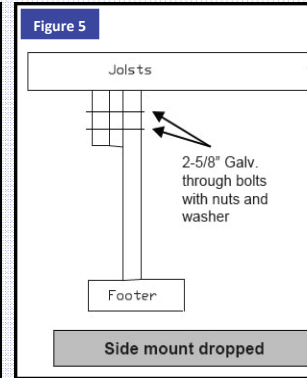
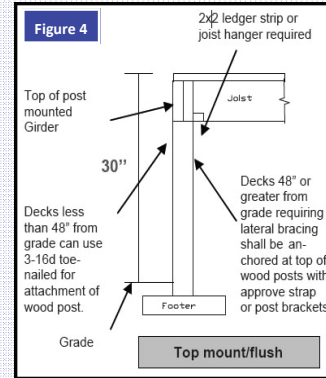


**Inspections Department**  
 900 7th Avenue, PO Box 446  
 Garner, NC 27529  
 919-772-4688

**What you need to know before building an attached or self-supported deck to your home.**



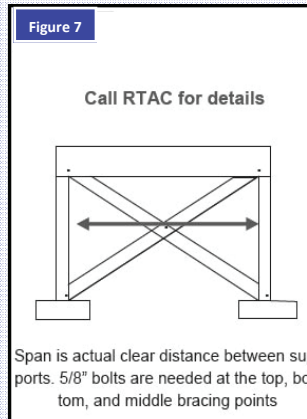
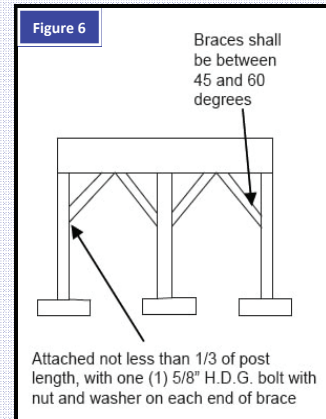
Town of Garner  
 Inspections Department  
 PO Box 446, 900 7th Avenue, Bldg. B  
 Garner, NC 27529



**Girder span tables from the Building Code for #2SYP and a 40lb. Live Load:**

Deck Width	Exterior Girder Clear Spans			
	Nominal Lumber Size			
	2 x 6	2 x 8	2 x 10	2 x 12
20' (2 ply)	3'11"	5'	6'1"	7'1"
20' (3 ply)	----	6'3"	7'7"	8'10"
20' (4 ply)	----	----	8'9"	10'2"

\*Partial reproduction of Table R502.5(l) at 30 ground snow load and roof ceiling and 1 clear span floor. Deck width is 20' or less measured in the direction of joists span. Splices in plys must break over bearing supports.



**Joist span tables from the Building Code for #2SYP and a 40 lb. Live Load:**

Joist Size	Spaced @	Will span	Joist Size	Spaced @	Will Span
2 x 6	12" OC	10'9"	2 x 10	12" OC	18'
	16" OC	9'9"		16" OC	16'1"
	24" OC	8'6"		24" OC	13'1"
2 x 8	12" OC	14'2"	2 x 12	12" OC	21'9"
	16" OC	12'10"		16" OC	18'10"
	24" OC	11'		24" OC	15'4"

**Our Recommendations for a "Minimum Code" and a "Code Plus" Deck ...**

**Lumber:**

First, all lumber should be treated or decay resistant. We will assume that you will use pressure treated Southern Yellow Pine #2 (SYP) with joist spacing set at 16 inches on center (OC). Other species of lumber are acceptable for use. For specific allowable spans on other species, consult the building code or call RTAC.

You only need to build to Minimum Code. However if you want a sturdier deck, we have also given you our recommendations for a Code Plus deck.

	Minimum Code Deck	Code Plus Deck
<b>Footing Depth:</b>	12" to bottom of footing	2'
<b>Footing Size:</b>	8" x 16" x 6"	16" x 16" x 8"
<b>Post Size:</b>	4" x 4" x varies up to 8'	6" x 6"
<b>Girder Size:</b>	2-2" x 8" (see girder table in Figure 4 & 5)	2-2" x 12" through bolted to posts
<b>Post Spacing:</b>	(see span drawing in Figure 7)	6' maximum between posts around perimeter and in lines across the deck floor
<b>Deck Band &amp; Ledger:</b>	2" x 8" for Band 2" x 2" for Ledger or use Joist hanger (see Figure 1)	Deck band: use 2" x 10" Ledger: use 2" x 2" with 3 nails under each joist  *(may substitute 2" x 8" for band if joist hangers are used in lieu of ledgers)
<b>Joist Size:</b>	(see span table under Figure 6)	Use 2" x 10" spaced 16" OC
<b>Deck Flooring:</b>	5/4" x 6"	Use 2" x 6" flooring with 1/8" space between
<b>Guard Rail &amp; Height:</b>	Max. clear space between pickets is 4" Height: 36" minimum	Space railing posts 6' OC

\* This option requires the Code-Plus features

**Important Note:**

The Building Code also regulates items such as the stringers and treads for steps, fastening (nailing and/or bolting) and bracing for lateral stability. Be sure to discuss these with the Plans Review personal if you have any questions about what the code requires.





## First Things First ...

### Everyone dreams of the “perfect deck”...

But getting from Point A (the dream deck) to point B (planning and construction) is not always as easy. We want your deck to be perfect, but we must ensure that Town code and standards. This brochure will help you construct a safe code-compliant “dream deck.”

### But, first things first...

The Town of Garner requires a building permit for the construction of your deck before, so you must acquire your permit BEFORE you begin construction. For information on how and where to obtain your building permit, call or visit the Town of Garner Inspections Department at 900 Seventh Ave., Garner, NC 27529. Or call (919) 773-4433. Office hours are Monday-Friday from 8:00 am to 5:00 pm.

### Why the permit and inspections?

To ensure that the deck will comply with local zoning regulations and with the North Carolina State Residential Building Code. The zoning regulations establish minimum setbacks that must be maintained from property lines. The building code governs the method of construction, materials, means of support, attachment and requires safety features such as guard rails and hand rails.

## Decisions You Need to Make ...

### Will your deck be attached to the residence for support or will it be a “self-supported” deck?

If attached, this means the deck band will be connected to the house band and that your deck will be supported partially by the existing foundation of the house. Attached decks must be connected to the band or rim joist of the house by 5/8 inch galvanized through bolts. Also, the existing siding (except brick) which covers the house band must be removed so that the deck band makes full contact with the house band. Non-aluminum, non-corrosive flashing must be installed between the deck and house bands. (see flashing detail Figure 1) to prevent water from rotting the house band. See diagram for detail.

**Figure 1**

Non-aluminum, non-corrosive flashing shall be between bands for full depth and kick out underneath of siding below. Flashing shall extend underneath siding above a min. 2”.

All Structures Except Brick Veneer		
Fasteners	8' Max Joist Span <sup>a</sup>	16' Max Joist Span <sup>a</sup>
5/8" Hot Dipped Galv. Bolts with nut and washer <sup>b</sup>	1 @ 3'-6" o.c.	1 @ 1'-8" o.c.
<b>and</b>	<b>and</b>	<b>and</b>
12d Common Hot Dipped Galv. Nails <sup>c</sup>	2 @ 8" o.c.	3 @ 6" o.c.

Brick Veneer Structures		
Fasteners	8' Max Joist Span <sup>a</sup>	16' Max Joist Span <sup>a</sup>
5/8" Hot Dipped Galv. Bolts with Nut and Washer <sup>b</sup>	1 @ 2'-4" o.c.	1 @ 1'-4" o.c.

a: attachment interpolation between 8' & 16' joists span are allowed, b: Minimum edge distance for bolts is 2.5 inches, c: Nails must penetrate supporting structure band a minimum of 1.5 inches

### Why do I need a permit and inspections?

To ensure that the deck will comply with local zoning regulations and with the North Carolina State Residential Building Code. The zoning regulations establish minimum setbacks that must be maintained from property lines. The building code governs the method of construction, materials, means of support, attachment and requires safety features such as guard rails and hand rails.

### What distances will you span between supports?

Your joist must be sized to carry lb. per sq. ft live load. In some instances, a girder is used to help meet this design criteria and to allow use of smaller individual floor joists (See floor joist span Figure 6)

### How deep and how large must the footings under support posts be?

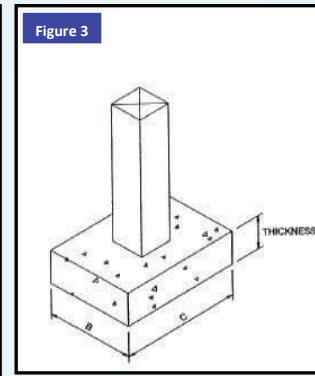
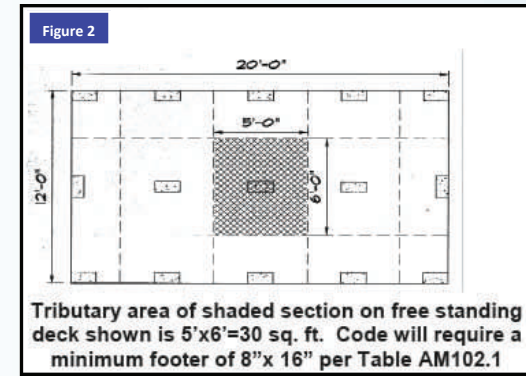
Each deck support post must be supported by concrete footing. The size of each footing is determined by the tributary load imposed on it. See the diagram below for an explanation of tributary load. Each footing must be dug down into undistributed soil and to a minimum depth of 12 inches.

### How high off the ground will the floor of your deck be?

If the walking surface of the deck is 30 inches off of the ground, your deck must be surrounded by guard rails which are a minimum of 36 inches in height. The steps for the deck must also have guard rails on both sides if there are 4 or more individual risers (spaces between steps). If the steps have a total rise of 30" or more above ground level, guard rails/ hand rails must also be provided on open sides of the steps. (See Figure 4)

### Bracing your deck for lateral support.

If your planned deck is attached and over 4' above the ground (measured from top of footing to deck floor), bracing for lateral support is required. Self supported decks greater than 30" in height (measured from top of footing to deck floor) also require bracing. Several methods of bracing are acceptable depending on whether the deck is free standing or attached (see Figure 6 & 7). Consult with Plans review personal at 919-772-4688 to select a method that meets code and will work best for your project.



Footing Chart a, b, c*				
SIZE (inches)		TRIBUTARY AREA (square)	THICKNESS (inches)	
Precast Footings	Poured-in-Place Footings		Precast	Cast-in-Place
8 X 16	8 X 16	36	4	6
12 X 12	12 X 12	40	4	6
16 X 16	16 X 16	70	8	8
	16 X 24	100	8	8
	24 X 24	150	8	8

Ex.: 4"x8"x16" double-stacked solid block

\*a. Footing values are based on single floor and roof loads; b. Support post must rest in center 1/3 of footer; c. Top of footer shall be level for full bearing support of post

### Handrails, Guards and General Construction

**Guards** at a Minimum 36" required per R312.1 with 30" drop and opening limits per R312.2 (4" on vertical pickets, 6" on horizontal and ornamental guard rails), top rail and post to support 200lbs with infill to meet 50lbs per Table R301.5

**Rail posts** cannot exceed 8" o.c. spacing and shall be attached with 2-3/8" Galv bolts with nut & washer to outer bands.

**Attachment** to structure based upon all cladding types but brick veneer per AM104.1.1, Brick veneer per AM104.1.2, Masonry ledge per AM104.1.3 or other per AM104.1.4.

**Deck post** per AM108

**Footers** per Table AM102.1. Minimum base of footers 12" below grade.

**Decking** per AM107 for #2 SYP and attached with 2-8d galv nails at each joist or approved screws. Other materials per mfg installation based upon joists o.c. spacing. Alternate material attached per mfg installation instructions.

**Lateral Bracing** per AM 109. AM109.1.1 height required; AM109.1.2 knee bracing; AM109.1.3 self supported embedment; AM109.1.4 diagonal bracing; AM109.1.5 Coastal embedment.

**Stairs treads and risers** per R311.5.3.1 (3/4" Max riser) & R311.5.3.2 (9" minimum tread depth + 3/4" nose). Stairways min 36" width per R311.5.1 (rail projections allowed).

**Riser openings.** Stairs with a 30" or more vertical rise must have solid risers or opening restricted to prevent a 4" sphere from passing per R311.5.3.3.

**Floor joist cantilevers** allowed per Table R502.3.3(1)

**Stair handrail/Guard.** Height between 30"-38" per R311.5.6 & R312.1. Openings on side of stairs requiring guards shall not allow a sphere 4 3/8" to pass per R312.2 exception #2.

## APPENDIX M WOOD DECKS

*This appendix is a North Carolina addition to the 2009 International Residential Code. There will be no underlined text.  
(The provisions contained in this appendix are adopted as part of this code.)*

### SECTION AM101 GENERAL

**AM101.1 General.** A deck is an exposed exterior wood floor structure which may be attached to the structure or freestanding. Roofed porches (open or screened-in) may be constructed using these provisions.

**AM101.2 Deck design.** Computer deck design programs may be accepted by the code enforcement official.

### SECTION AM102 FOOTERS

**AM102.1 Footers.** Support post shall be supported by a minimum footing per Figure AM102 and Table AM102.1. Minimum footing depth shall be 12-inches below finished grade per Section R403.1.4. Tributary area is calculated per Figure AM102.1.

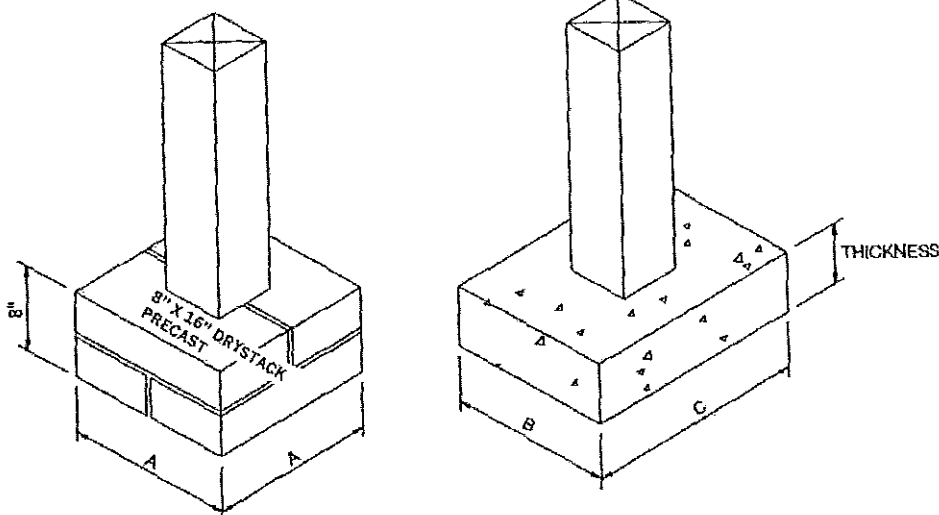


FIGURE AM102

TABLE AM102.1  
FOOTING TABLE<sup>a,b,c</sup>

SIZE (inches)		TRIBUTARY AREA (sq. ft.)	THICKNESS (inches)	
A x A	B x C		Precast	Cast-in-Place
8 x 16	8 x 16	36	4	6
12 x 12	12 x 12	40	4	6
16 x 16	16 x 16	70	8	8
—	16 x 24	100	—	8
—	24 x 24	150	—	8

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m<sup>2</sup>.

- a. Footing values are based on single floor and roof loads
- b. Support post must rest in center 1/3 of footer
- c. Top of footer shall be level for full bearing support of post

**SECTION AM110  
STAIRS**

**AM110.1** Stairs shall be constructed per Figure AM110. Stringer spans shall be no greater than 7 foot span between supports. Spacing between stringers shall be based upon decking material used per AM107.1. Each Stringer shall have minimum 3 1/2 inches between step cut and back of stringer. If used, suspended headers shall be attached with 3/8 inch galvanized bolts with nuts and washers to securely support stringers at the top.

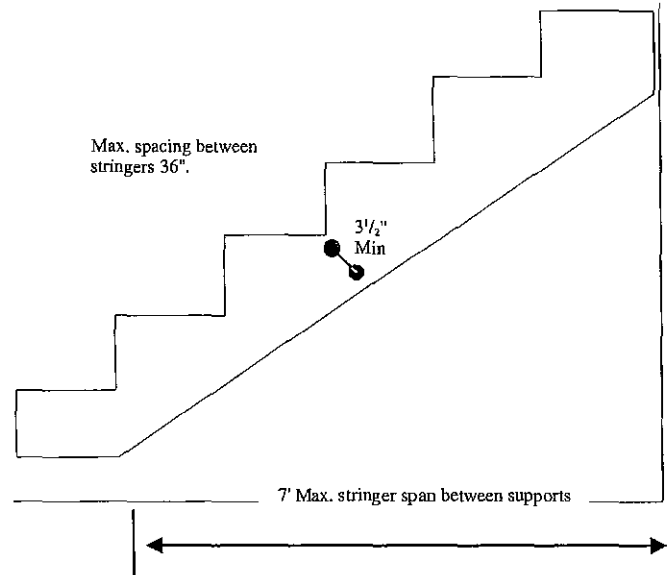


FIGURE AM110

**SECTION AM111  
HANDRAILS, GUARDS AND GENERAL**

**AM111.1** Handrails, guards and general. Deck handrails, guards and general construction shall be per Figure AM111.

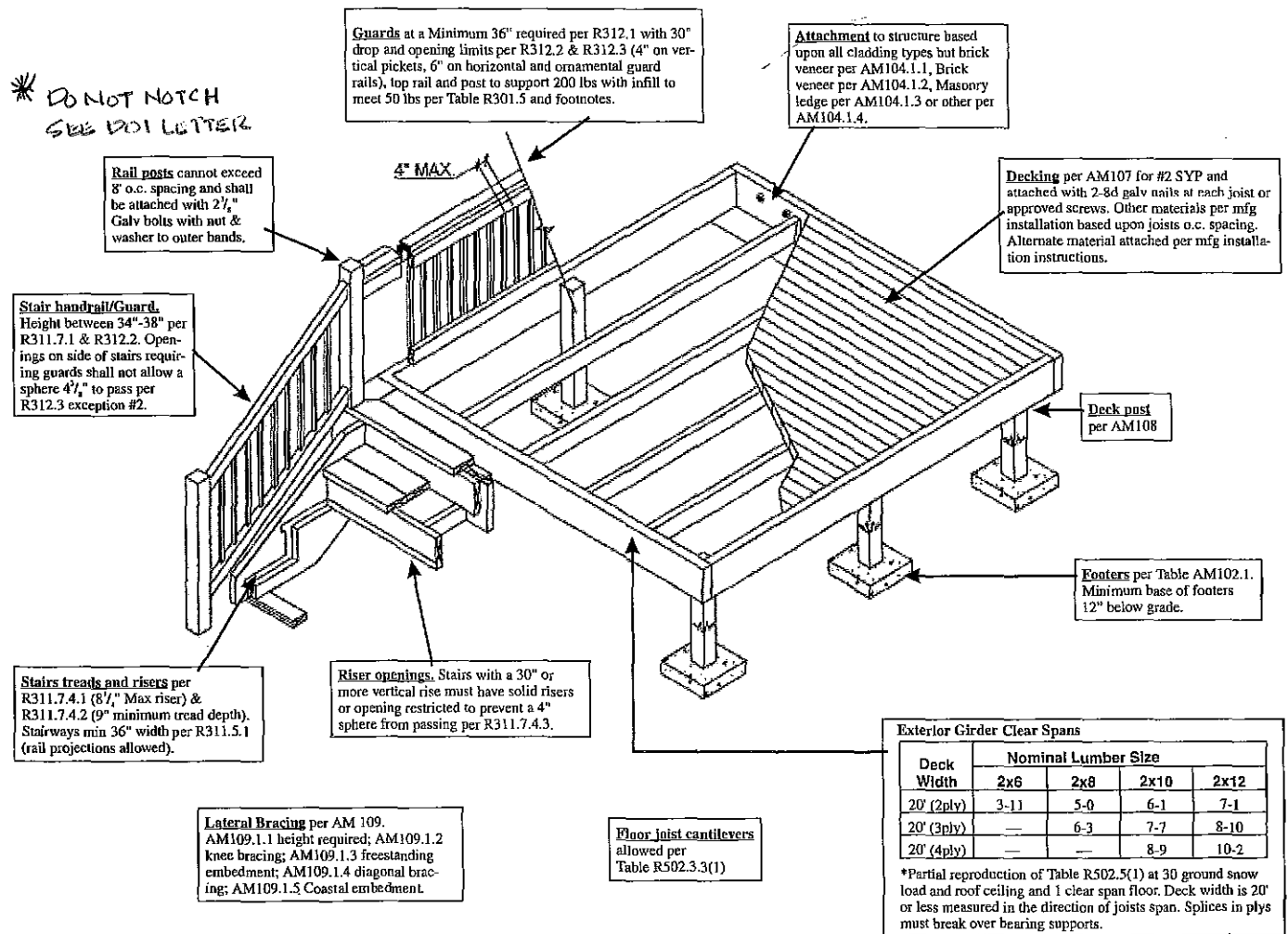


FIGURE AM111

**SECTION AM109  
DECK BRACING**

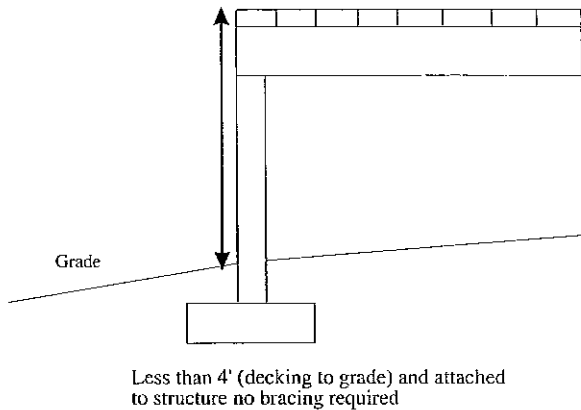
**AM109.1 Deck bracing.** Decks shall be braced to provide lateral stability. The following are acceptable means to provide lateral stability.

**AM109.1.1.** When the deck floor height is less than 4'-0" above finished grade per Figure AM109 and the deck is attached to the structure in accordance with Section AM104, lateral bracing is not required.

**AM109.1.2.** 4x4 wood knee braces may be provided on each column in both directions. The knee braces shall attach to each post at a point not less than 1/3 of the post length from the top of the post, and the braces shall be angled between 45 degrees and 60 degrees from the horizontal. Knee braces shall be bolted to the post and the girder/double band with one 5/8 inch hot dipped galvanized bolt with nut and washer at both ends of the brace per Figure AM109.1

**AM109.1.3.** For freestanding decks without knee braces or diagonal bracing, lateral stability may be provided by embedding the post in accordance with Figure AM109.2 and the following:

POST SIZE	MAXIMUM TRIBUTARY AREA	MAXIMUM POST HEIGHT	EMBEDMENT DEPTH	CONCRETE DIAMETER
4x4	48 SF	4'-0"	2'-6"	1'-0"
6x6	120 SF	6'-0"	3'-6"	1'-8"



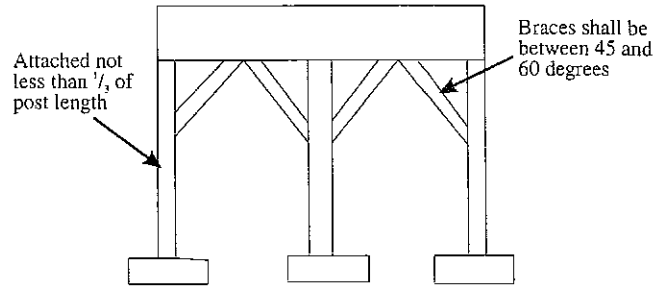
**FIGURE AM109**

**AM109.1.4.** 2x6 diagonal vertical cross bracing may be provided in two perpendicular directions for freestanding decks or parallel to the structure at the exterior column line for attached decks. The 2x6's shall be attached to the posts with one 5/8 inch hot dipped galvanized bolt with nut and washer at each end of each bracing member per Figure AM109.3.

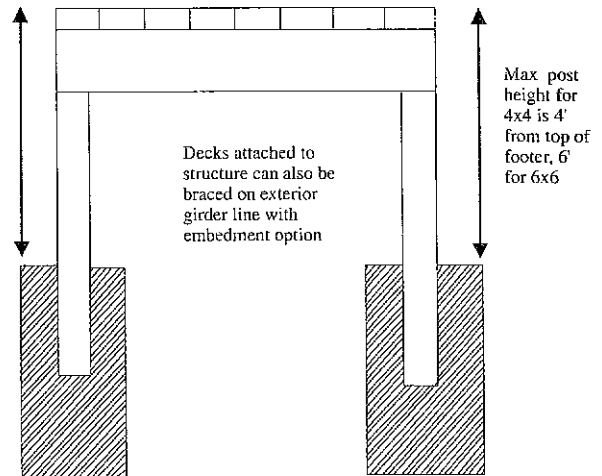
**AM109.1.5.** For embedment of piles in Coastal Regions, see Chapter 45.

Freestanding decks requiring bracing shall be installed in both directions off each post

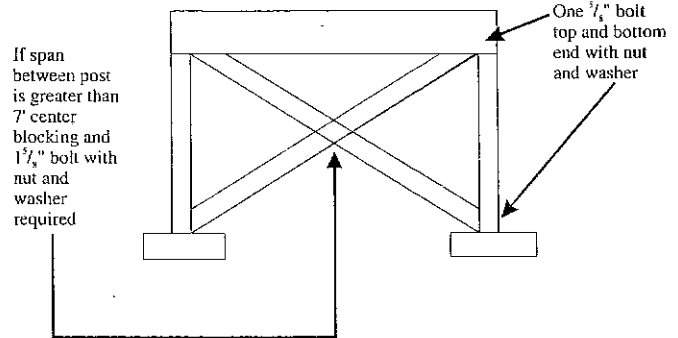
Decks attached to structure require diagonal bracing only at outside girder line parallel with structure



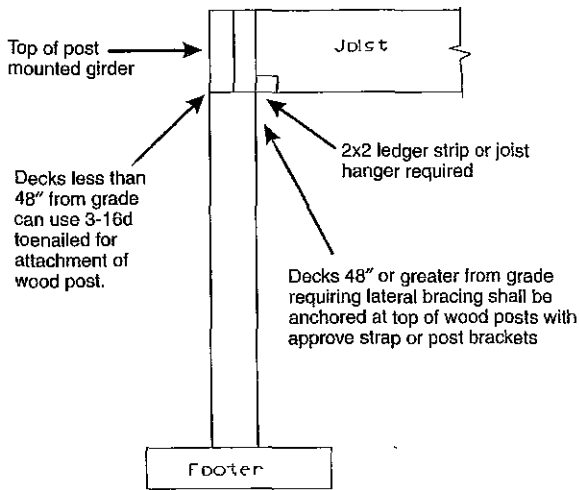
**FIGURE AM109.1**



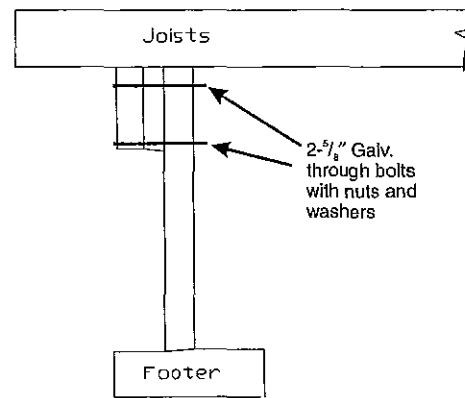
**FIGURE AM109.2**



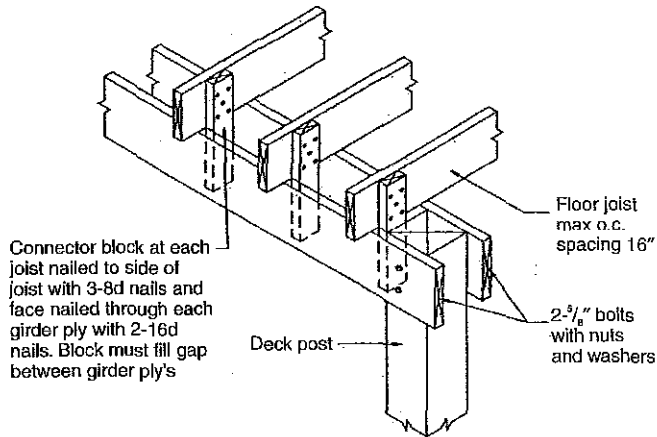
**FIGURE AM109.3**



**TOP MOUNT/FLUSH  
FIGURE AM105**

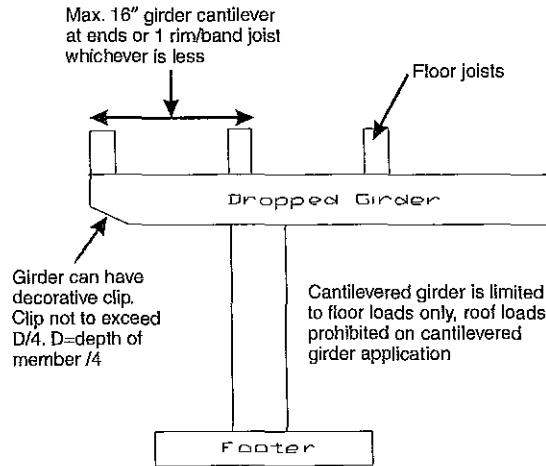


**SIDE MOUNT DROPPED GIRDER  
FIGURE AM105.1**



Split girder limited to floor loads only and cantilever girder ends allowed per AM105.3

**SPLIT GIRDER DETAIL  
FIGURE AM105.2**



**CANTILEVERED DROPPED GIRDER DETAIL  
FIGURE AM105.3**

**SECTION AM107  
FLOOR DECKING**

**AM107.1 Floor decking.** Floor decking shall be No. 2 grade treated Southern Pine or equivalent. The minimum floor decking thickness shall be as follows:

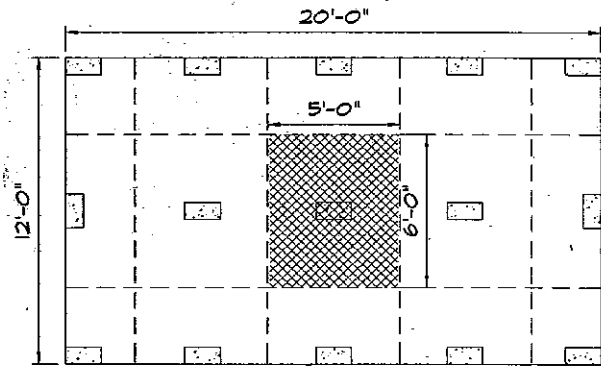
SPACING	DECKING (nominal)
12" o.c.	1" S4S
16" o.c.	1" T&G
19.2" o.c.	1 1/4" S4S
24"-36" o.c.	2" S4S

**SECTION AM108  
POST HEIGHT**

**AM108.1 Post height.** Maximum height of deck support posts as follows:

Post size <sup>a</sup>	Max. Post Height <sup>b,c</sup>
4x4	8'-0"
6x6	20'-0"

- a. This table is based on No. 2 Southern Pine posts.
- b. From top of footing to bottom of girder.
- c. Decks with post heights exceeding these requirements shall be designed by a registered design professional.



Note: Tributary area of shaded section on free standing deck shown is 5' x 6' = 30 sq. ft. Code will require a minimum footer of 8" x 16" per Table AM102.1.

FIGURE AM102.1

**SECTION AM104  
DECK ATTACHMENT**

**AM104.1 Deck attachment.** When a deck is supported at the structure by attaching the deck to the structure, the following attachment schedules shall apply for attaching the deck band to the structure.

**AM104.1.1 All structures except brick veneer structures.**

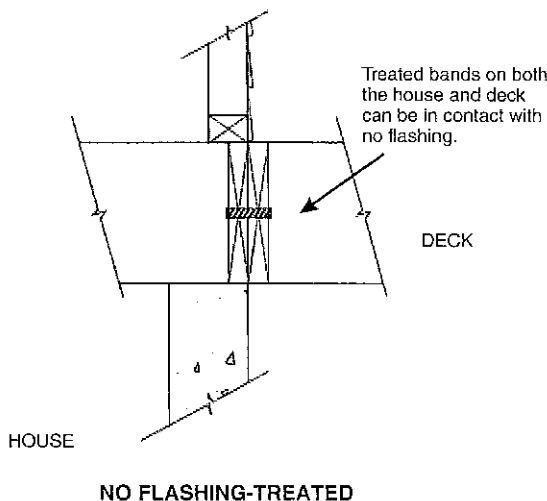
FASTENERS	8' MAX JOIST SPAN <sup>a</sup>	16' MAX JOIST SPAN <sup>a</sup>
5/8" Hot dipped galv. bolts with nut and washer <sup>b</sup> and 12d Common hot dipped galv. nails <sup>c</sup>	1 @ 3'-6" o.c.	1 @ 1'-8" o.c.
	and 2 @ 8" o.c.	and 3 @ 6" o.c.

- a. Attachment interpolation between 8 foot and 16 foot joists span is allowed.
- b. Minimum edge distance for bolts is 2 1/2 inches.
- c. Nails must penetrate the supporting structure band a minimum of 1 1/2 inches.

**AM104.1.2 Brick veneer structures.**

FASTENERS	8' MAX JOIST SPAN <sup>a</sup>	16' MAX JOIST SPAN <sup>a</sup>
5/8" Hot dipped galv. bolts with nut and washer <sup>b</sup>	1 @ 2'-4" o.c.	1 @ 1'-4" o.c.

- a. Attachment interpolation between 8 foot and 16 foot joist span is allowed.
- b. Minimum edge distance for bolts is 2 1/2 inches.



**AM104.1.3 Masonry ledge support.** If the deck band is supported by a minimum of 1/2 inch masonry ledge along the foundation wall, 5/8 inch hot dipped galvanized bolts with washers spaced at 48 inches o.c. may be used for support.

**AM104.1.4 Other means of support.** Joist hangers or other means of attachment may be connected to house band and shall be properly flashed.

**SECTION AM105  
GIRDER SUPPORT AND SPAN**

**AM105.1 Girder support and span.** Girders shall bear directly on support post with post attached at top to prevent lateral displacement or be connected to the side of posts with two 5/8 inch hot dipped galvanized bolts with nut and washer. Girder spans are per Tables R502.5(1) and (2). Girder support may be installed per Figure AM105 for top mount; Figure AM105.1 for side mount and Figure AM105.2 for split girder detail. Girders may also be cantilevered off ends of support post no more than 1 joist spacing or 16 inches, whichever is greater per Figure AM105.3.

**SECTION AM106  
JOIST SPANS AND CANTILEVERS**

**AM106.1 Joist spans and cantilevers.** Joists spans shall be based upon Table R502.3.1(2) with 40 lbs per sq. ft. live load and 10 lbs per sq. ft. dead load. Floor joists for exterior decks may be cantilevered per Table R502.3.3 (1).

SPACING	2 x 6	2 x 8	2 x 10	2 x 12
12 inches	10-9	14-2	18-0	21-9
16 inches	9-9	12-10	16-1	18-10
19.2 inches	9-2	12-1	14-8	17-2
24 inches	8-6	11-0	13-1	15-5

Partial reprint of Table R502.3.1(2), #2 SYP only joist spans (ft-in)

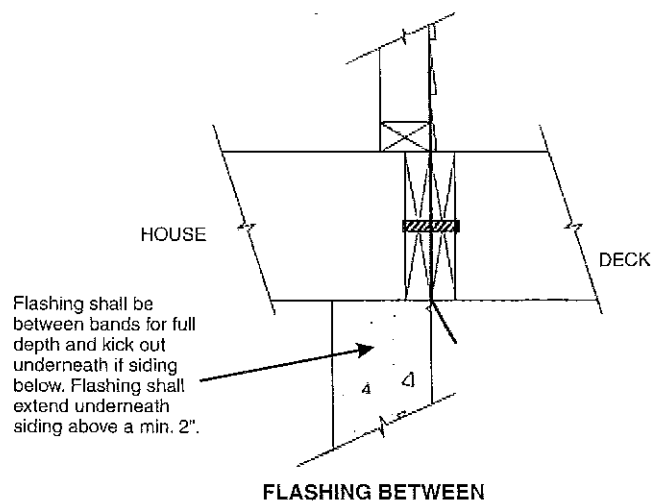
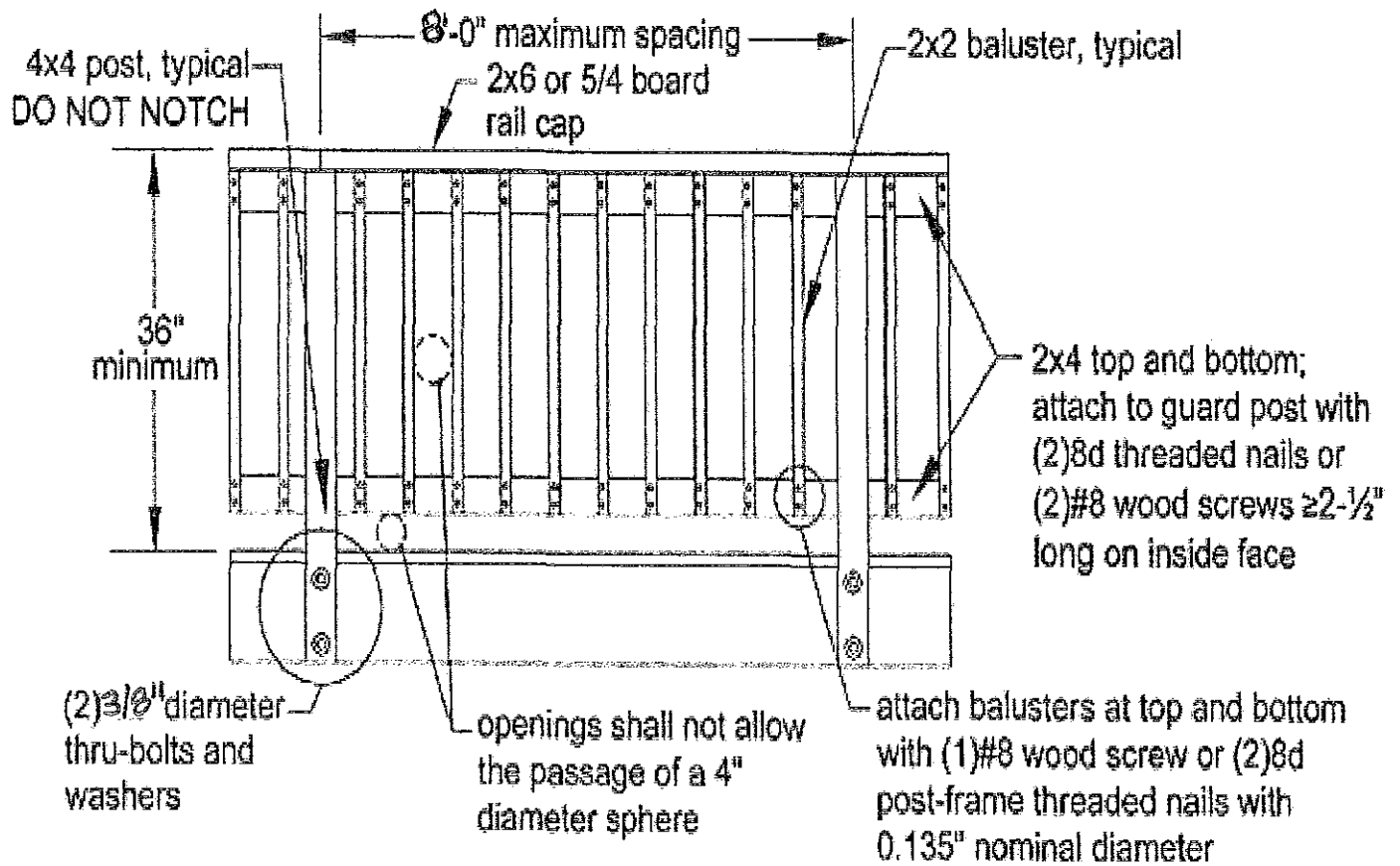
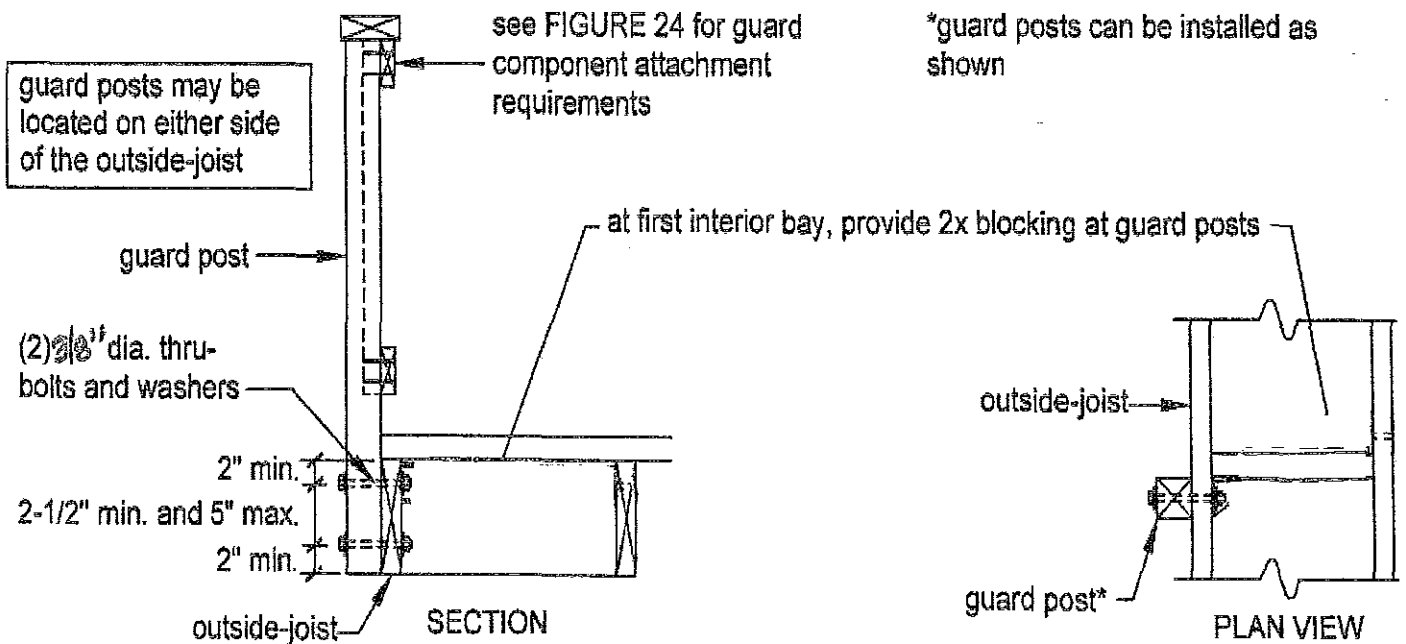


FIGURE AM103

## Guard Rail Detail



## Guard Post Detail





From: Conner, David [mailto:David.Conner@ncdoi.gov]

Sent: Wednesday, August 10, 2011 3:39 PM

To: Doug Beninate

Cc: jmcconstr1@aol.com; Moeller, Bill; Martin, Carl; Page, Mike; Gupton, Barry;  
jeff.griffin@mecklenburgcountync.gov

Subject: RE: notching of 4x4 post at deck rails.

Mr. Beninate

The NC Residential Code, Table R301.5<sup>1</sup> requires that guardrails be designed for a minimum concentrated live load of 200 pounds applied at any point along the top. Thus, the guardrail supporting post (rail post) must be designed for the same loading at the top of the post (36 inches above the floor). The current Appendix M includes an acceptable deck design that incorporates 4"x4" rail posts bolted to the exterior side of the deck band. In question is whether the 4"x4" post could be notched to effectively yield a 2"x4" section at its connection to the band. This office has evaluated both cross sections (for treated SYP) and the evaluation shows that for the 2"x4" section the allowable bending stress is severely exceeded. The bending stress for the 4"x4" section is just within the allowable limits. The full 4"x4" section is required so that the allowable bending stress is not exceeded.

David W. Conner, Sr., PE

Chief Residential Building Code Consultant

Office of State Fire Marshall

NC Department of Insurance

Phone (919) 661-5880 Ext. 229

FAX (919) 662-4414

David.Conner@ncdoi.gov