Southern Pine Decks and Porches

value comfort beauty durability

SOUTHERN FOREST PRODUCTS ASSOCIATION®

SouthernPineDecks.com

Safety First

When planning your deck, consider the safety of your family and guests. A deck is an uncovered, outdoor structural floor system that is expected to endure changing weather and resist significant loads and lateral forces over many years. Careful material selection, design, installation plus periodic inspection and maintenance are keys to avoiding an unexpected structural failure, which could result in serious injury or death.

The *Prescriptive Residential Wood Deck Construction Guide* from the American Wood Council provides code-compliant details for single-level residential decks. Both professionals and handy do-it-yourselfers can use this guide to help design and build safe decks. A PDF download is available at www.awc.org.

Preservatives

Today's pressure-treated wood products are manufactured with a new generation of preservatives and are safe for use around people, plants and pets. The treatment provides long-term resistance to decay and termite attack, with no components that are considered hazardous under Environmental Protection Agency (EPA) regulations. For more detailed information about available wood preservatives please refer to the booklet *Pressure-Treated Southern Pine*, available from the Southern Forest Products Association.

Handling Treated Wood

Dispose of treated wood in accordance with state, federal and local regulations. Treated wood should not be burned in open fires or in stoves, fireplaces or residential boilers.

Use common sense safety practices when working with all wood products. Avoid prolonged inhalation of sawdust. Use a dust mask and eye protection when sawing, sanding and machining wood. Wear gloves. After working with wood, wash exposed areas of skin thoroughly. Launder clothing before reuse. Wash work garments separately from other household clothing.

Inspect Your Deck Periodically

Inspect your deck at least once a year. Look for signs of decay and check the condition of structural connections and railings.

Getting Started

The location and design of a deck can be influenced by several factors:

- Preferred uses (sunbathing, large parties, family relaxation, outdoor cooking)
- Air circulation (take advantage of gentle breezes)
- Existing structure (compatible with function, environment, style)
- Sunlight (sun or shade)
- Privacy (screen certain areas, avoid street noise, landscaping)
- Terrain (elevated deck, ground level, split level)
- Access to and from the home (adjoin kitchen, den, bedroom)

Decks originally gained popularity as a way of adding outdoor living space on sloping lots. Today, however, many decks are built on level ground where they offer firm, dry footing close to the home.

It's important, of course, to locate the deck so that it does not obstruct access to any utility or drainage lines. Contact utility providers before any digging begins to determine the exact location of buried lines.

SOUTHERN FOREST PRODUCTS ASSOCIATION®

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Choose your Decking

Keep in mind the deck's intended use: Does it need to be large enough to accommodate furniture or the outdoor grill? How many people will be using the deck at any given time? These are points to consider while planning the proper size and design of your new deck.

Once the basic size, shape and location of the deck are determined, check local building codes. In addition to code requirements, there may be neighborhood covenants that restrict height and/or size of the deck. Contact your local building department. A construction permit may be needed, along with a copy of your plans. Do not purchase any materials or start work until all local requirements have been satisfied.

Pressure-treated Southern Pine is the most popular real wood decking choice. To satisfy the most discriminating homeowner, Southern Pine decking is offered in a variety of profiles and grades, along with water-repellent and re-drying options. Select the Southern Pine decking that is right for your project by reviewing the table and images below. The ultimate goal is a satisfied customer and fewer callbacks for the builder.

Table 1: Southern Pine Decking Selection Guide[1]

Decking Option	Grades	Size, inches Nominal (Actual)	Lengths by feet	Water Repellant[4] Kiln Dried[4]
Radius Edge[2] Decking	Premium Standard	5/4 x 6 (1 x 5½)	8, 10,12 14 & 16	Check Supplier
Dimension	No. 1 No. 2	2 x 4 (1½ x 3½) or 2 x 6 (1½ x 5½)	8, 10,12 14 & 16	Check Supplier
Patio[3]	Patio 1 Patio 2	5/4 x 6 ($1^{5}/_{32}$ x 5½)	8, 10,12 14 & 16	Check Supplier

1: Consult your local lumber dealer or find special option producers at southernpine.com product locator.
2: Radius Edge Decking (R.E.D.) is typically manufactured ¼" round on all four edges, but may be offered ¼" round on the top two edges only.
3: Patio typically manufactured $^{3}/_{8}$" round on all four edges.
4: Built-in water repellant and kiln drying options improve decking performance.

Tip
To avoid excessive cupping, do not install decking material wider than 6 inches.

A deck is made up of many components – footings, posts, beams, bracing, joists, decking, ledgers, rim boards, guard posts and railings, and stairs – all required to be properly connected together. Plan the layout of your deck carefully. Proper planning saves time, money, labor and material. For example, fewer cuts may be required if the dimensions of your deck call for using standardized lumber and decking lengths (8, 10, 12, 14 and 16 feet).

There are two common methods for supporting a deck. One practice, shown in Figure 1, is to construct a non-ledger deck supported on all corners by posts to support vertical loads. An alternative, shown in Figure 2, is to attach the deck (or porch) directly to the joist system of the house with a ledger board; proper installation and detailing of this ledger is critical.

Ledger Attachment

Lumber used for the ledger should be flashed to prevent moisture intrusion and decay. In normal backyard service, copper flashing is recommended, fastened with copper flashing nails (use like metals to avoid galvanic corrosion). In coastal applications, stainless steel flashing and fasteners are recommended. Aluminum flashing is not compatible with the copper in treated wood. Plastic is also not recommended since the flashing may become brittle and crack due to UV exposure.

Ground-Level Decks

Site preparation is very important for ground-level decks. Prepare an area approximately 2 feet larger than the footprint of the deck site. Remove sod to a depth of 2 or 3 inches and replace with fill (clay, sand, gravel) to prevent water from ponding beneath the deck. Be sure the ground is sloped to direct runoff away from the deck and home. To prevent weeds and unwanted vegetation from growing beneath the deck, spread 6-mil polyethylene sheeting over the area. Secure the sheeting around the edges with gravel, pebbles, bark chips or other decorative edging.

Footings & Posts

Footings transfer loads from the deck framing to the ground and should be securely anchored to resist uplift. Posts support the beams and transfer deck loads to the footings. Refer to the *Prescriptive Residential Wood Deck Construction Guide* (available at www.awc.org) for footing requirements, typical footing options, footing sizes and post requirements.

Deck posts are generally solid-sawn wood, but may also be glued-laminated timber or structural composite lumber. *The Prescriptive Residential Wood Deck Construction Guide* recommends a minimum 6x6 (nominal) post size for residential decks. A 6x6 post is conservative for most deck applications, allows a deck height of up to 14' and provides adequate bearing for beams. Diagonal bracing is required for decks greater than two feet above the ground.

Support posts can be notched within limits to accommodate bearing for the beam. However, notching may expose untreated wood to decay. Notching also reduces the post cross section, thus reducing strength. To avoid notching, use a post cap connector to attach the beam directly on top of the post. If high lateral loads are anticipated (wind or seismic), notching is prohibited.

Table 2: Southern Pine Post Heights for 6 x 6 Posts

Beam Span, L_B	10'			12'			14'			16'		
Joist span, L_J	≤10'	≤14'	≤18'	≤10'	≤14'	≤18'	≤10'	≤14'	≤18'	≤10'	≤14'	≤18'
Post Heights	14'	14'	12'	14'	13'	11'	14'	11'	9'	13'	10'	7'

1. Assumes 40 psf live load, 10 psf dead load, $L_B/4$ and $L_J/4$ overhangs, No.2. Stress grade and wet service conditions.
2. Assumes 1,500 psf soil bearing capacity and 150 pcf concrete. Value may be multiplied by 0.9 for corner posts.
3. Assumes 2,500 psi compressive strength of concrete. Coordinate footing thickness with post base and anchor requirements.
5. 8x8 nominal posts may be substituted anywhere in Table 4 to a maximum height of 14'.

Figure 1: Non-Ledger Deck

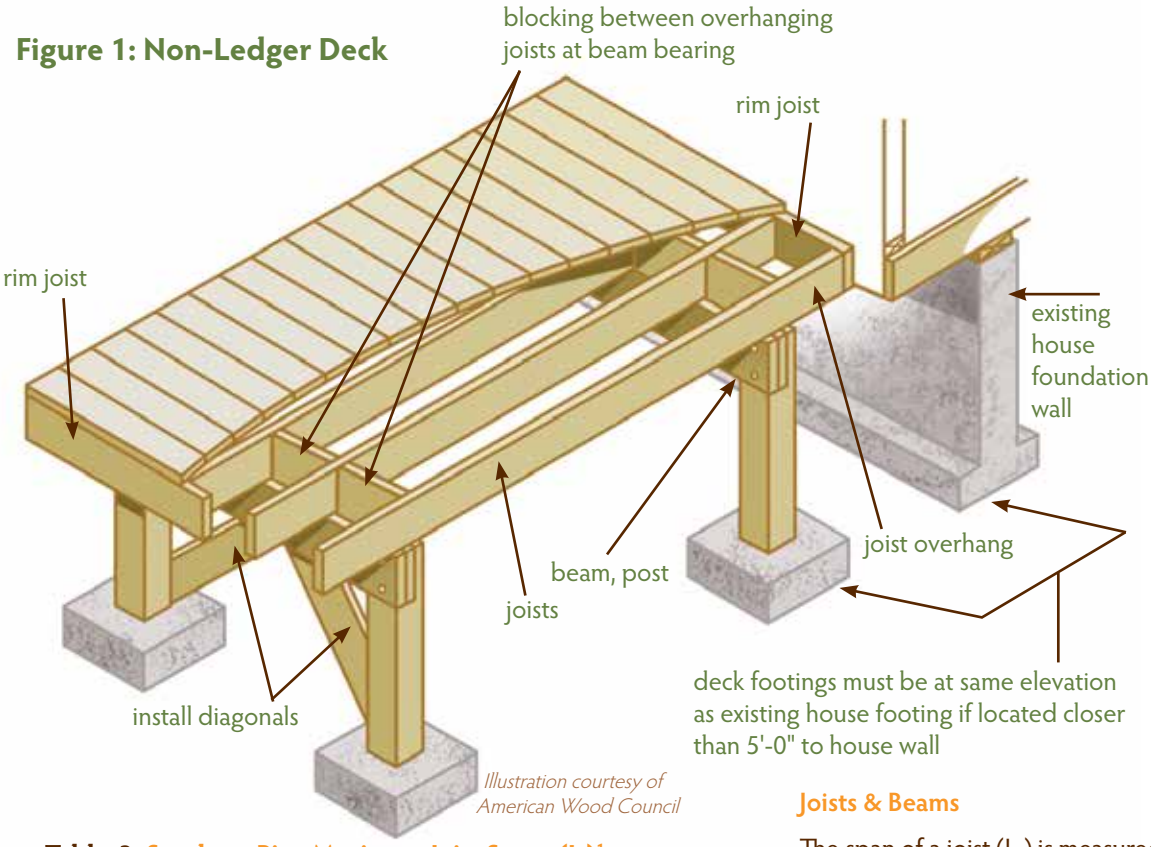


Illustration courtesy of American Wood Council

The Southern Pine lumber reference design values used in developing the tables in this brochure are design values that became effective June 1, 2013; they are from the *SPIB Standard Grading Rules for Southern Pine Lumber*, published by the Southern Pine Inspection Bureau (SPIB).

Table 3: Southern Pine Maximum Joist Spans (L_J)[1]

Size	Joist Spacing (o.c.) Allowable Span (L_J)			Allowable Overhang (L_O)[2]		
	12"	16"	24"	12"	16"	24"
2x8	13' - 1"	11' - 10"	9' - 8"	1' - 10"	2' - 0"	2' - 4"
2x10	16' - 2"	14' - 0"	11' - 5"	3' - 1"	3' - 5"	2' - 10"
2x12	18' - 0"[3]	16' - 6"	13' - 6"	4' - 6"	4' - 2"	3' - 4"

1 Assumes 40 psf live load, 10 psf dead load, L/360 deflection, No. 2 grade, and wet service conditions.
2 Maximum allowable overhang cannot exceed L/4 or ¼ of actual main span. Assumes cantilever length/180 deflection with 220 lb point load.
3 Joist length prescriptively limited to 18' - 0" for footing design.

Joists & Beams

The span of a joist (L_J) is measured from the centerline of bearing at one end of the joist to the centerline of bearing at the other end of the joist and does not include the length of the overhangs. Use Table 3 to determine Southern Pine joist spans based on lumber size and joist spacing.

Refer to Table 4 for Southern Pine deck beam spans (L_B). Joists may bear on the beam and extend past the beam centerline up to $L_J/4$, or the joists may attach to the side of the beam using joist hangers (however, joists shall not be attached to opposite sides of the same beam).

Refer to the *Prescriptive Residential Wood Deck Construction Guide* (available at www.awc.org) for joist-to-beam connection details, plus beam assembly details for multiple 2x members.

Table 4: Southern Pine Deck Beam Spans (L_B)[1]

Size[2]	Joist Spans (L_J) Less Than or Equal to: 6'	8'	10'	12'	14'	16'	18'
(2) 2x6	6' - 8"	5' - 8"	5' - 1"	4' - 7"	4' - 3"	4' - 0"	3' - 9"
(2) 2x8	8' - 6"	7' - 4"	6' - 6"	5' - 11"	5' - 6"	5' - 1"	4' - 9"
(2) 2x10	10' - 1"	8' - 9"	7' - 9"	7' - 1"	6' - 6"	6' - 1"	5' - 9"
(2) 2x12	11' - 11"	10' - 4"	9' - 2"	8' - 4"	7' - 9"	7' - 3"	6' - 9"
(3) 2x6	7' - 11"	7' - 2"	6' - 5"	5' - 10"	5' - 5"	5' - 0"	4' - 9"
(3) 2x8	10' - 7"	9' - 3"	8' - 3"	7' - 6"	6' - 11"	6' - 5"	6' - 1"
(3) 2x10	12' - 9"	11' - 0"	9' - 9"	8' - 9"	8' - 3"	7' - 8"	7' - 3"
(3) 2x12	15' - 0"	13' - 0"	11' - 7"	10' - 6"	9' - 9"	9' - 1"	8' - 7"

1. Assumes 40 psf live load, 10 psf dead load, L/360 simple span beam deflection limit, L/180 cantilever deflection limit, No. 2 stress grade, and wet service conditions. Deck beam spans (L_B) can extend past the post centerline up to $L_B/4$.
2. Beam depth must be equal to or greater than the joist depth if joist hangers are used.

Tip

Do not exceed maximum spans for structural deck components.

Decking

Southern Pine decking and 2x6 lumber used for decking are both rated to span up to 24 inches on center when installed perpendicular to the joist system (boards must span across at least three joists). However, many pros recommend limiting the R.E.D. span to 16 inches on center to reduce board deflection (springiness). When decking is installed diagonally, space joists 16 inches on center for both R.E.D. and 2x6.

The width of pressure-treated Southern Pine decking may vary due to moisture content, so spacing between boards should be adjusted at installation to compensate for shrinkage as the wood dries. Refer to Table 5 below.

Table 5: Recommended Spacing between Treated Southern Pine Decking Boards - 2x6 or 5/4 x6 Nominal

Width at Installation	Spacing (min - max)
5½" (wet or dry)	⅛" - ¼"
5⅝" (wet)	1/16" -⅛"
5¾" (wet)	No space
More than 5¾" (wet)	Allow drying time prior to installation

The most common decking fasteners are nails, screws and a variety of hidden fasteners. Refer to Table 6 below for proper nailing patterns for nails and screws.

Table 6: Decking Fastener Schedule

	Common Practice			Superior Performance		
Decking	5/4 x 6	2x4	2x6	5/4 x 6	2x4	2x6
Nails	(2) 8d	(2) 10d	(2) 10d	(3) 8d	(2) 10d	(3) 10d
Screws	(2) #8x2½"	(2) #8x3"	(2) #8x3"	(3) #8x2½"	(2) #8x3"	(3) #8x3"

Tip:
When attaching fasteners near the ends of decking, pre-drill holes to help prevent splitting. To improve fastener grip, double joists where deck boards abut.

Figure 2: Deck Supported by a Ledger Attached to the House

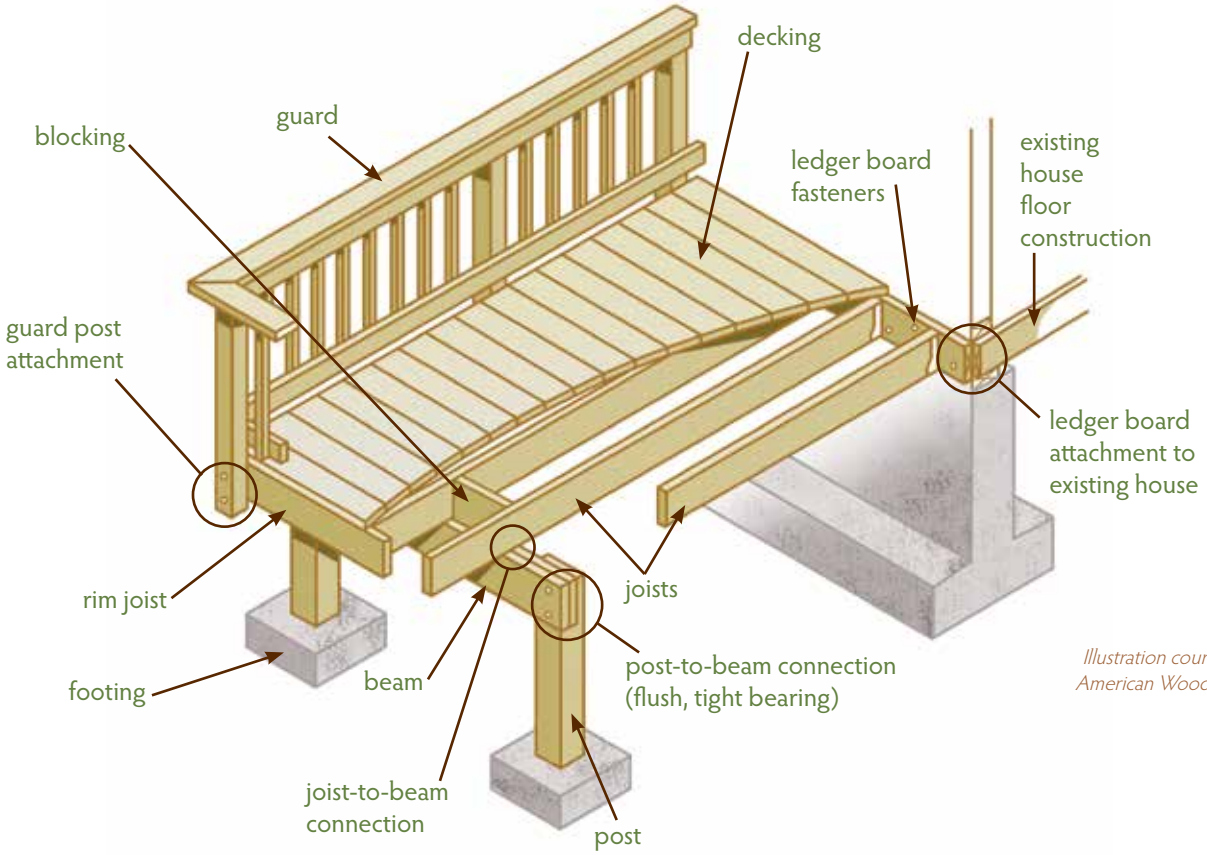


Illustration courtesy of American Wood Council

Connections

Proper connection of all deck components is vital to the long-term performance and safety of a deck. Refer to the *Prescriptive Residential Wood Deck Construction Guide* (available at www.awc.org) for proper connection details for the following:

- Footing-to-post connections
- Post-to-beam connections
- Joist-to-beam connections
- Decking-to-joist connections
- Rim joist connections
- Bracing attachments
- Ledger board attachments
- Non-ledger deck attachment to house
- Guard details and attachments
- Guard post attachments
- Stair details and attachments

All hardware in contact with pressure-treated wood must be corrosion-resistant. Hot-dipped galvanized fasteners and hardware offer the minimum code-acceptable corrosion resistance in contact with pressure-treated wood. Do not use standard carbon steel or aluminum fasteners and hardware.

Guards

Check with local building codes for specific guard requirements. In general, all decks that stand more than 30 inches above grade are required to have a guard (posts, rails, balusters) to protect occupants. Guard posts must be a minimum of 4x4 material. Guard railings along stairs must include a graspable handrail on at least one side. Railings must include a baluster system that prevents the passage of a 4-inch sphere. Refer to complete requirements and details for guards in the *Prescriptive Residential Wood Deck Construction Guide* (available at www.awc.org).

Tip:
The guard should be installed as an independent system. Do not incorporate ground support posts as part of the guard system. Guard posts should be properly connected to the rim joist. Upper ends of railing posts should be covered with caps or cut at an angle to shed water. Coat all cut ends with copper naphthenate.

The porch has withstood the test of time as an architectural icon, adding comfort, distinction and value. Today's home designs incorporate the porch as a natural extension of the family's living space.

Southern Pine, combined with the technology of wood preservation, is a superior choice for building a porch. With its built-in resistance to decay and termites, pressure-treated Southern Pine porch flooring, when properly installed, will provide decades of satisfying service.

The size, grade and pattern of flooring utilized in porches will depend upon the type of protection given to the structure. A porch, fully protected by a roof, incorporates the design of an outdoor floor system. Porches without complete roof protection are generally constructed in the same manner as outdoor decks, incorporating a surface of either 2″x 6″ nominal size or 5/4x6 radius edge pressure-treated Southern Pine.

Porch flooring material is widely available and similar in sizes, grades and patterns to flooring used for interior applications. Nominal thicknesses are typically 1″ and 1¼″ (¾″ and 1″ actual) with the tongue-and-groove (T&G) pattern, available in widths of 4″ to 6″ nominal (3⅛″ to 5⅛″ actual). For appearance considerations, the grade of C&Better is most often specified for porch flooring applications.

Generally, above-ground retention is adequate for porch flooring, floor joists, railings and other components used above ground, while a higher preservative retention for ground contact is necessary for wood in direct contact with the soil, such as posts.

Reducing the opportunities for dimensional changes to the material due to seasonal moisture fluctuations is the key to long-term performance of the porch floor. For porch flooring, the specification of material that is kiln-dried-after-treatment (KDAT) is highly recommended. Redrying the treated material will return each piece to a workable moisture content, generally to 19% or less. The advantages of KDAT flooring material include enhanced dimensional stability, plus reduced tendencies to warp, twist and cup.

When framing the porch, the maximum recommended joist spacing for installing Southern Pine porch flooring is 16 inches on center. For a more solid feel, 12 inches on center is an option. T&G porch flooring is fastened directly to the floor joists. Each piece of flooring is blind-nailed at every joist, using hot-dip galvanized 8d ringed-shank nails. A minimum ½" expansion space is maintained between the flooring area and house (or wall) to allow for seasonal dimensional changes. Extend flooring beyond the porch front band joist to allow a 1" overhang.

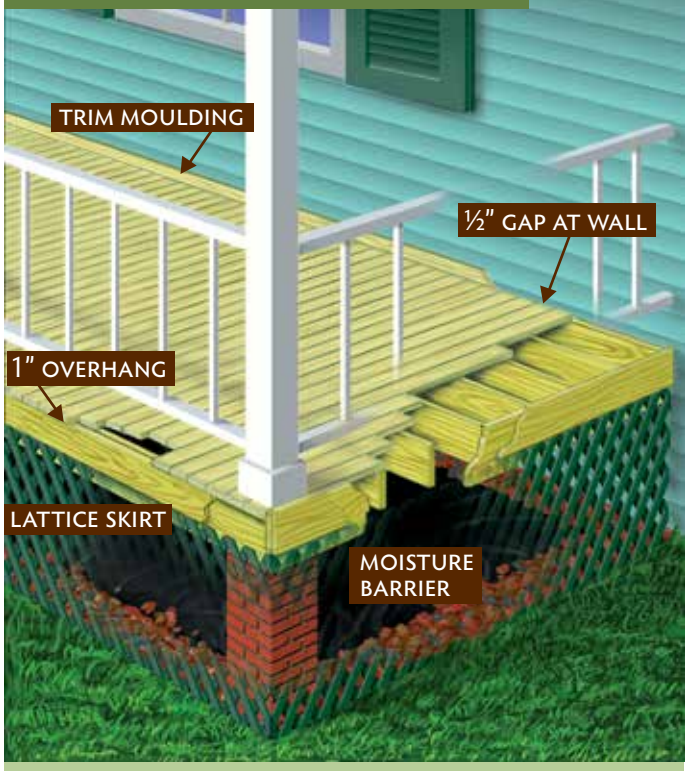
Tip:
Make sure the wood is treated for its intended exposure. Check plastic end tags or ink stamps affixed to the lumber for "above ground" or "ground contact."

Proper porch flooring installation actually can involve applying the finish prior to installation. Many builders start with a coat of a water-repellent sealer on the top of all floor joists, providing added protection against joist expansion due to excessive collection of moisture.

When installing the porch flooring material, begin with a coat of a mildew-resistant oil-based primer for exterior use applied to all four sides and the ends. Consider applying a coat of the final oil-based porch enamel to both the tongue and the grooves (also to the end of any piece that will be adjacent to the house) and installing it while the paint is still wet. This procedure not only assures an effective seal against moisture penetration, but also provides a good bond between floor boards.

Upon completion of the flooring installation, two coats of the oil-based porch enamel to the surface and exposed ends are recommended. To maintain the optimum performance of a porch following proper design, material specification, installation and finishing, a regular maintenance program should be undertaken. Inspection for water accumulation, integrity of the moisture barrier, and any raised fasteners are just a few items to include in a periodic examination of the structure. Refinishing porch flooring can be anticipated every three to five years, depending upon weather conditions, foot traffic and the amount of exposure to direct sunlight.

Figure 3: Porch Design Considerations



Attention to proper porch design is as important to the longevity of the structure as are the details of porch flooring specification and installation. Inadequate air circulation beneath the porch and trapped moisture between framing components will greatly reduce the serviceability and long-term appearance of the porch. The following recommendations are key elements to the proper design and construction of a fully-covered porch:

- Slope the exposed soil underneath the porch away from the center to permit runoff of any water that may accumulate.
- To reduce the upward migration of moisture from the exposed soil underneath the porch, cover with a suitable moisture barrier (such as 6-mil polyethylene), leaving two feet of exposed soil inside the perimeter of the porch. Anchor edges of this barrier with gravel.
- Encourage air flow beneath the porch by using ornamental vents or lattice skirting.
- Slope the porch framing 1/4" per foot away from the house to permit adequate water runoff.
- Vent columns at top and bottom.
- Check with your local building code department to be sure all code requirements are satisfied within your porch design.

Finishing & Maintenance

Decks and porches present a particularly severe exposure for both the wood and finishes. The horizontal surfaces, especially in decks, are often exposed to the direct rays of the sun and tend to collect moisture, therefore, the weathering process is greatly accelerated. As repeated cycles of wetting and drying occur, surface checks (small cracks) and end-grain surfaces begin to retain moisture.

As the decking continuously shrinks and swells with changes in its moisture content, any finish is likewise subjected to excessive stress. Furthermore, the finish is subjected to abrasive wear, particularly in high-traffic areas. By design, porches are somewhat protected, so the wearing conditions are not normally as severe.

Although treated wood is protected against decay and termite attack, the application of a water-repellent sealer to all exposed surfaces is recommended when construction is completed. This sealer will help control surface checking (splitting or cracking) and provide an attractive appearance. Over time, reapplication of a sealer is recommended, perhaps every year or two.

Over several months, pressure-treated Southern Pine will weather naturally to an appealing silver-gray color. Should you decide to paint or stain the treated material, you will find that it will accept a finish similar to untreated Southern Pine. Most importantly, treated Southern Pine should be dry before any type of finish is applied. Be sure to follow the paint or stain manufacturer's instructions carefully.

Following construction, stain and paint manufacturers typically recommend a waiting period – from a week to two months – before applying stain or paint to treated wood. If the project was built with material that was kiln-dried after treatment (KDAT), the finish can be applied right away. When using paint, most manufacturers recommend two coats of an acrylic latex paint for best results on treated Southern Pine. Solid-color stains should never be used on horizontal surfaces of decks and porches; these will not withstand the wear of foot traffic. For best results, follow the manufacturer's instructions and the advice of your local paint dealer.

Tip

Many formulations for pressure treating Southern Pine materials include a water-repellent component, and even color additives. Marketed under a variety of brand names, these treatments provide convenience as well as optimum appearance for deck and porch projects.

If the decking material was purchased wet (not re-dried after treatment), allow the wood time to dry before finishing. Drying time will depend upon the product used and local climate conditions. On weathered decks, the original color of the wood can be restored (and surface mildew and mold removed) using one of the available products, sold as deck cleaners, brighteners or restorers. If a pressure washer is used to clean the deck or porch surface, care should be taken not to remove part of the wood itself.

Paint may be used successfully on roof-protected porch floors. Many paint manufacturers offer products specifically for painting porch floors. For optimum results, first treat the wood with a water-repellent sealer. After drying, a primer plus two topcoats of a porch enamel can be applied. Porch enamel is specially formulated to resist abrasion and wear. If a stain is preferred, semi-transparent is recommended. Solid-color stains tend to crack and peel on walking surfaces.

Inspect your deck and porch once a year for signs of decay, condition of structural connections and the security of guard railings and stairs. For a self-inspection checklist, visit the North American Deck & Railing Association online at www.nadra.org.

Tip

The Splash Test

Regardless of a deck's age, when should you apply (or reapply) a finish? Here's a simple test:
First, be sure the wood surface is thoroughly dry. Splash water and observe its dispersion.

A. Water droplets form on contact when:
(1) for newly constructed decks, the lumber is not yet sufficiently dry to accept a finish, OR
(2) for existing decks, the finish is performing satisfactorily

B. If droplets do not form and water is absorbed into the wood, it's time to apply or reapply a sealer or stain.

Finish is OK

Time to reapply

The Green Choice

Wood products are the most environmentally responsible building material available, making them the green choice. Wood is renewable, stores carbon and has a low environmental impact. In addition, wood products are the only major building products with a third-party certification system in place to verify their origination from sustainably managed resources.

sustainable resources

Wood products are produced from trees, a naturally renewable resource. More wood is grown each year in the U.S. than is harvested.

responsible manufacturing

Waste is virtually eliminated when trees are used to make wood products. Bark, trims and sawdust are used as an energy source to help power wood production facilities. It takes far less energy and fossil fuels to produce wood products than to manufacture concrete and steel.

quality construction

As a building material, wood offers a unique combination of benefits, including strength, affordability, ease-of-use and environmental superiority.

long service life

The durability of wood products contributes to the long life of a home. Wood products also store carbon, reducing the amount of carbon in the atmosphere.

renovation upgrade

The flexibility of wood makes renovating a home easy and affordable. Wood is builder-friendly, as well as environmentally friendly. Wood also enhances the aesthetic value of a home when used as flooring, cabinetry, furniture and molding.

recycle renew

At the end of their initial service life, wood products are easily recycled for other uses. Wood contributes fewer greenhouse gas emissions than non-renewable steel and concrete.

ADDITIONAL RESOURCES

A PDF download is available at SouthernPine.com for these helpful publications:

- **Pressure-Treated Southern Pine** preservatives, standards, fasteners and connectors, proper use and handling
- **Southern Pine Use Guide** grade descriptions, design values, specification guidelines
- **Marine Construction Guide** product selection, design details for marine applications

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