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“Understanding Porches: Best practices for construction &
technique for repair”

By Mary Ellen Polson

understanding
PORCHES

BY MARY ELLEN POLSON

BEST PRACTICES
FOR
construction
& techniques
FOR REPAIR



Porches are subject to the insidious force of all weathers, from driving rain and bleaching sun to wind-driven snow and high humidity. If not kept in good repair using water-resistant materials and strategically applied coats of paint, the key elements of a porch—floors, framing, posts, railings, and decorative elements—will deteriorate quickly.

Original porches are survivors for two reasons. The first is that many were built with old-growth lumber that's dense and sap-rich, resistant to both penetrating water and insects, with longevity that ranges from decades to centuries. As OHJ has been repeating for more than 40 years, lumber of that quality is nearly impossible to find today, so it makes sense to preserve and re-use as much of the original material as possible.

Less well known but equally important is the fact that older porches were constructed with techniques that encourage water to escape quickly and that permit ventilation between individual components. Many of these details are subtle and easily overlooked. Before beginning any restoration or rebuilding, it's worthwhile to document existing joinery and spacing details with photographs and/or a sketch that includes measurements on all components, even when the parts are beyond saving. What's left may provide clues to construction techniques that gave the porch its initial long life.

PORCH, PIAZZA, OR VERANDAH?

Victorians used terms like porch, verandah, and piazza to mark social differences more than architectural ones. The Italian word for a square, "piazza" is an evocative misnomer used for the structure of column and roof, like the gallery porch on an Italian villa. Verandah was later used for more elaborate porches, especially those that spanned full width or turned a corner to extend on a second side. In the 20th century, when designs were simplified and Victorian labels seen as fussy artifice, the word "porch" sufficed.

A Decorative Railing that Meets Code

When Jill Chase and I added a verandah to our 1920s home (see p. 24), the porch deck was low enough over the ground to not require a railing. The steps to the side yard, however, were a different matter. **By Bill Ticineto**

1. DESIGN

My first design attempt for the stair railing specified off-the-shelf materials. With simple spindles and plain rails, the design met building-code requirements but was too tall and angular for our taste (we're both designers). To include decorative details that had inspired us, my next design incorporated two elements: a ball-and-spindle run between top and middle rails, and slats between middle and bottom rails. Creating two sections gave the balustrade proportions that look right architecturally and historically, even though the finished railing is much taller than one typical of period porches.

2. CONSTRUCT

It also meant creating three rails instead of two. Doing all the work myself, I envisioned each as a housing to protect the decorative spindles and slats beneath. I made the wide, tapered caps from two blocks of 2x4 CVG Douglas fir on a bandsaw, then joined the top cap to a housing constructed of the same wood. Where the caps changed angles, both pieces were joined with biscuits at several points, then glued and screwed together.

3. DRILL

The ball-and-spindle (or dowel) trim came as stock parts, in poplar. I gave the wood extra primer and paint, since it's not as sturdy as Douglas fir. To get the spindle elements to interlock with the top and middle rails, I stacked the part of the rail housing where they would attach on a jig set at the correct angle, then drilled upper and lower holes simultaneously. The decorative slats—with a cutout pattern repeated elsewhere in the house—are slotted into housings in the middle and bottom rails.

4. ASSEMBLE

Once all of the components were cut and drilled, I primed and painted every surface, using a shellac-based primer and finishing with alkyd enamel porch paint. The handrail is screwed and bolted together; it can be removed for maintenance, as can the rain-shedding cedar post caps, which are attached with hidden Velcro. Even the decorative part of the paneled newel post (a separate construction project) slides, like a vertical sleeve, over the plain cedar structural posts installed by our builder during initial porch construction.



A FILM OF PROTECTION

The only real protection for a wood porch exposed to the elements is a good quality paint or pigmented stain. Prime each component on all sides as you construct or repair the porch, and finish with at least two thin coats of paint or stain. Oil-based enamels are traditional and offer good longevity, as do marine paints and stains. The penetrating semi-transparent stains used for fully exposed decks are a good alternative for porch flooring.



Porch Construction & Maintenance

A porch is covered, yet exposed to the elements. High-quality materials and construction details that encourage the structure and all of its many components to shed water will help give this outdoor room a long life.

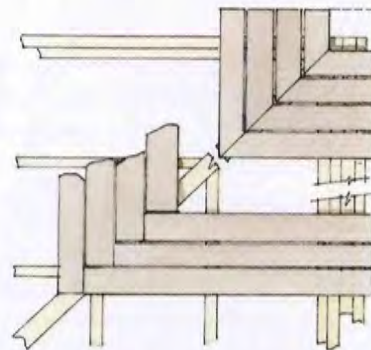
FOUNDATION A good porch starts with good footings. While the earliest porches were built on large stones set deep into the ground or full masonry piers of fieldstone or brick, contemporary building codes call for footers of poured concrete.

Porches that have settled or sagged should first be raised as close as possible to the original position using jacks, shims or 2x4 props. (Take care not to raise it so high that you disturb or damage intact structural or trim elements.)

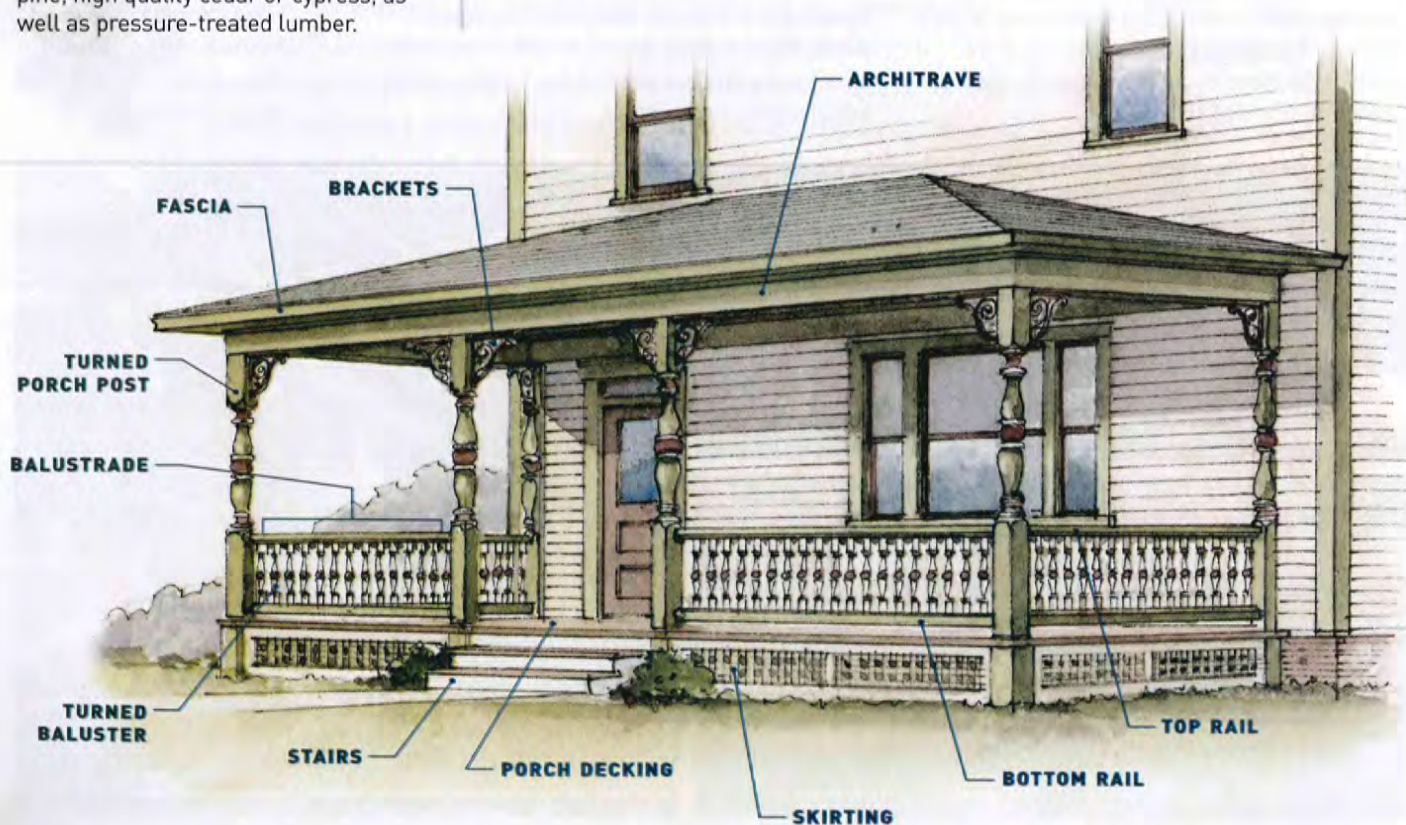
Excavate space for new footings below the frost line, then pour the concrete and allow it to fully cure. Then reuse the historic stone or brick above grade to conceal the exposed part of the footings.

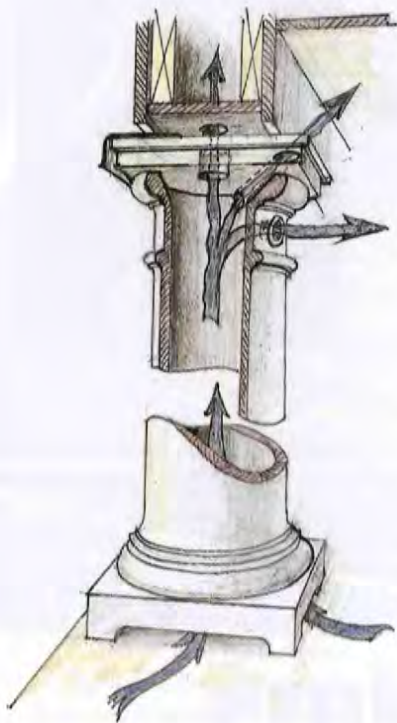
Set posts of naturally rot-resistant wood, chamfered and notched to support the upper framing, on the new footings. Choices include eastern white pine, high quality cedar or cypress, as well as pressure-treated lumber.

DECK FRAMING Deck framing is the most common area for rot damage on a porch. Before about 1860, deck frames were often built of large logs called "sleepers." These sturdy logs were hewn flat on one or two sides, with one of the flat side facing up to act as floor joists. If your porch has sleepers that are rotted, replace them with supporting beams of comparable heft. **Before ripping out wood that's too far gone to repair, take note of all the connections and spacers.** When doubling up of support beams is called for—say when replacing an old beam with a pair of 2x10s—place shims between the boards every few feet to allow water to pass through. The shims needn't be large: a piece of rot-resistant wood that's ¼" thick and 2" long is enough to create a gap for water to drip through and permit ventilation.



TURNING THE CORNER On a porch with changes of direction (for example, on a verandah that turns a corner and continues on a second side of the house), cut the boards where they meet along a diagonal. There are two classic join patterns: miter joints (shown at top) and heringbone joints (bottom).





POSTS & COLUMNS Whether turned or chamfered, porch posts support the roof-framing system (a topic for another story) and act as anchors for attached railings. If they're made of old-growth wood and positioned correctly, they should last indefinitely—provided they are properly ventilated.

It's important that wood posts and columns not come in direct contact with the wood floor of the porch. Columns that are not solid wood should also be vented at both bottom and top. For posts, use a concealed post support of metal or PVC. Mount new wood columns on an aluminum, composite, or masonry plinth or base.

While methods to repair rotted porch posts and columns could easily fill an entire issue, consider making repairs using epoxy (see p. 44). Another alternative is to install plain cedar posts covered with custom-made sheathing, or replace severely rotted posts with composite materials that can be shaped to historical specifications.

ABOVE Vent wood columns at the top and especially at the bottom, where water can collect. Depending on the column, the exit can be through the top of the capital or on the face of the column.

PORCH FLOORS Historically, porch floorboards were milled from vertical grain $\frac{5}{4}$ " tongue-and-groove Douglas fir, which meant they were fully 1" thick. The ends were often shaped in a half-round bullnose by an onsite carpenter, the better to shed water. After World War II, board thicknesses shrank to $\frac{3}{4}$ ", and the ends were typically square-cut, both compromises in terms of the expected lifespan of the wood.

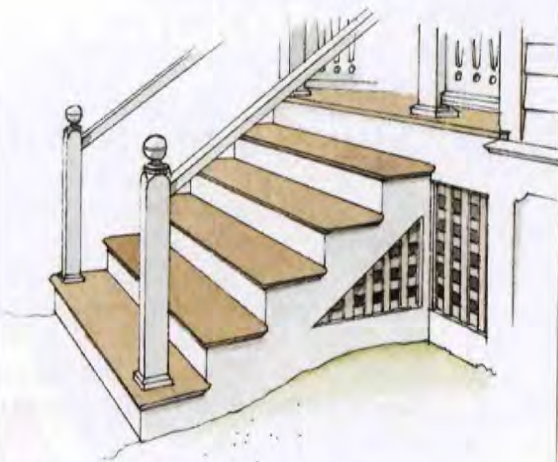
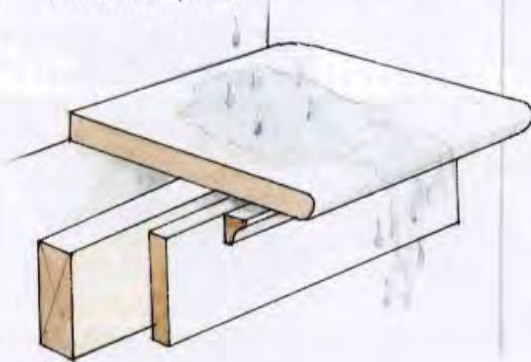
For best longevity, choose 1" thick tongue-and-groove vertical-grain boards, preferably at least 5" wide. **The wood should be a high-quality, rot-resistant species such as cedar, cypress, Douglas fir, ipe, mahogany, or another tropical wood.** Traditionally, boards are laid running perpendicular to the house.

Make sure the porch floor has a slight slope to it—between $\frac{1}{8}$ " and $\frac{1}{4}$ " per linear foot for tongue-and-groove floors. (If the porch is deeper than 8', use a slope closer to $\frac{1}{8}$ " per foot to avoid a pronounced slant.)

If the porch floor isn't tongue-and-groove, allow at least $\frac{1}{4}$ " between new or replacement boards as you lay them, to permit water to flow through the decking. Many construction experts say there's no need to factor in a slope for spaced floorboards, since the water can drain through easily.

Before laying the boards, prime every surface on every board, including the tongue and groove. To further limit the penetration of water, add a bead of paintable caulk to the interior groove as you lay in each board before nailing it into place. Wipe away the excess with a clean wet rag; otherwise, you may need to do some spot sanding before finish-painting the porch floor.

BELOW To give the boards every advantage against water, add a half bullnose cut to the ends on the top side.



STAIRS/SKIRTING Stair treads should overlap risers and stringers by about 1" and slope forward slightly to drain water. Use a router to create bullnose edges on both tread ends and edges. The ventilated skirting underneath the porch allows air to circulate and keeps animals from invading the space under the house.

Ventilation is crucial for preventing dampness, which can attract wood-eating insects and encourage decay. "You want the bugs to crawl in," says Andrew Curtis, an exterior restoration specialist, "and you want them to crawl back out."

Skirting aprons usually have ventilated panels that are hung, hinged, or tacked to the framing or bandboard. Clever ones are designed so at least one panel is removable for access to underneath the porch.

BALUSTERS & RAILS The balustrade is an assemblage consisting of top and bottom rails and the connecting vertical balusters. Balustrades are especially vulnerable to weather, given the structure's position at the edge of the porch. When rebuilding a balustrade, **copy or approximate the sloping profile of the top rail so that it sheds water easily.**

Match joinery details as closely as possible too, and cut new pieces from wood of comparable quality, preferably of the same species. Rails, balusters, and any decorative component should interlock soundly, like a three-dimensional puzzle.

Before assembling parts that mate, prime or seal the hidden sides of all joints. For rails spanning more than 8', place one or two small, painted support blocks between the bottom rail and the porch floor.

Gingerbread Restoration

Restoring the ornate porch on the Judge William D. Fenton House, a Queen Anne on the National Register of Historic Places, in Portland, Oregon, posed a series of construction challenges for the team from Full Circa Inc. The floorboards were rotted, supporting joists had separated from the decking, and many of the intricate fretwork panels were damaged beyond repair.

While the team restored and reused as many of the fretwork 1' x 16" panels they could, simply removing the old paint was tremendously labor intensive. "In some places, the paint was more than 1/8" thick," says Andrew Curtis, owner and president of Full Circa. "We actually had to cut paint out of the crevices with a scroll saw."

On a project spanning more than a year, the team erected a temporary shelter in the yard to stage the work: all components were transferred to the shelter, where they were labeled and numbered for later reassembly.

Much of the paint removal was done by a lead abatement firm. That way, the work was in full compliance with local and national codes for the removal of lead paint. Where replacement structural elements were needed, the team used clear vertical grain cedar or Douglas fir, opting for salvaged wood when available.

One of the most challenging construction puzzles was what to do about the fretwork panels. The originals were cut from old-growth wood. Comparable wood was not available, and Curtis knew from experience that new wood wouldn't hold up for more than five years without needing maintenance.

Curtis also knew that synthetic PVC composite might be a good compromise solution. Working with the flat, non-textured side up, the new decorative panels were cut from solid PVC sheets made by AZEK (azek.com). The material won't shrink or swell, and takes paint well. "It looks just like wood when you brush paint on," Curtis says.



LIQUID STRENGTH

When restoring a 120-year-old porch with components that include curving horizontal members that have been turned on a lathe, replacing original wood is usually the last option. To strengthen reusable structural elements, the Full Circa team treated damaged, dry, or paint-resistant wood with epoxies, using both liquid and paste versions from Abatron (abatron.com). Depending on the problem to be addressed, liquid epoxy parts A and B are mixed to different viscosities. Dry rotted or "punky" wood, for example, might get a brushing of liquid epoxy mixed to the consistency of thin syrup.

Paste epoxies make excellent fillers and extenders. The team also scrubbed miter and scarf joints with Gorilla Glue. The glue foams up when applied with a wet rag and acts as both epoxy and primer, says Curtis, especially over hard-to-remove paint. The result is a stable surface that won't move.

LEFT A section with fretwork panels restored. Some are original; others were cut from a dimensionally stable PVC composite.



PATTERN

Elaborate ornament, like lacy panels cut on a scroll saw, is a signature of the Queen Anne porch.