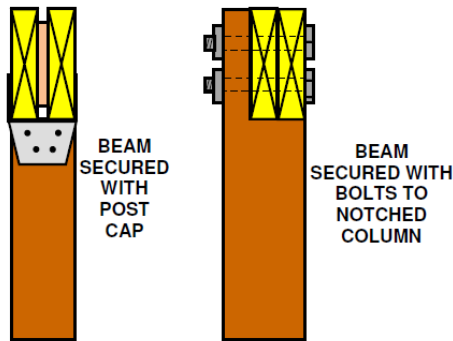
- Capacity of lag or carriage bolts shall not exceed 400 lb's per bolt unless design provided.

# BEAMS

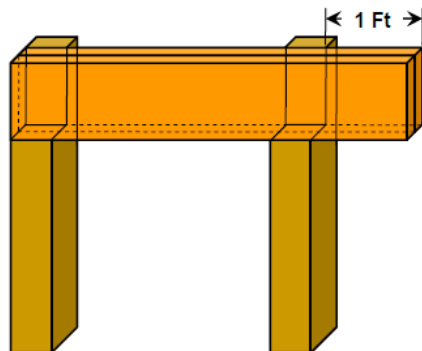
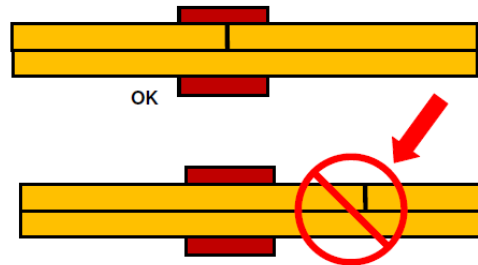
Construct beams using two or more 2 inch nominal pieces of lumber. Nail beams together using 16d nails at 16 inches o.c. along each edge of the beam. Beams should be installed with any arch or crown facing up. Attachments to columns should be with post caps designed for such use. Splices must occur over columns. MBC TABLE R507.5

BEAM SPANS (Center of one column to center of next) (Source AF&PA; rev5-19-2020)								
Species	Beam Size	Joist Spans						
		6'	8'	10'	12'	14'	16'	18'
Southern Pine	2-2X6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2-2X8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2-2X10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2-2X12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3-2X6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3-2X8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3-2X10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3-2X12	15-3	13-3	11-10	10-9	10-0	9-4	8-10
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"

METHODS OF ATTACHING BEAM TO COLUMN



BEAM SPLICES

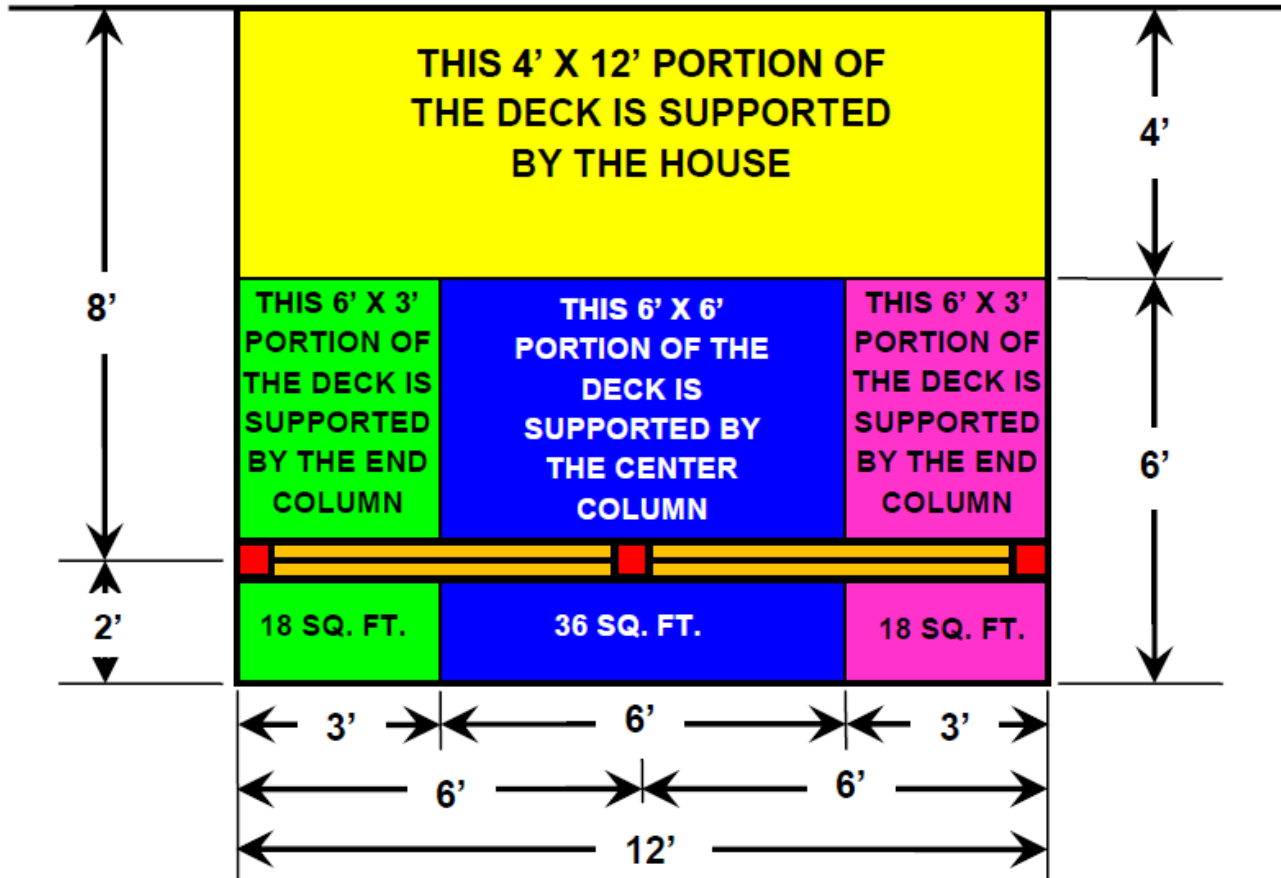


BEAM CANTILEVERS ARE LIMITED TO THE ADJACENT BEAM'S SPAN DIVIDED BY 4

## COLUMNS

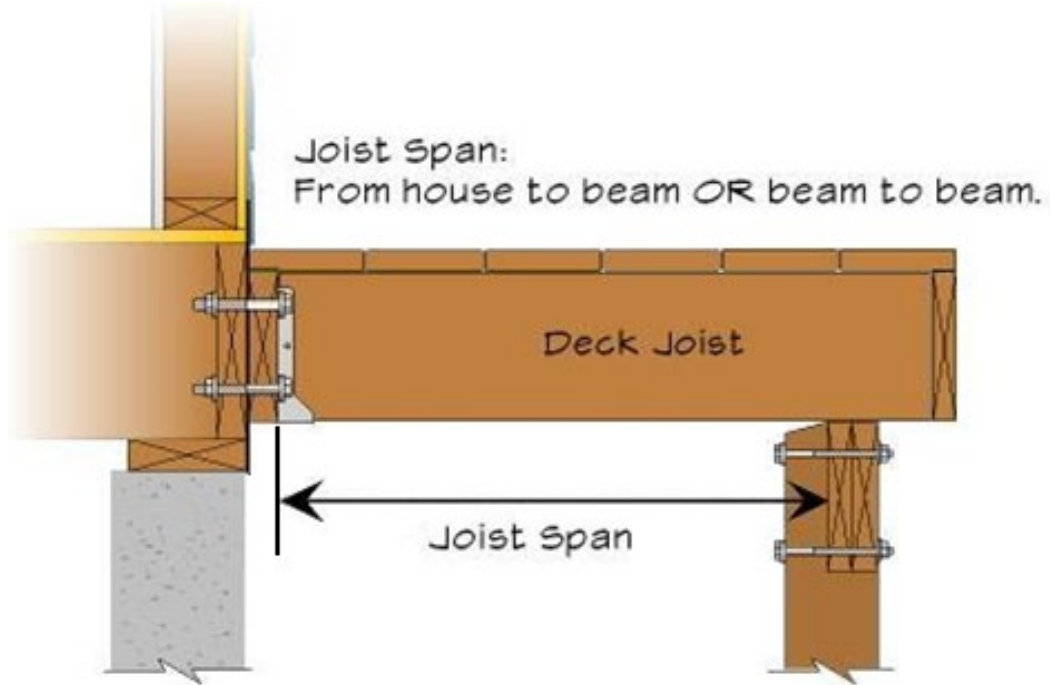
DECK POST SIZE	MAXIMUM HEIGHT
4X4	6-9
4X6	8
6X6	14
8X8	14

MEASURED TO THE UNDERSIDE OF THE BEAM.



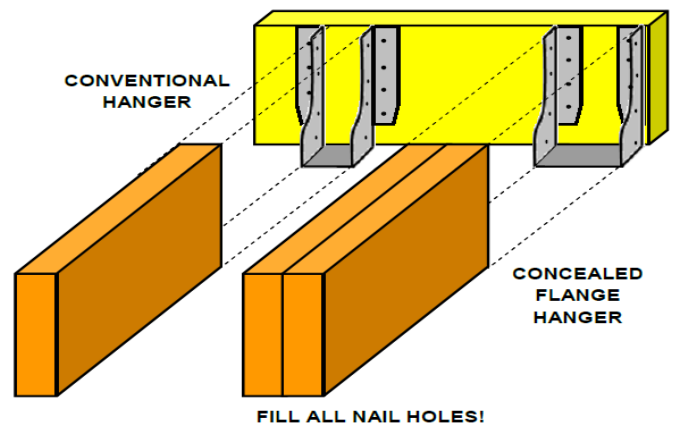
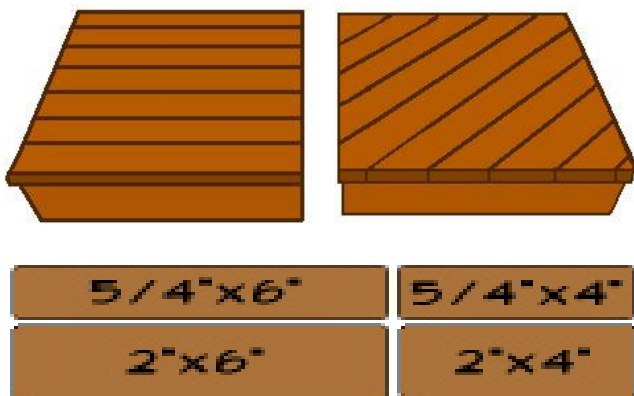
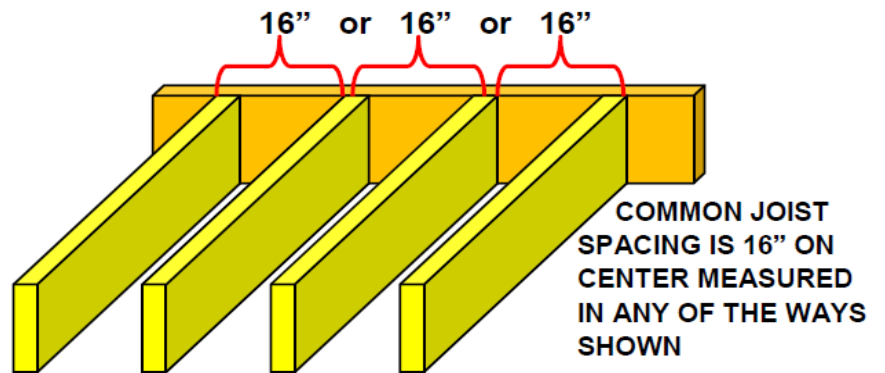
## JOIST SPANS

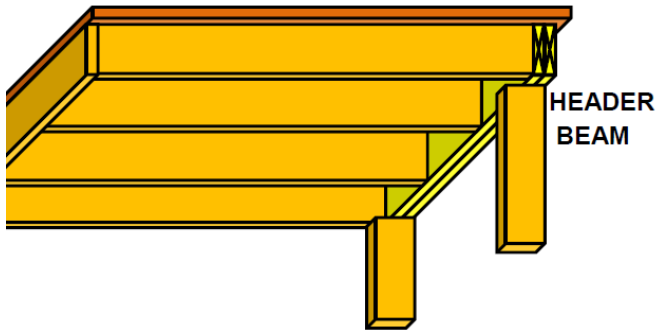
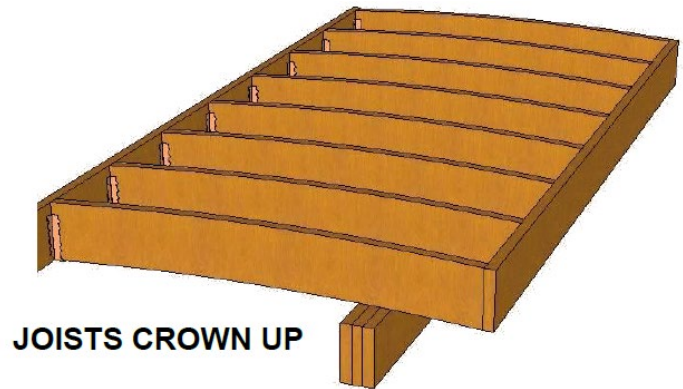
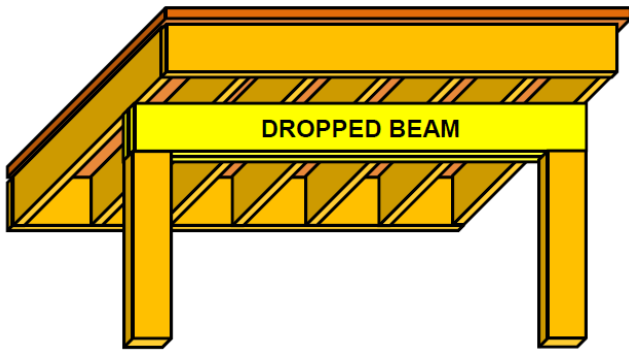
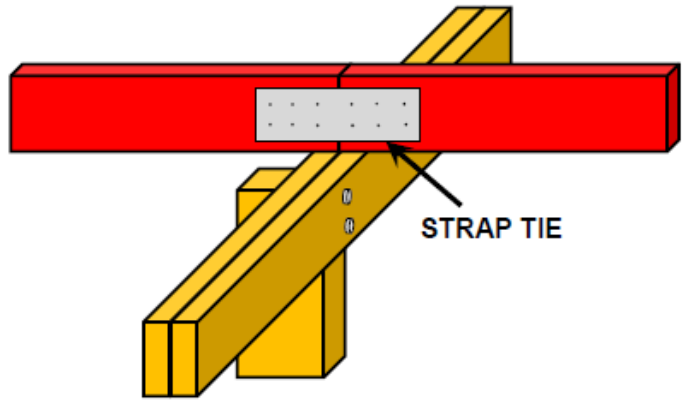
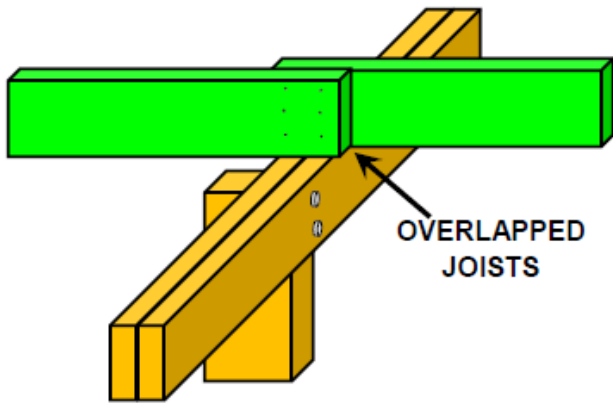
SIZE	SOUTHERN PINE		
	12" oc	16" oc	24" oc
2X6	9-11	9-0	7-7
2X8	13-1	11-10	9-8
2X10	16-2	14-0	11-5
2X12	18-0	16-6	13-6



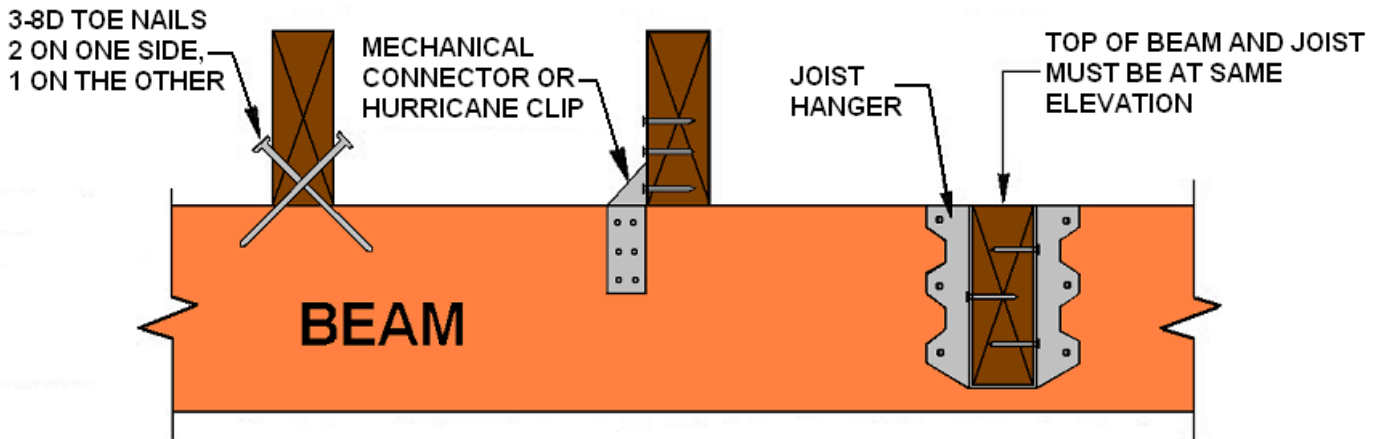
## JOIST DETAILS

JOIST SPACING IS DETERMINED BY THE TYPE OF DECKING USED. 16" O.C. SPACING MUST BE USED WITH 5/4 DECKING OR WHEN 2X6 OR 2X4 DECKING IS USED AT A 45° ANGLE. 12" O.C. SPACING REQUIRED WHEN 5/4 DECKING IS USED AT A 45° ANGLE.

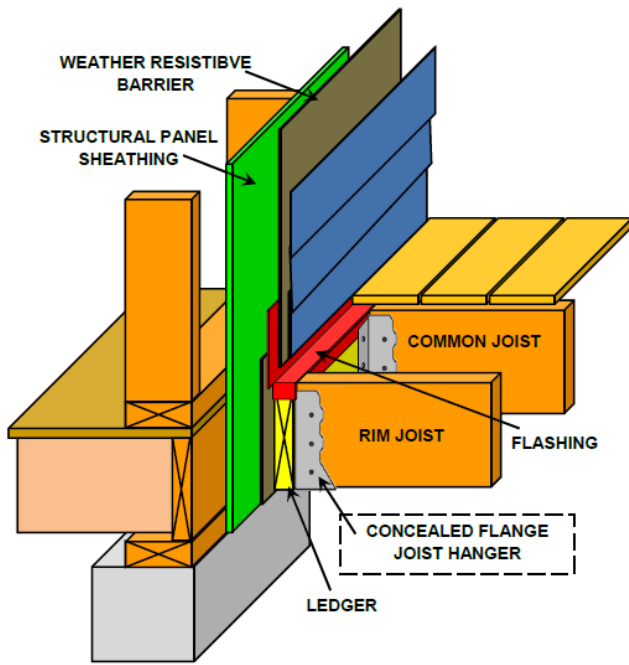




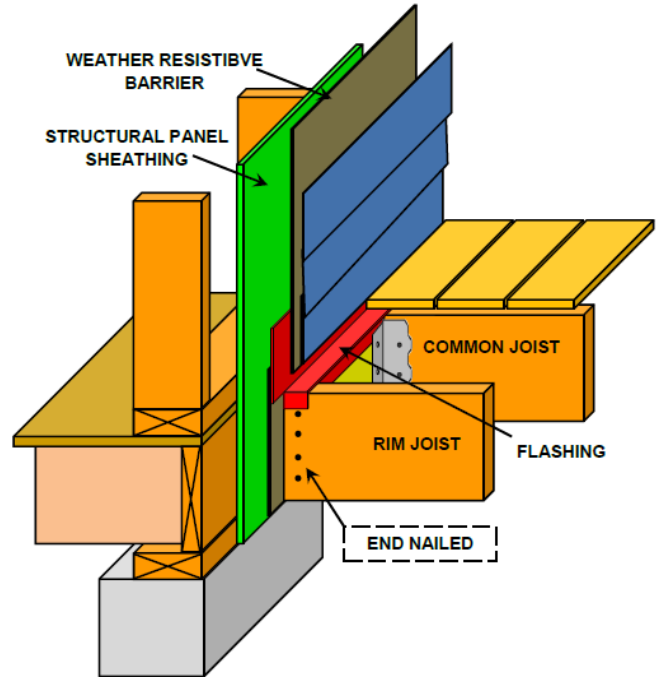
**JOIST TO BEAM ATTACHMENTS**



**RIM JOIST ATTACHED TO LEDGER WITH CONCEALED FLANGE HANGER**



**RIM JOIST ATTACHED TO LEDGER BY END NAILING**



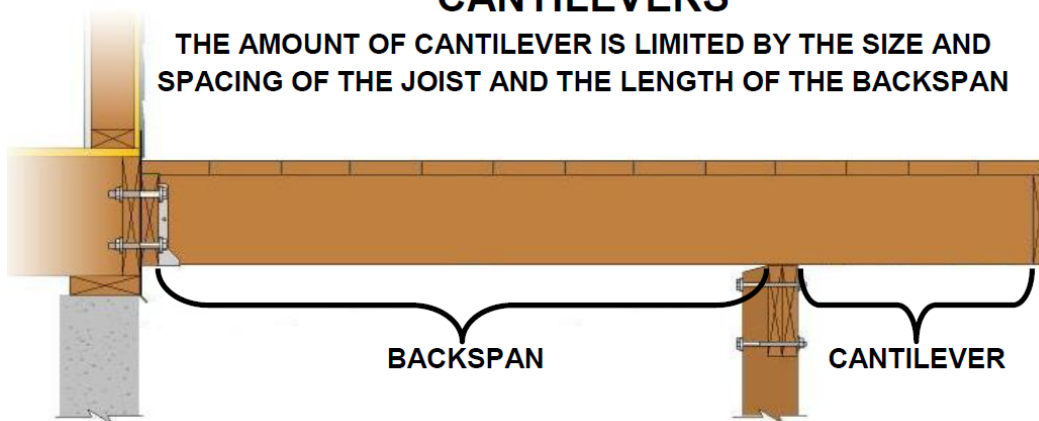
**MAXIMUM CANTILEVER SPANS FOR JOISTS WITH BACKSPAN AT LEAST 2:1**

JOIST SIZE	SPACING O.C.	MAX. CANTILEVER
2X8	12"	2-1
2X8	16"	2-3
2X10	12"	3-4
2X10	16"	3-6
2X10	24"	2-10
2X12	16"	4-6
2X12	24"	4-2

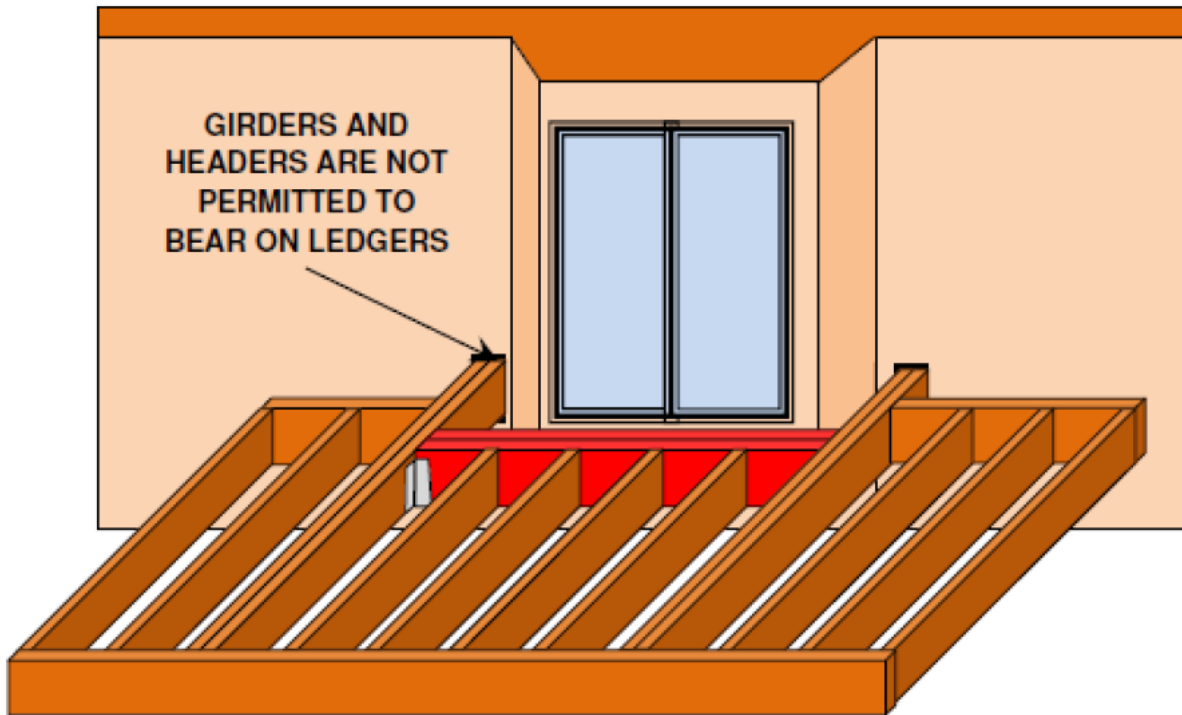
Joists must bear on a beam, ledger strip, or joist hangers. Joist hangers must be installed in accordance with the manufacturer's recommendations. **Fill all nail holes in joist hangers.**

**CANTILEVERS**

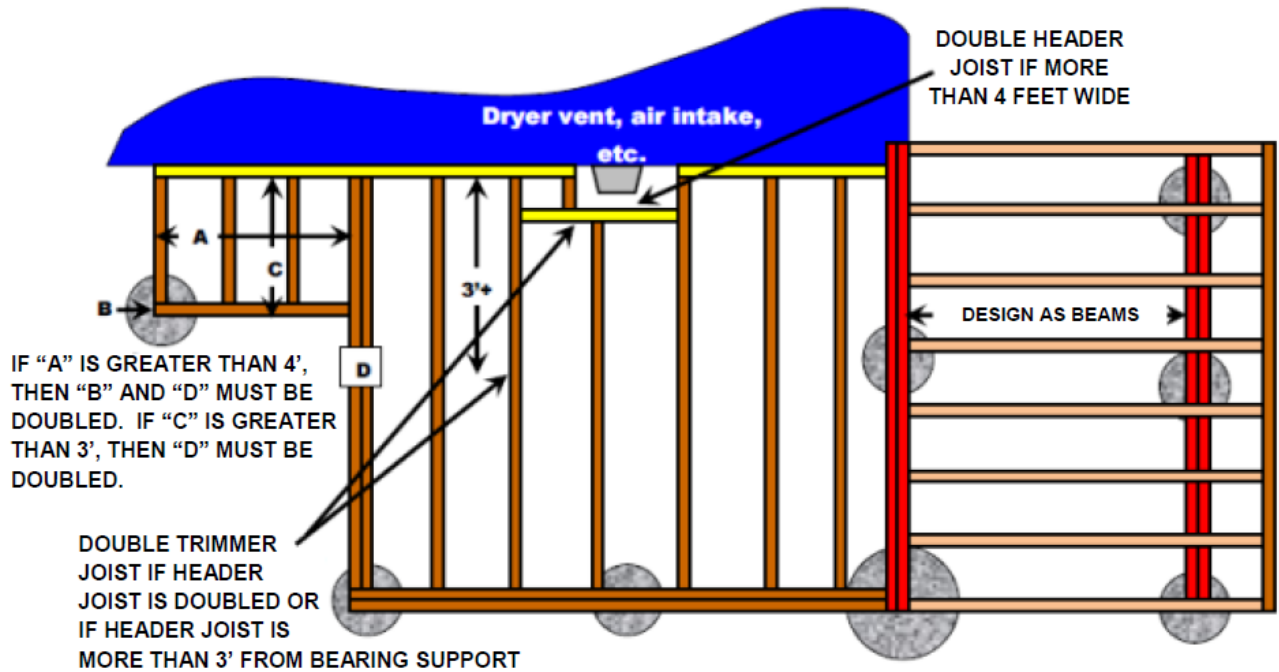
THE AMOUNT OF CANTILEVER IS LIMITED BY THE SIZE AND SPACING OF THE JOIST AND THE LENGTH OF THE BACKSPAN



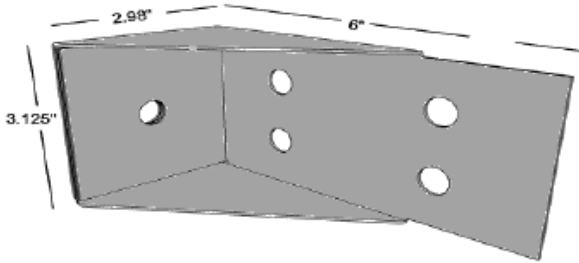
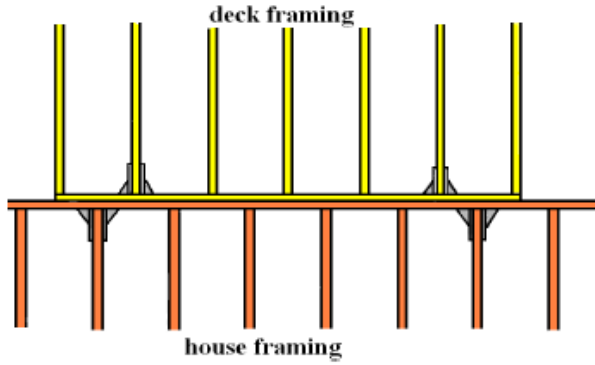
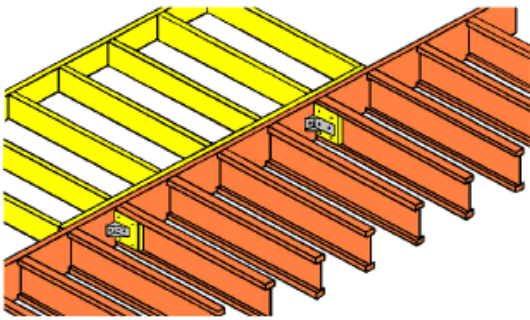
# HOUSE CANTILEVERS



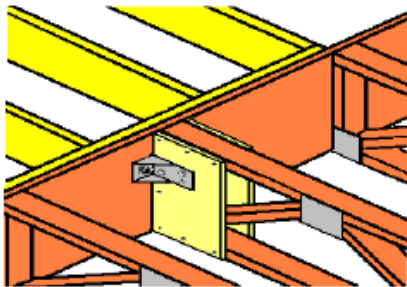
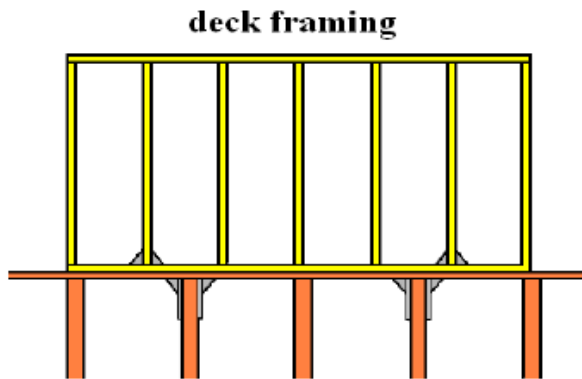
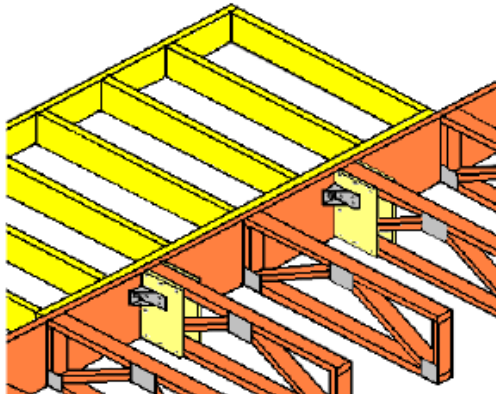
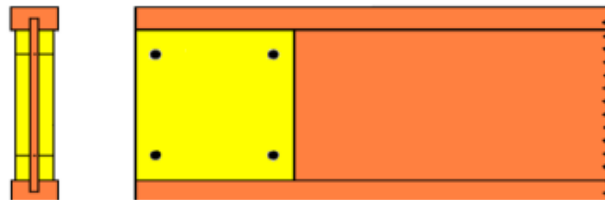
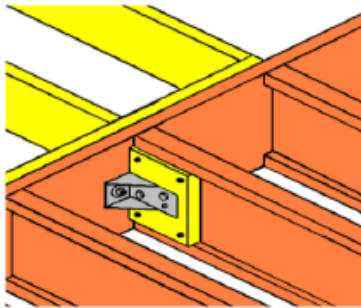
## SPECIAL FLOOR FRAMING DETAILS



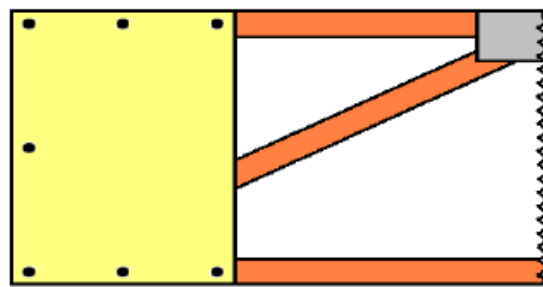
# DECK ATTACHMENTS TO I-JOIST OR TRUSS FLOOR SYSTEMS



INSTALL HARDWARE IN ACCORDANCE WITH MANUFACTURER'S INSTALL REQUIREMENTS



truss joist to rim joist & ledger



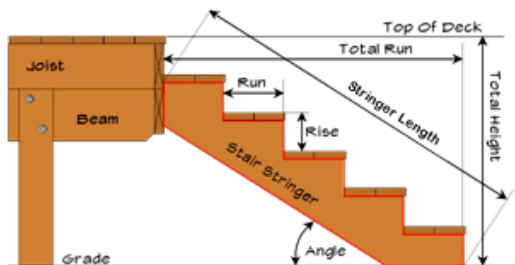
blocking plate nailed to truss joist

# STAIRS

Stairs must have a maximum rise of  $7\frac{3}{4}$  inches and a minimum run of 10 inches measured as shown. The greatest riser height within any flight of stairs shall not exceed the smallest by more than  $\frac{3}{8}$  inch. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than  $\frac{3}{8}$  inch. **Open risers are permitted provided that a 4" diameter sphere will not pass between the treads.**

Stairs must be a minimum of 36 inches wide above the handrail and 31½ inches below the handrail.

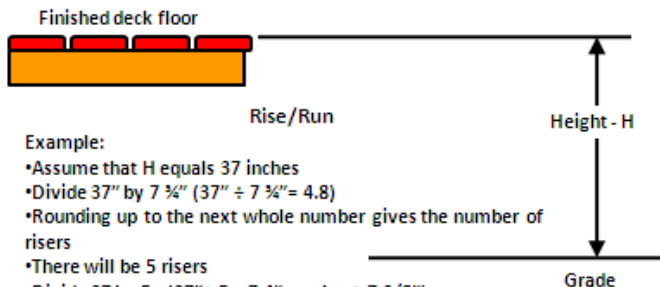
## STAIR TERMINOLOGY



Stair Basics

- The maximum riser height is  $7\frac{3}{4}$  inches
- The minimum tread run is 10 inches
- Treads and risers should be approximately equal with the largest not exceeding the smallest by more than  $\frac{3}{8}$  inch.

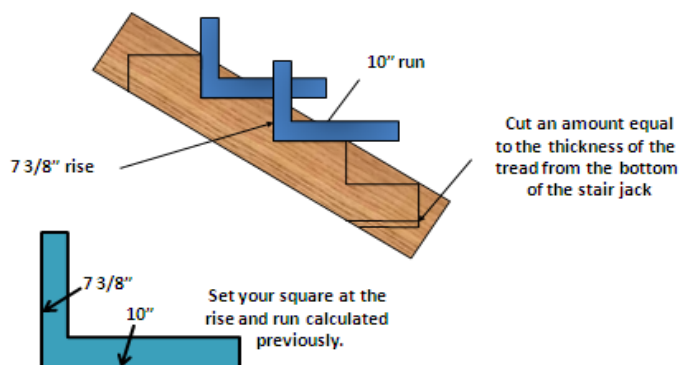
## DETERMINING RISE/RUN



Example:

- Assume that H equals 37 inches
- Divide 37" by  $7\frac{3}{4}$ " ( $37" \div 7\frac{3}{4}" = 4.8$ )
- Rounding up to the next whole number gives the number of risers
- There will be 5 risers
- Divide 37 by 5. ( $37" \div 5 = 7.4"$  or about  $7\frac{3}{8}"$ )
- Each riser will be  $7\frac{3}{8}"$
- For 5 risers there will be 4 treads
- Since each tread must be at least 10", the length of the stair from the face of the deck to the face of the bottom riser will be at least 40" ( $10" \times 4 \text{ treads} = 40"$ )

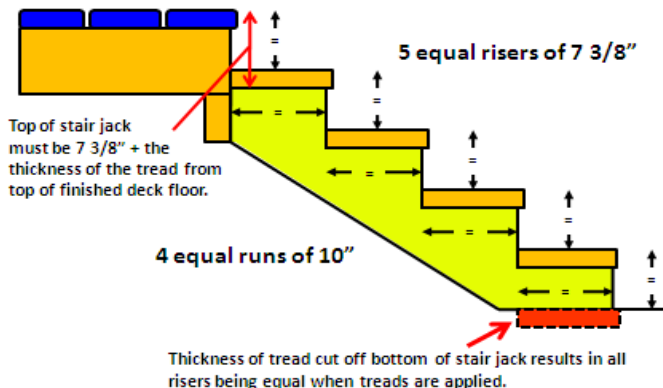
## LAYING OUT STAIR JACKS



Cut an amount equal to the thickness of the tread from the bottom of the stair jack

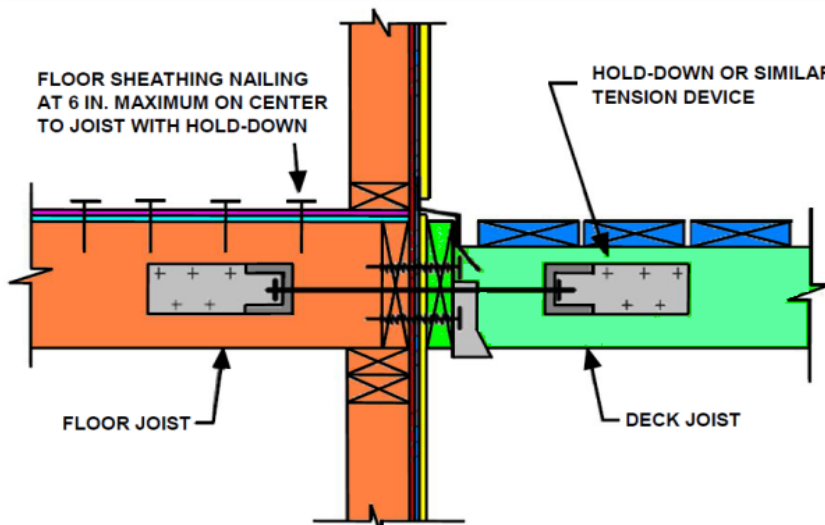
Set your square at the rise and run calculated previously.

## THE COMPLETED STAIR

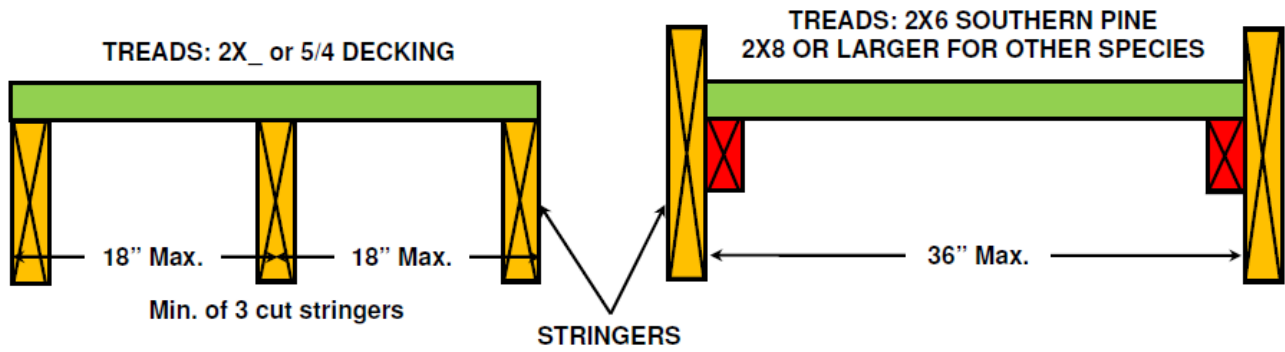


Thickness of tread cut off bottom of stair jack results in all risers being equal when treads are applied.

## HOLD-DOWN TENSION DEVICE

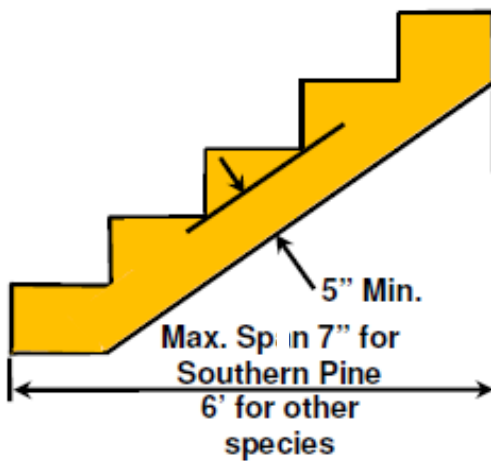


- HOLD-DOWN TENSION DEVICES MUST BE INSTALLED IN NOT LESS THAN TWO LOCATIONS PER DECK.
- EACH DEVICE MUST HAVE AN ALLOWABLE STRESS DESIGN CAPACITY OF NOT LESS THAN 1500 POUNDS.

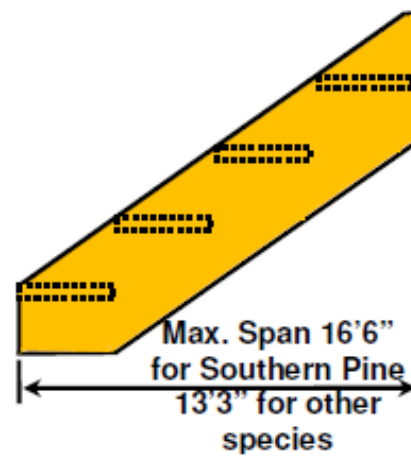


## STAIR STRINGER SPANS

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

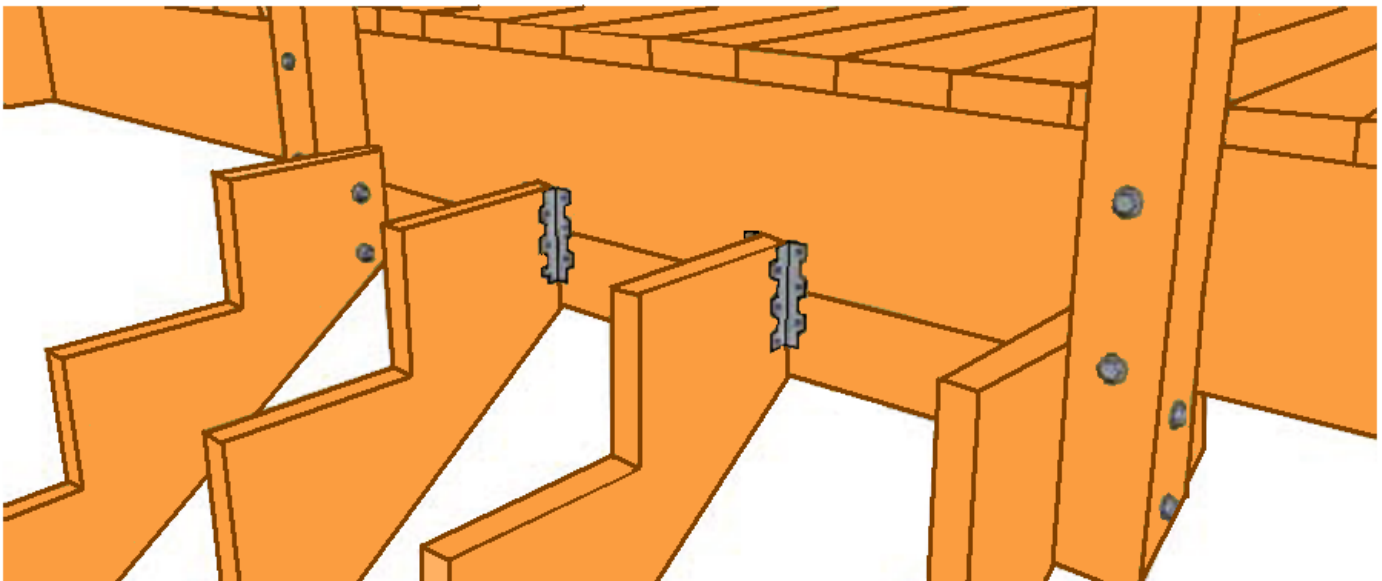


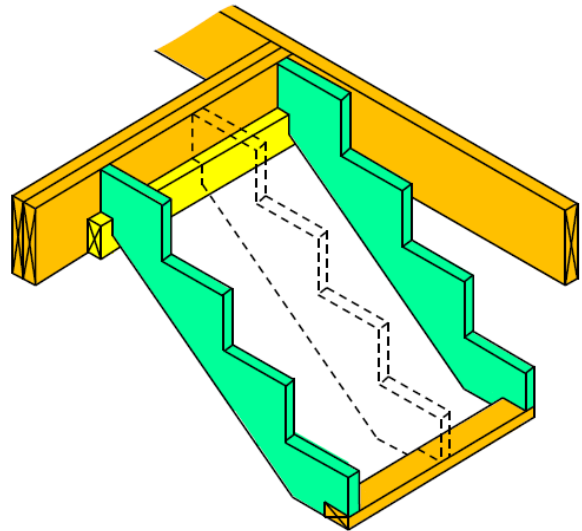
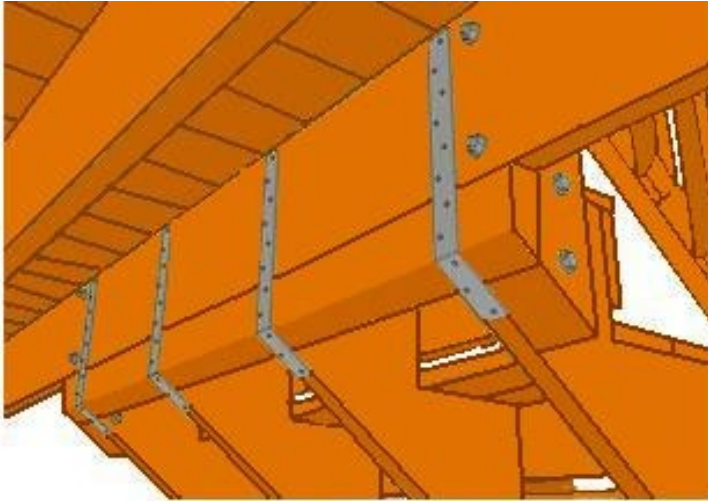
CUT STRINGER



SOLID STRINGER

## STAIR ATTACHMENT OPTIONS





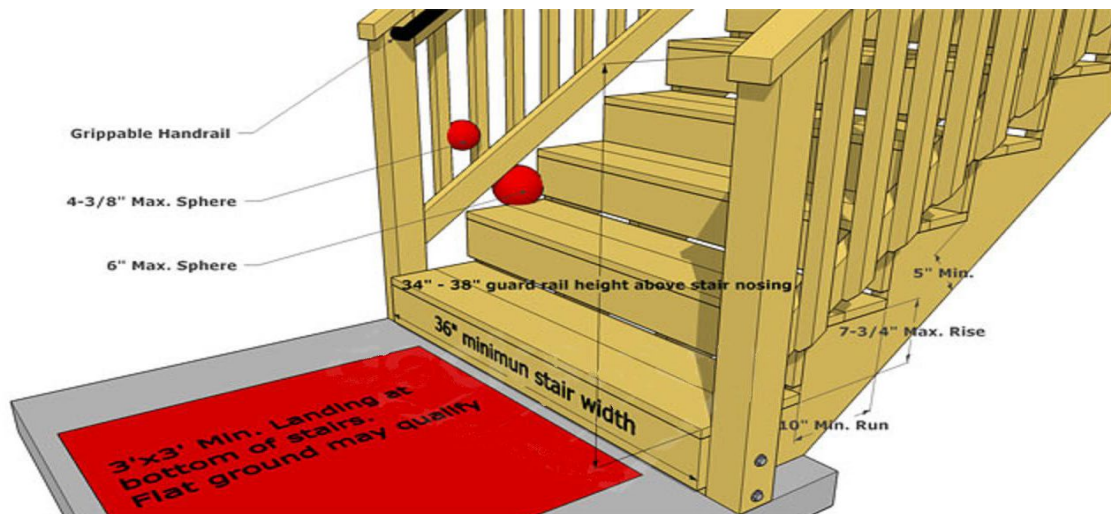
## GUARDS AND HANDRAILS

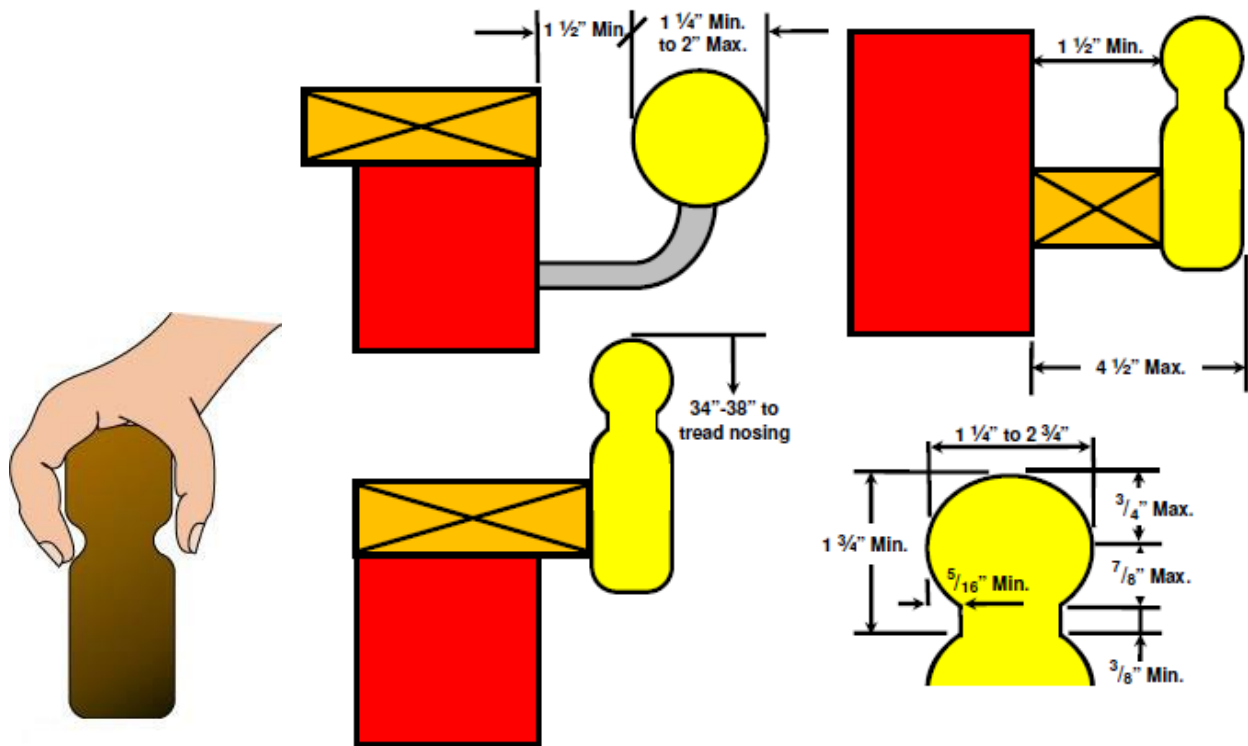
Guards and handrails must be provided as shown on the following illustrations. Guards must continue down stairs where the stair is more than 30 inches above grade. The height of guards on stairs must be 34 inches minimum.

***Handrails must be provided on at least one side when there are four or more risers. Handrails must have returns on each end or terminate in a newel post.*** Other handrail shapes having an equivalent gripping shape may be used with prior approval of the Building Department.

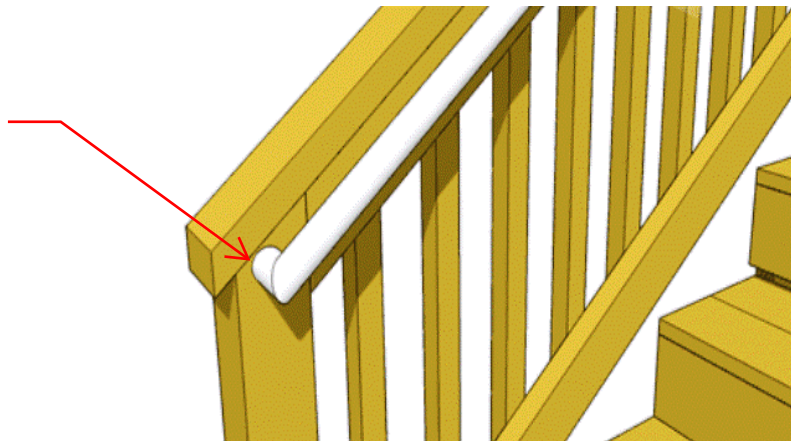
***Handrails must be continuous for the entire length of the stairs and may not be interrupted by newel posts except at landings.***

**Hand rails and guards must be designed to support a 200 lb load applied in any direction at any point along the top of the guard or rail.** The bottoms of the stringers should rest on a sound foundation such as a gravel bed, a concrete pad, pavers, or similar.



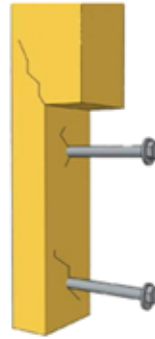
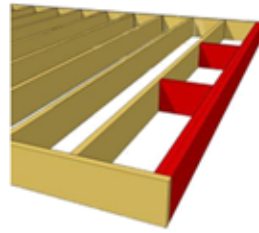


RETURN  
ENDS OF  
HANDRAIL  
TO POST

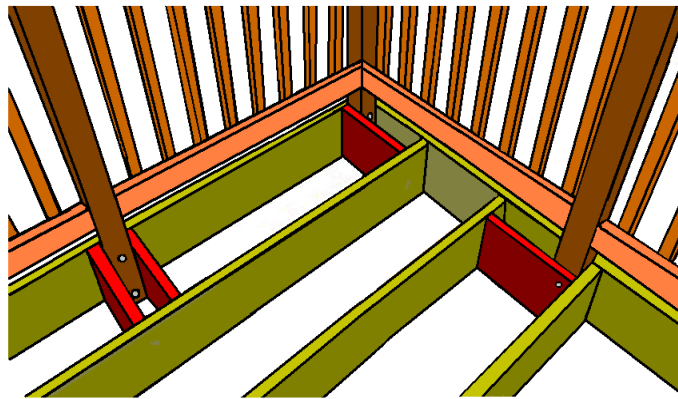


**HANDRAILS MUST RETURN TO A NEWEL POST  
AND BE CONTINUOUS WITHOUT INTERRUPTION  
FOR THE LENGTH OF THE FLIGHT**

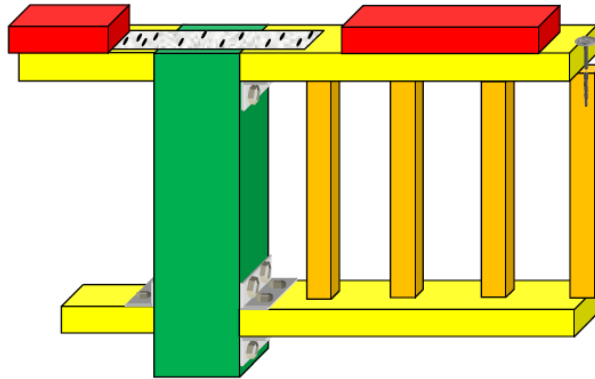
**AVOID NOTCHING  
GUARD POSTS**



**BLOCKING MAY BE ADDED TO  
STRENGTHEN POST ATTACHMENT**



**Examples of Devices that can be  
used to resist horizontal loads**



## **COMPOSITES AND OTHER DECK/RAILING PRODUCTS**

**THIS HANDOUT DOES NOT COVER DECK OR RAILING PRODUCTS MADE OF COMPOSITES, ALUMINUM, STEEL, GLASS, OR ANY OTHER MAN MADE PRODUCT. THOSE PRODUCTS MAY BE USED IF THE MANUFACTURER HAS A RESEARCH REPORT FROM THE INTERNATIONAL CODE COUNCIL OR AN INDEPENDENT EVALUATION SERVICE REPORT.**