



DEPARTMENT OF INSPECTIONS, LICENSES & PERMITS

*Robert J. Frances P.E. Director*

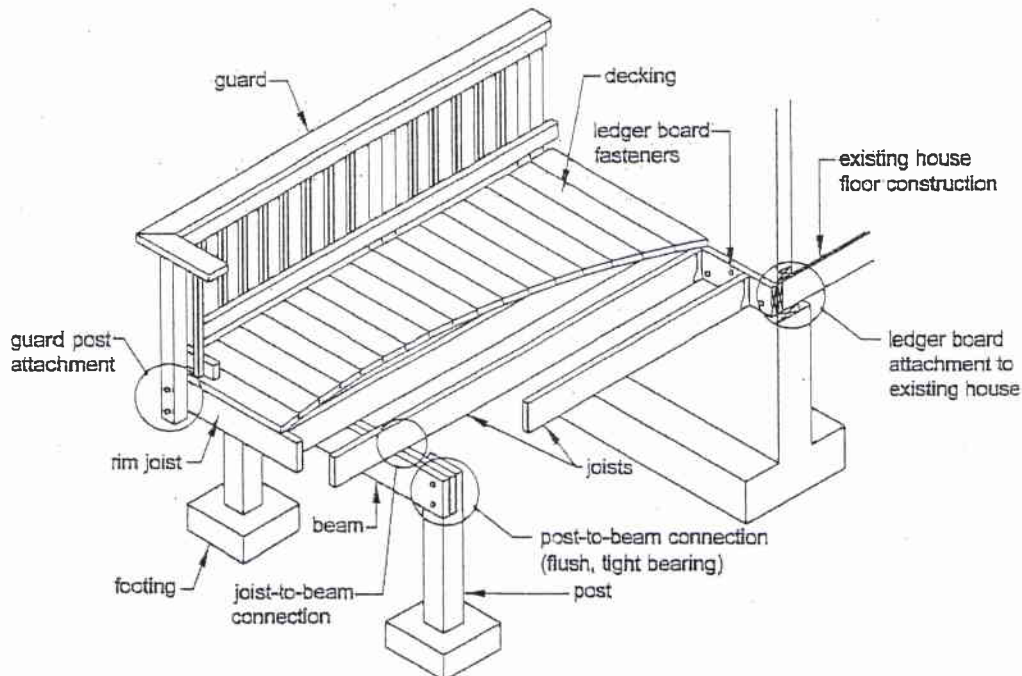
To: *All Deck Builders*

From: *Plan Review Division  
Department of Inspection Licenses and Permits*

Subject: *Prescriptive Residential Wood Deck  
Construction Guide*

## **Prescriptive Residential Wood Deck Construction Guide**

**Based on the 2009 International Residential Code**



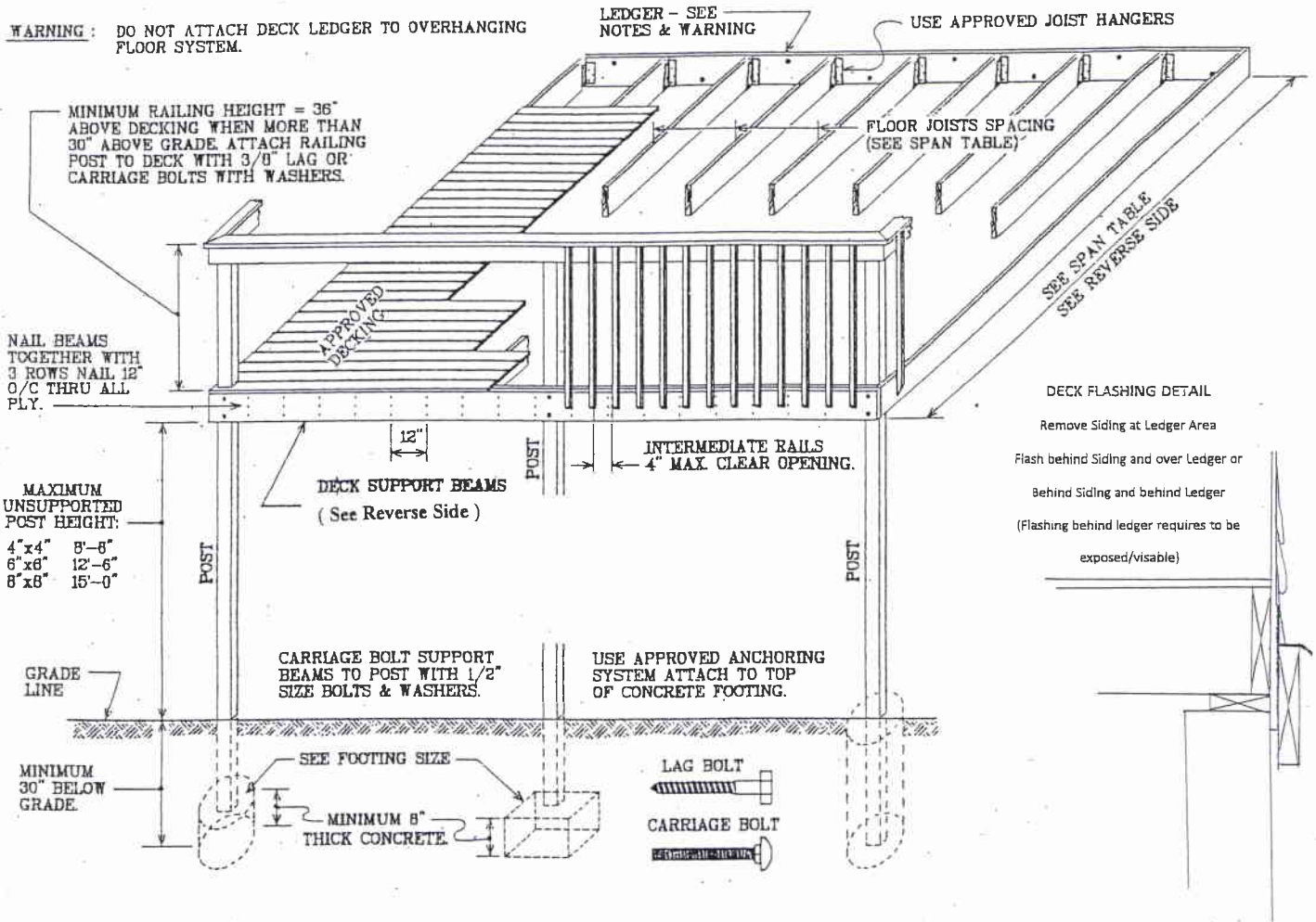
## MINIMUM REQUIREMENTS:

1. This document applies to single level residential wood decks only.
2. All lumber shall be identified by the grade mark of, or certificate of inspection issued by, an approved lumber grading or inspection bureau or agency ([www.alsc.org](http://www.alsc.org)).
3. **Decks supporting large concentrated loads such as hot tubs are beyond the scope of this guide.**
4. This guide does not address wind or seismic design loads.
5. Flashing shall be corrosion-resistant metal (R703.8) of minimum nominal 0.019-inch thickness or approved non-metallic material. Siding shall be removed, and flashing placed before Ledger Board is installed. **Aluminum should not be used in direct contact with lumber treated with preservatives that contain copper such as ACQ, Copper Azole, or ACZA.**
6. Decks shall not be used or occupied until final inspection and approval is obtained.
7. This guide is not intended to preclude the use of other construction methods or materials not shown herein.

## **General Notes:**

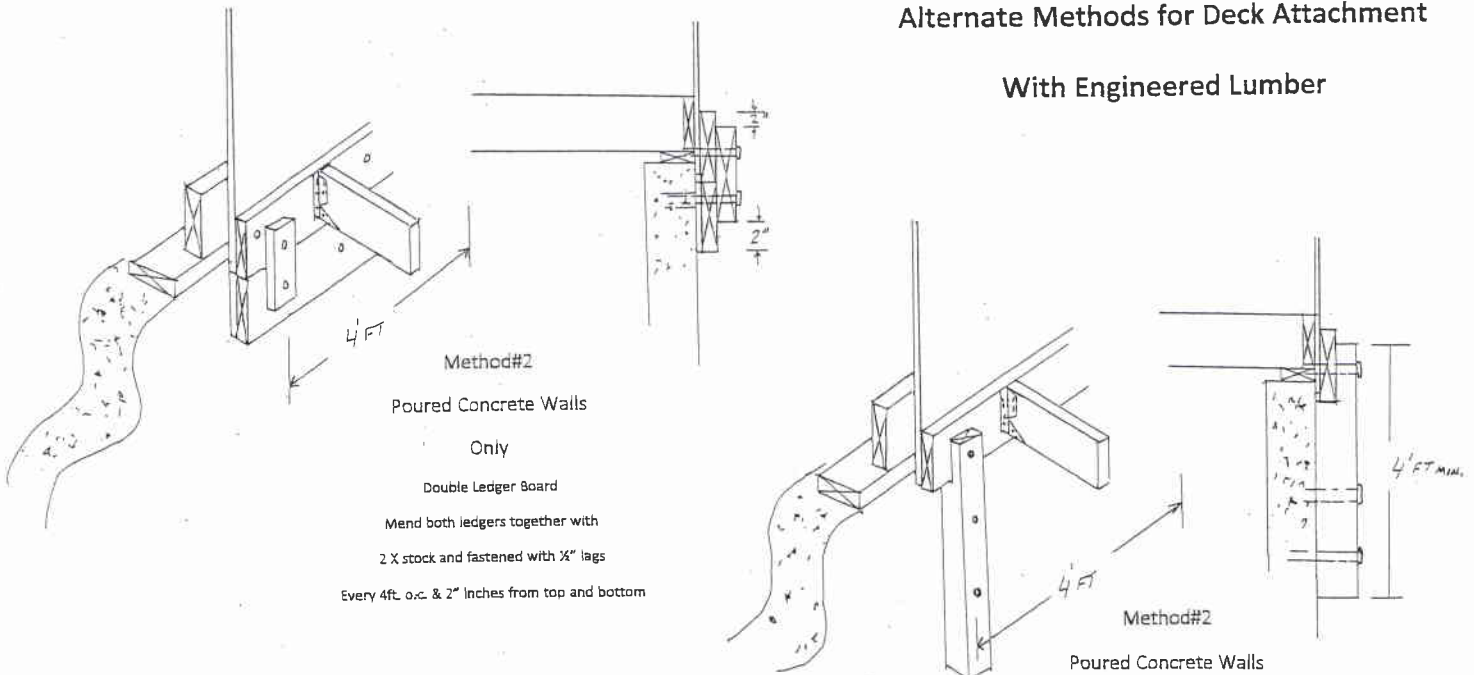
- **Footings** must extend 30" inches below grade, and have a minimum footing **thickness of 8 inches**.
- Decks extending up to 14 feet from the house with 2 foot cantilever, and a maximum column spacing of 10 feet apart, shall have a **footing** size of at least 18 inches diameter or 16"x16".
- Decks up to 16 feet from the house with 2 foot cantilever, and a maximum column spacing of 12 feet shall have a **footing** of at least 22 inches diameter or 20"x20" inches square.
- Maximum Floor Joist Cantilever (4' feet, base on size), Maximum Beam Cantilever (2' feet).
- Handrails shall be provided on at least one side of each continuous run of treads or flight with "four" or more risers, (31" inches) vertical distance, Handrail size (Max. 3 1/4" inches cross section dimension or a Min. 1 1/4" inches). **Stair risers** are to be (Max. 7 3/4" inches) and a **tread depth** of (Min. 10" inches). Risers can be open but for not more than 4" inches.
- **Ledger Attachments:** Attachment of the ledger to the ends of pre-manufactured open web floor trusses/ joist, to brick veneer, and to house overhang/bay windows **is strictly prohibited**.
- Guardrail support posts are to be solid and mechanically bolted to deck structure, as shown in Figure 13, **no notching of support post will be allowed**. (Other methods as approved, may be used)
- Freestanding decks: Diagonal cross bracing shall be provided for all decks greater than 4' feet above grade to resist lateral loads on all vertical members (posts). Cross bracing shall be a minimum of 2"x4" inch material with a minimum of two 3/8" inch lags or two 3/8" inch thru-bolts at each end to the post.
- Post to Beam Requirements: Post to beam connection shall be made with pre-manufactured mechanical connectors. Mechanical connectors shall be galvanized with 1:85 oz/sf of zinc (G-185 coating) or shall be stainless steel. Post to beam connection may also be accomplished using a minimum 6x6 post notched for a 4x beam as shown in Figure 14. All thru-bolts shall have washers at the bolt head and nut.

**WARNING:** DO NOT ATTACH DECK LEDGER TO OVERHANGING FLOOR SYSTEM.



**Alternate Methods for Deck Attachment**

**With Engineered Lumber**



**FLASHING TO GO BEHIND SIDING**

(Flashing to go over Ledger and behind Ledger)

**CRUSHING OF SIDING NOT PERMITTED**

**Table 1. Common preservative treatments and retention levels (pcf) for sawn lumber in ground contact.<sup>a</sup>**

| Species           | ACQ-B | ACQ-C | ACQ-D | CA-B | CuN-W |
|-------------------|-------|-------|-------|------|-------|
| Southern Pine     | 0.40  | 0.40  | 0.40  | 0.21 | 0.11  |
| Douglas Fir-Larch | 0.40  | 0.40  | NR    | 0.21 | 0.11  |
| Hem-Fir           | 0.40  | 0.40  | 0.40  | 0.21 | 0.11  |
| Ponderosa Pine    | 0.40  | 0.40  | 0.40  | 0.21 | 0.11  |
| Red Pine          | 0.40  | 0.40  | 0.40  | 0.21 | 0.11  |
| Spruce-Pine-Fir   | NR    | 0.40  | NR    | NR   | NR    |
| Redwood           | NR    | NR    | NR    | NR   | NR    |

<sup>a</sup> Preservatives and retentions listed in Table 1 are based on the American Wood Protection Association (AWPA) *Book of Standards*. NR = Treatments Not Recommended.

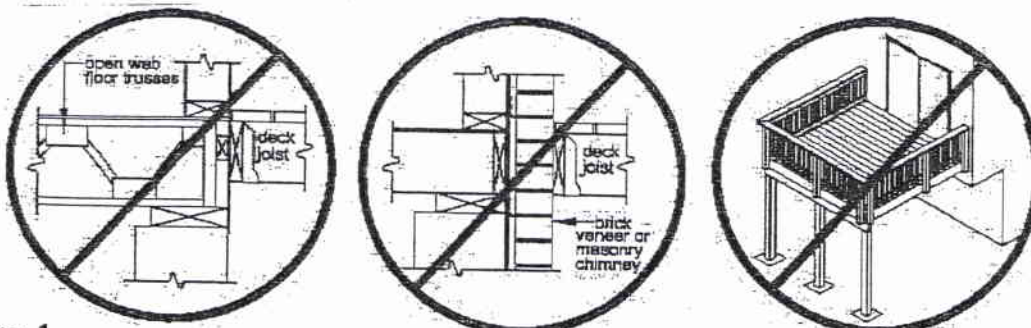
**Table 2. Maximum Joist Spans (L<sub>j</sub>)**

| Species  | Size | Joist Spacing (o.c.)           |           |           |   |          |           |
|--|------|--------------------------------|-----------|-----------|---|----------|-----------|
|  |      | Without Overhangs <sup>1</sup> |           |           | With Overhangs up to L <sub>j</sub> /4 <sup>2</sup> |          |           |
|  |      | 12"                            | 16"       | 24"       | 12"   | 16"      | 24"       |
| Southern Pine  | 2x8  | 13' - 8"                       | 12' - 5"  | 10' - 2"  | 10' - 9"  | 10' - 9" | 10' - 2"  |
|  | 2x10 | 17' - 5"                       | 15' - 10" | 13' - 1"  | 15' - 6"  | 15' - 6" | 13' - 1"  |
|  | 2x12 | 18' - 0"                       | 18' - 0"  | 15' - 5"  | 18' - 0"  | 18' - 0" | 15' - 5"  |
| Douglas Fir-Larch, Hem-Fir, SPF <sup>3</sup>                                 | 2x8  | 12' - 6"                       | 11' - 1"  | 9' - 1"   | 9' - 5"   | 9' - 5"  | 9' - 1"   |
|  | 2x10 | 15' - 8"                       | 13' - 7"  | 11' - 1"  | 13' - 7"  | 13' - 7" | 11' - 1"  |
|  | 2x12 | 18' - 0"                       | 15' - 9"  | 12' - 10" | 18' - 0"  | 15' - 9" | 12' - 10" |
| Redwood, Western Cedars, Ponderosa Pine <sup>4</sup> , Red Pine <sup>4</sup> | 2x8  | 11' - 8"                       | 10' - 7"  | 8' - 8"   | 8' - 6"   | 8' - 6"  | 8' - 6"   |
|  | 2x10 | 14' - 11"                      | 13' - 0"  | 10' - 7"  | 12' - 3"  | 12' - 3" | 10' - 7"  |
|  | 2x12 | 17' - 5"                       | 15' - 1"  | 12' - 4"  | 16' - 5"  | 15' - 1" | 12' - 4"  |

1. Assumes 40 psf live load, 10 psf dead load, L/360 deflection, No. 2 grade, and wet service conditions. See Figure 1B.
2. Assumes 40 psf live load, 10 psf dead load, L/180 cantilever deflection with 220 lb point load, No. 2 grade, and wet service conditions. See Figure 1A and Figure 2.
3. Incising assumed for refractory species including Douglas fir-larch, hem-fir, and spruce-pine-fir.
4. Design values based on northern species with no incising assumed.

**Table: 3** TABLE R502.2.2.1  
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, 4, 5</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' |
|---|--|------------|-------------|--------------|--------------|--------------|--------------|
| Connection details  | On-center spacing of fasteners <sup>d, e</sup> |            |             |              |              |              |              |
| 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           |



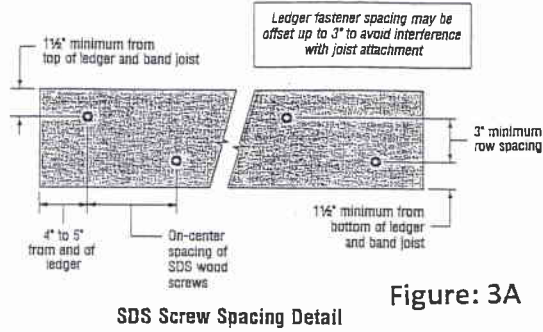
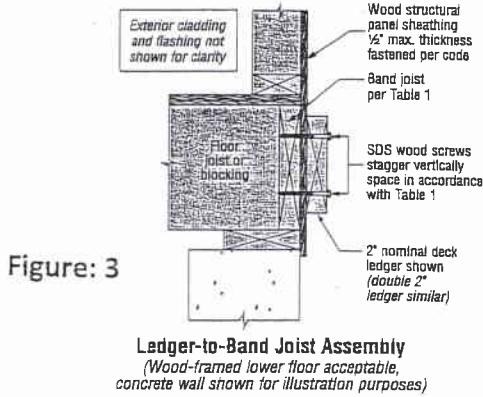
**Figure: 1**  
NO ATTACHMENT TO OPEN WEB TRUSSES

NO ATTACHMENT TO BRICK VENEER

NO ATTACHMENT TO HOUSE OVERHANG

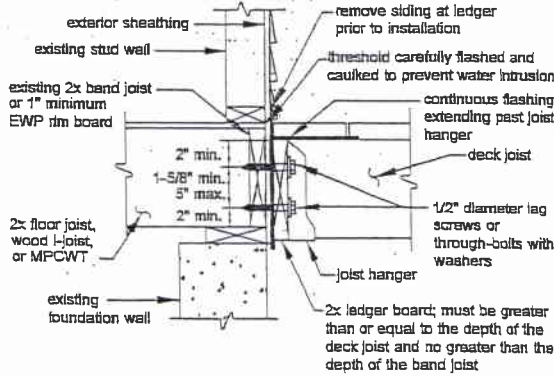
**Table: 4 SDS Screw Spacing for a Sawn Lumber Deck Ledger to Band Joist**

| Loading Condition | Ledger Nominal Size (in.) | SDS Screw Length (in.) | Band Joist Material and Size   | Maximum Deck Joist Span                      |             |              |              |              |              |              |
|-------------------|---------------------------|------------------------|--|--|-------------|--------------|--------------|--------------|--------------|--------------|
|                   |                           |                        |  | Up to 6 ft.                                  | Up to 8 ft. | Up to 10 ft. | Up to 12 ft. | Up to 14 ft. | Up to 16 ft. | Up to 18 ft. |
|                   |                           |                        |  | Maximum On-Center Spacing of Fasteners (in.) |             |              |              |              |              |              |
| 40 psf Live       | 2x                        | 3½                     | 2" Nominal Sawn Lumber   | 13"  | 10"         | 8"           | 6"           | 5"           | 5"           | 4"           |
|                   | 2-2x <sup>a</sup>         | 5                      |  |  |             |              |              |              |              |              |
| 10 psf Dead       | 2x                        | 3½                     | 1" Min. Oriented Strand Board (OSB) Rim Board  | 12"  | 9"          | 7"           | 6"           | 5"           | 4"           | 4"           |
|                   | 2x                        | 3½                     | 1½" Min. Oriented Strand Board (OSB) Rim Board or 1¼" Min. Structural Composite Lumber | 15"  | 11"         | 9"           | 7"           | 6"           | 5"           | 5"           |



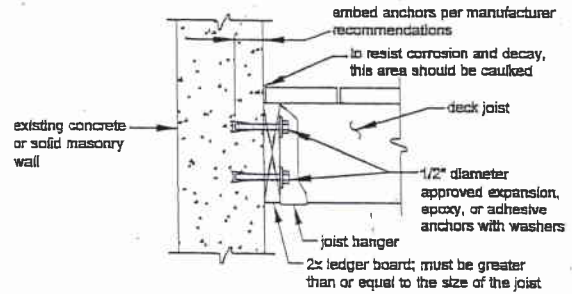
**Figure: 4**

**General Attachment of Ledger Board to Band Joist or Rim Board**



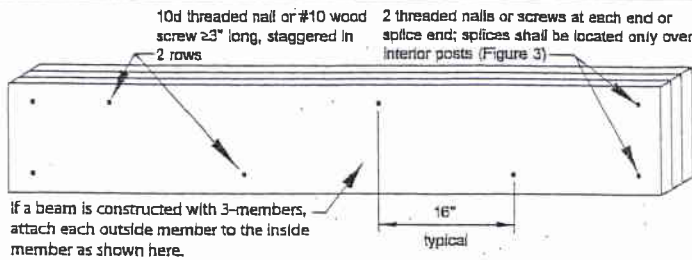
**Figure: 5**

**Attachment of Ledger Board to Foundation Wall (Concrete or Solid Masonry)**

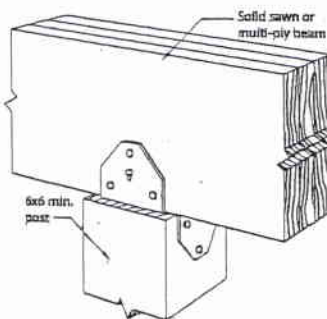


**Figure: 6**

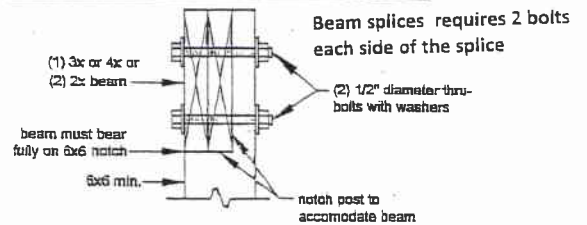
**Beam Assembly Details**



**Figure: 7 Alternate Approved Post-to-Beam Post Cap Attachment**



**Figure:6A Post-to-Beam Attachment Requirements**



**Figure: 7A Prohibited Post-to-Beam Attachment**

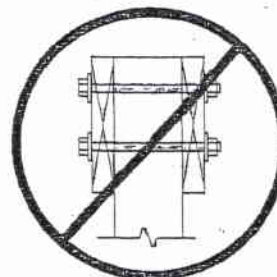


Table: 5 Deck Beam Spans ( $L_B$ )<sup>1</sup> for Joists Framing from One Side Only

| Species       | Size <sup>4</sup> | Joist Spans ( $L_J$ ) Less Than or Equal to: |           |          |          |          |          |          |
|---------------|-------------------|--|-----------|----------|----------|----------|----------|----------|
|               |                   | 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' - 5"  | 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" |

Figure: 8

Beam Span Types

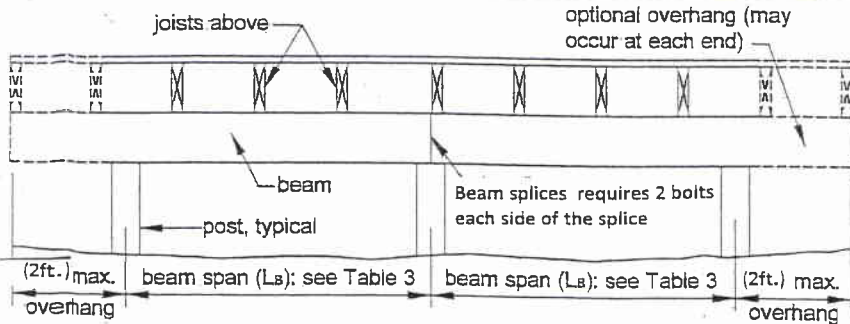


Figure: 9

Joist Span - Deck Attached at House and Bearing Over Beam

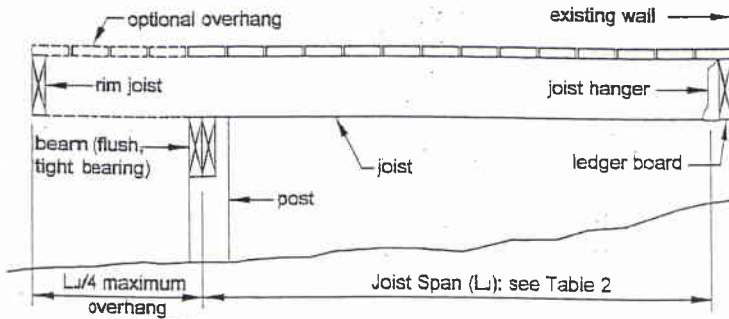


Figure: 8A

Joist-to-Beam Detail

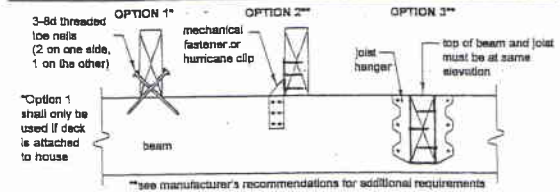


Figure: 10

Joist Span - Joists Attached at House and to Side of Beam

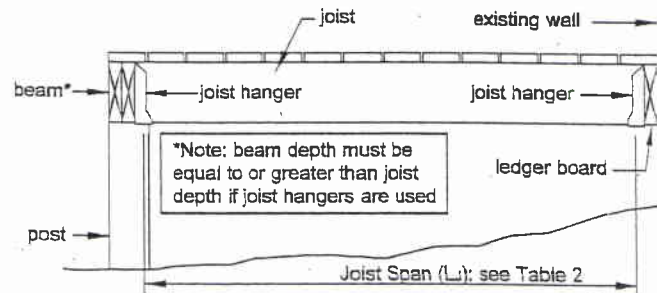


Figure: 11

Joist Span - Free Standing Deck

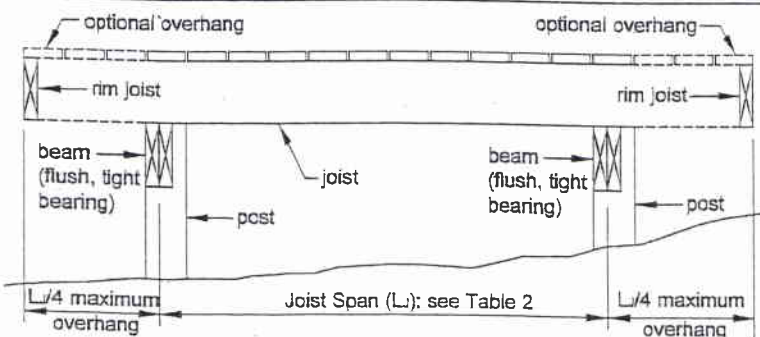
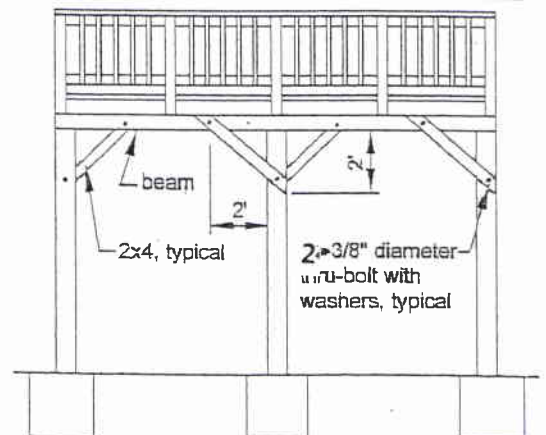


Figure: 12

Diagonal Bracing Requirements



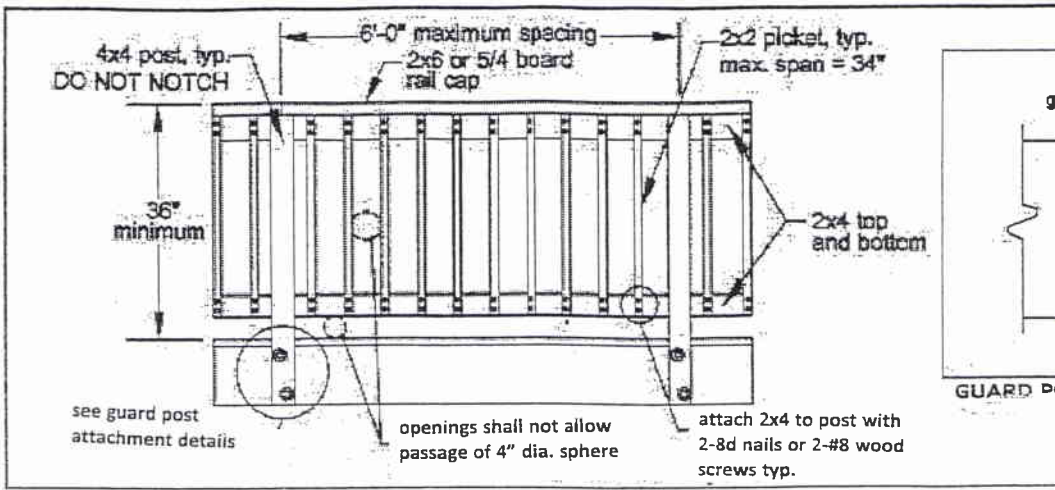


Figure: 13 **TYPICAL GUARD DETAIL**

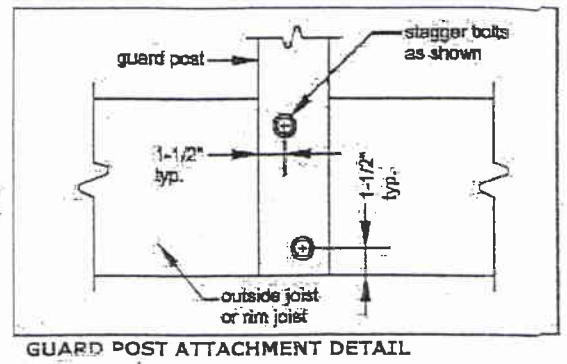


Figure: 13A

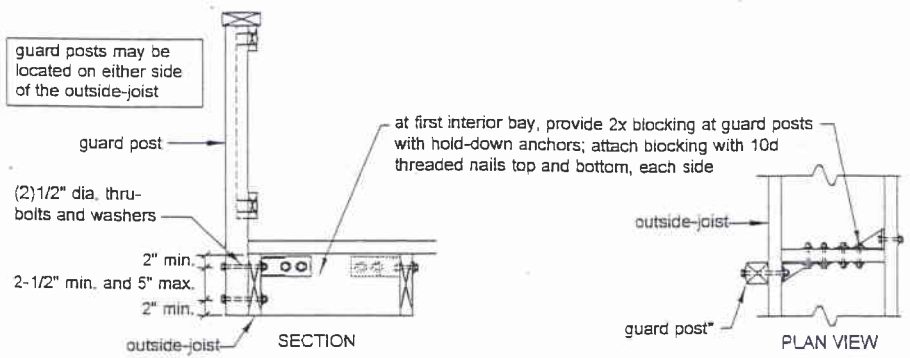


Figure:14  
Mechanical Connected Post to Deck Structure

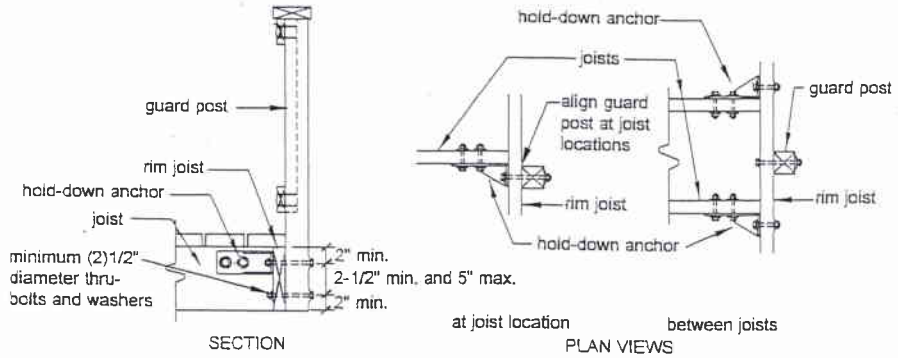


Figure:15 Guard Post to Outside Rim Joist

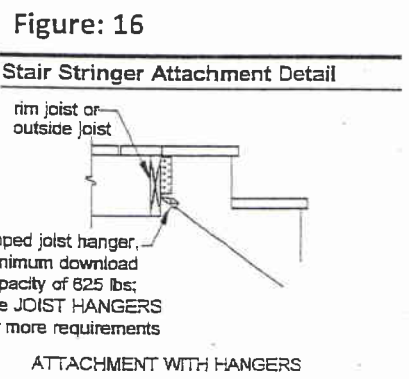


Figure: 16  
Stair Stringer Attachment Detail

Figure: 17 **Stair Guard Requirements**

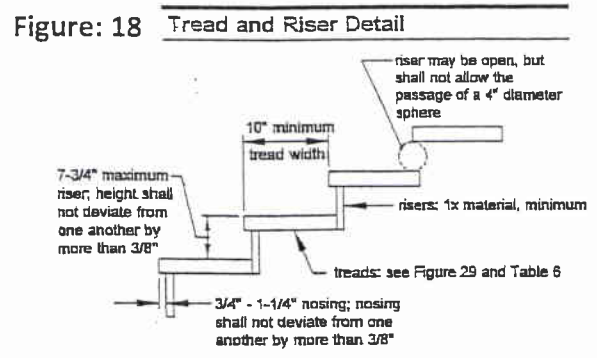
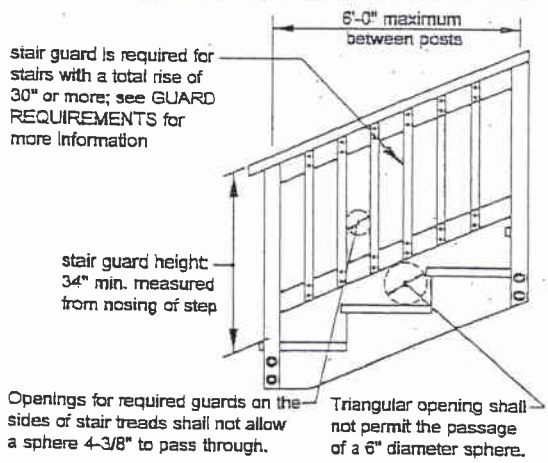
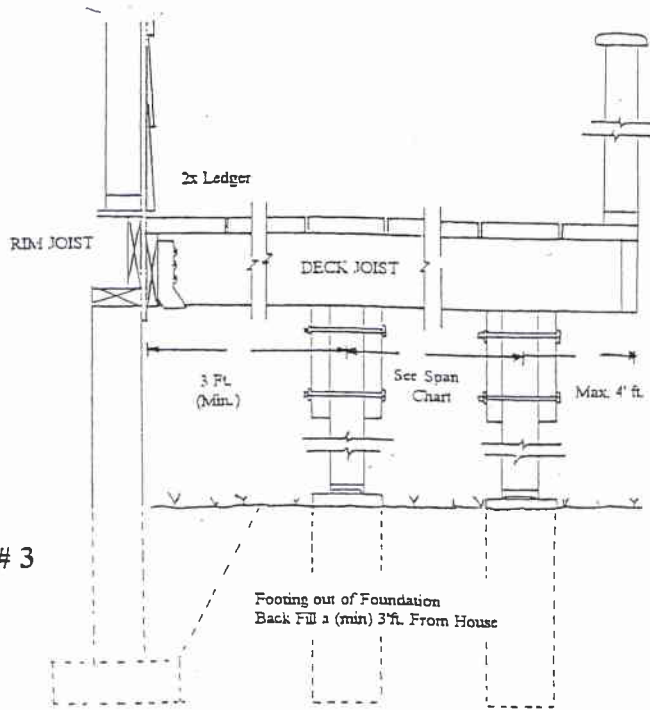
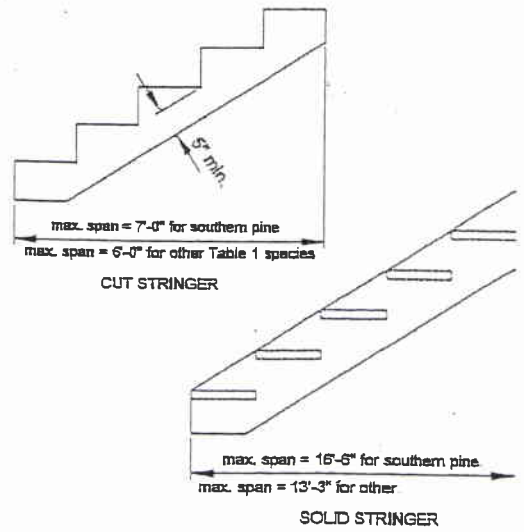


Figure: 18 **Tread and Riser Detail**

Figure: 19 Stair Stringer Requirements



Method # 3



### Sample Plot Plan

