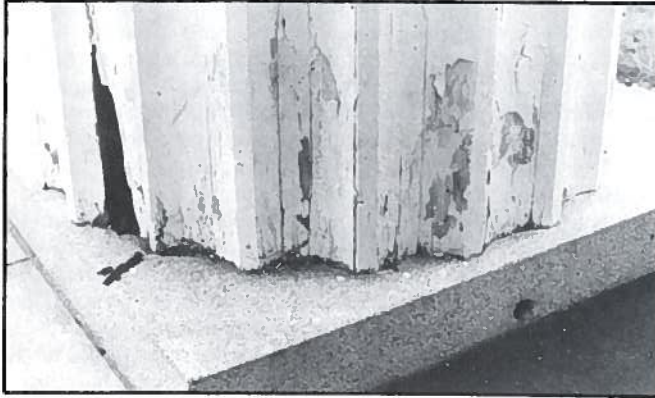


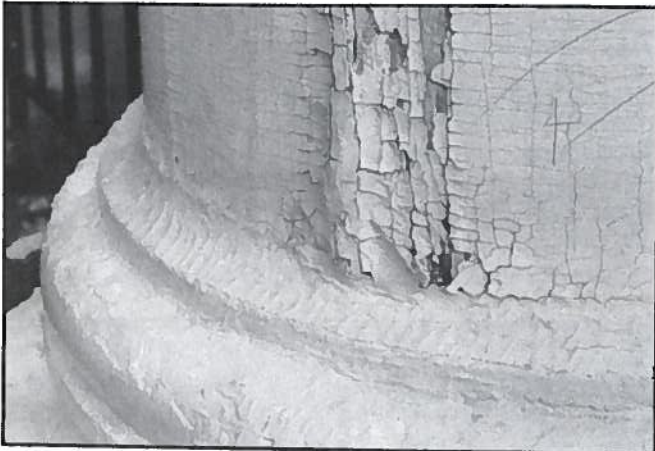
BIG REPAIRS COLUMN

by John Leeke

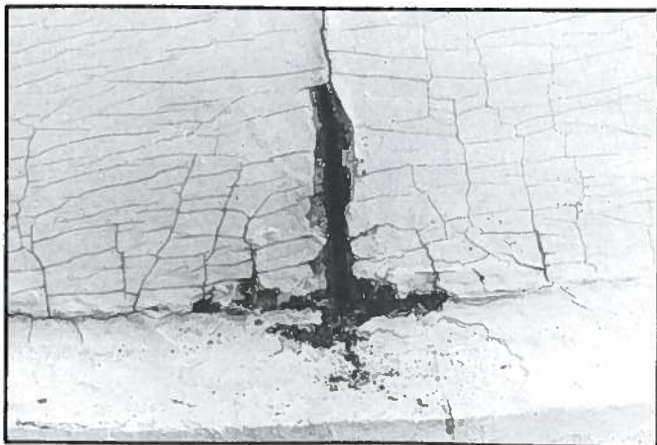
To accompany the preceding case history, John Leeke provides technical notes and photos from similar projects



Paint failures tell their own story: Peeling down to bare wood indicates excessive moisture.



Alligatoring and cracking indicates the paint film is too thick. The remedy is to strip and repaint.



Vertical cracks indicate loose and open wood joints beneath the paint — movement is the culprit here.

Big columns — those over 18 inches in diameter or 20 feet tall — are complex wooden structures that require special attention. Repairs make good economic sense, as complete replacement costs are high. However, you can expect a return on your investment of money and effort only if the repairs will have a long life. In this article, I'll show you how to make effective repairs that will last.

EVALUATING COLUMNS

Movement and moisture cause columns to fail. Moisture penetrates in several ways: Flashing at the capital may be deteriorated, or the deck of a second-floor balcony may drain into the columns. Failing paint on column exteriors lets rainwater saturate the wood. Backsplash from the roof often attacks column bases from above; rising damp from masonry foundations invades them from below.

Movement, either at the entablature or the foundation, can break columns apart. This kind of movement can be very slow, taking place over many years. Sometimes, stresses build up and release suddenly with dramatic, serious consequences (say, the crushing of a base). More often, column parts just move slightly, adjusting to new positions.

A third reason why columns fail, of course, is lack of regular, effective maintenance. The key to successfully evaluating columns is to look for the underlying causes of problems before jumping to conclusions about what should be done.

Often a thin shell of sound wood covers a seriously decayed area. Tap the suspect area with your knuckle or a screwdriver handle and listen for a hollow sound that differs from the surrounding area. (If the shell is thick, though, the sound won't give you a clue, so more invasive methods will be needed to find the extent of the decay.)

"Probe with an ice pick to find soft, decayed wood. Jab the pick into a wood surface at an angle and pry up a small section of the wood. Sound wood will separate in long fibrous splinters, but decayed wood will lift up in short, irregular pieces due to the breakdown of fiber strength" (National Park Service).

Drill a hole with an auger bit and brace. Damp chips indicate the obvious, while wood that is dark but dry may have been very wet at one time. Look for more decayed wood nearby.

To check the alignment of columns, sight down the row of plinths or along the edge of the porch decking, or stretch a chalkline. Look for sections that are higher or lower than the rest.

Do the same for the capitals above, but be careful on ladders. Sometimes a good view is available from the upstairs of a neighboring house.



Look for cracks in the foundation that indicate movement, possibly breaking up base parts between the joints.

COMMON PROBLEMS

Decay in bases and plinths: The most common problem, always caused by excessive moisture. The moisture may be rising up through masonry due to hygroscopic action, or dripping down from above. Either way, the source must be eliminated. A moving foundation may be breaking up base parts, leaving gaps at the joints that let water run in. Stabilize the foundation before proceeding with column repairs. Add ventilation to the columns to help keep them dry inside.

Loose or open stave joints: These are almost always caused by movement. Correct poor foundation and structural conditions. The glue in the stave joints may have failed due to moisture, so stabilize by regluing or doweling.

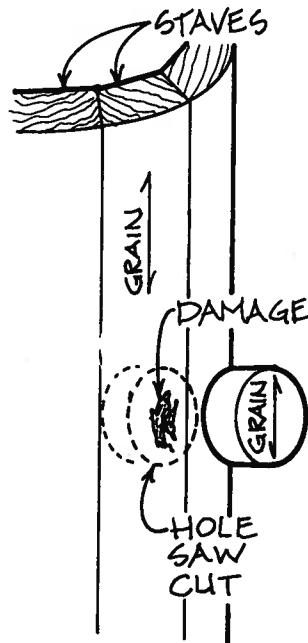
Woodpecker holes: Why did the birds make the holes in the first place? Usually, they were after insects, and the insects were probably there because the wood was very moist. Resolve all moisture and insect problems before you fill the holes. Woodpecker holes are likely to be 1½ inches in diameter or larger.

WOOD PLUG REPAIRS

Small holes (1 inch or less) are most effectively repaired with epoxy fillers. For those greater than three-quarters the width of a stave, it's best to replace a whole section of the stave. Use round wood plugs, though, to fill holes between these two sizes, say, those made by woodpeckers, or any up to 2½ or 3 inches in diameter.

To prepare the column for a wood plug, even-up the hole to a slightly larger diameter with an electric drill and hole saw. The result should be a hole with fairly smooth, straight sides (not undercut).

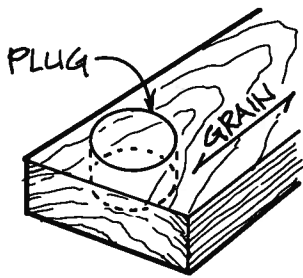
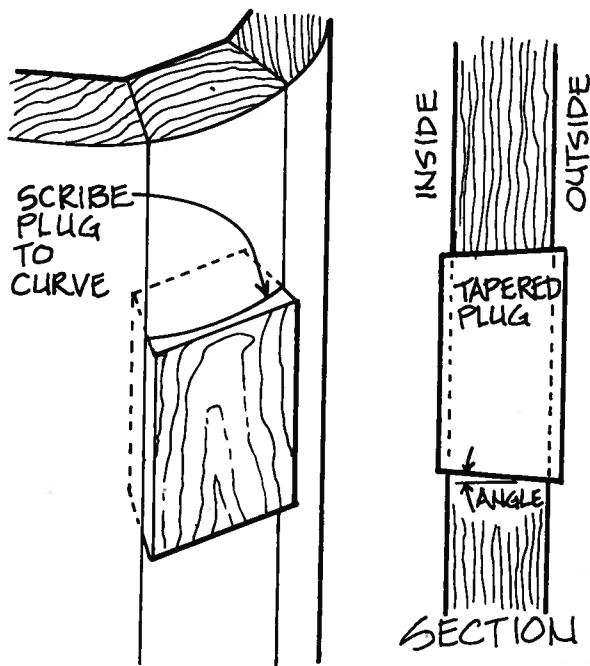
Next, using a sabre saw or bandsaw, make a plug out of wood the same species and thickness as the column shaft. To match the expansion and contraction of the surrounding wood, the grain of the plug



the plug in its hole with weatherproof glue, checking grain direction. After the glue is set, trim the face of the plug flush with the surface of the shaft.

REPLACING STAVE SECTIONS

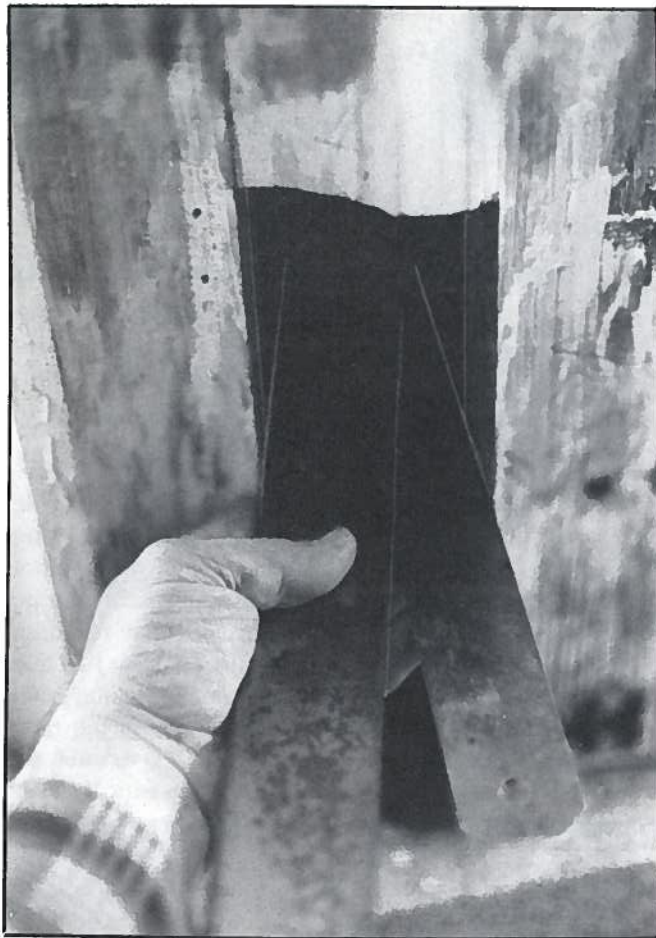
Repairing woodpecker holes near the top of the shaft, or decay at the base, often means replacing stave sections. In removing damaged sections, first determine where decayed wood ends and sound wood begins by using the auger-bit technique. Then saw across the grain of the stave with a keyhole saw or sabre saw until your cut meets the stave joint on each side. Make the cut at a slight angle as shown in the drawing.



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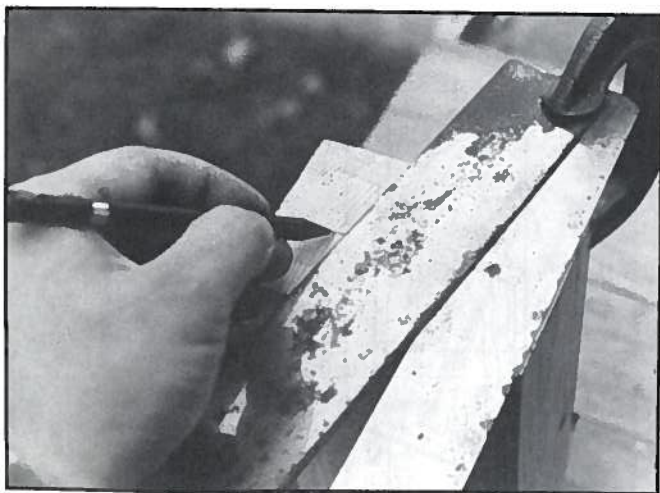
must go in the same direction as the area of the column it's set into — otherwise, the joint between the two may fail. Turn the plug blank to a very slightly tapered shape on the screw-point chuck of a lathe (dressing the sides on a sander works too). Use a sample hole as a guide, and taper the plug so it will stand slightly higher than the surrounding surface when it is fit snugly in the hole.

Closeness of the final fit depends on the type of glue used. With gap-filling glue (like epoxy) a close fit is not critical. A non-gap-filling glue (like formaldehyde-resourcinol) requires a close fit. Glue

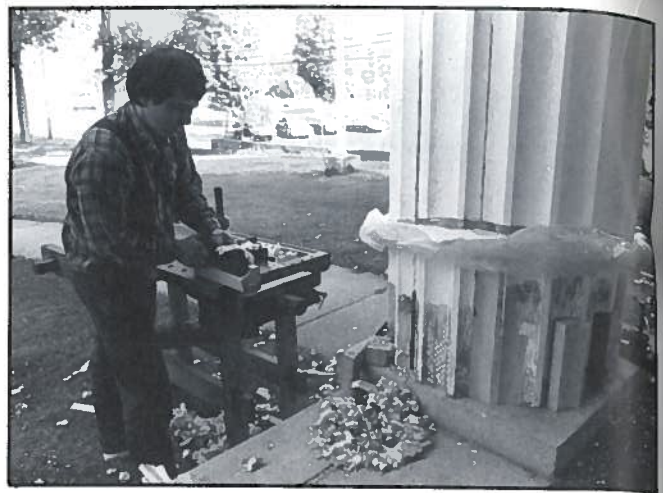


Above: An angle copier — improvised from two straight edges and a clamp — is a big help when replacing stave sections. Maneuver the straight edges so that they mate with the angle of the “walls” in the opening.

Below: The next step is to remove the copier and transfer the measurement to the new stock. (Be careful not to move the straight edges while working.)



Next, prepare the joints of the adjacent staves. Old paint and putty must be cleaned off to expose fresh wood without changing the angle of the surface. Existing splines or tongues in the staves may also have to be trimmed even,

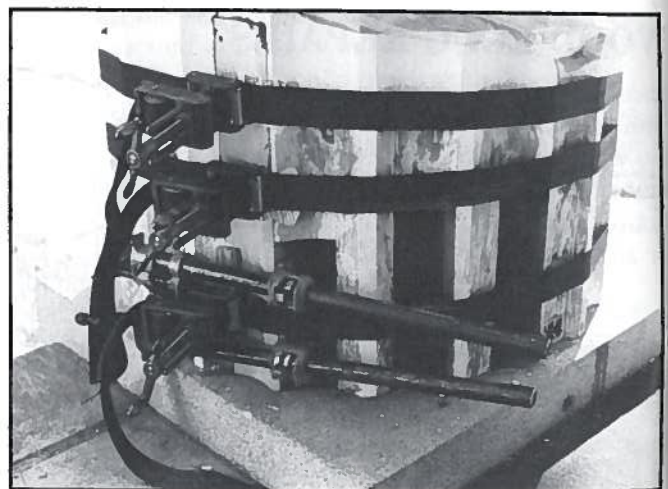


to mate with the new repair piece.

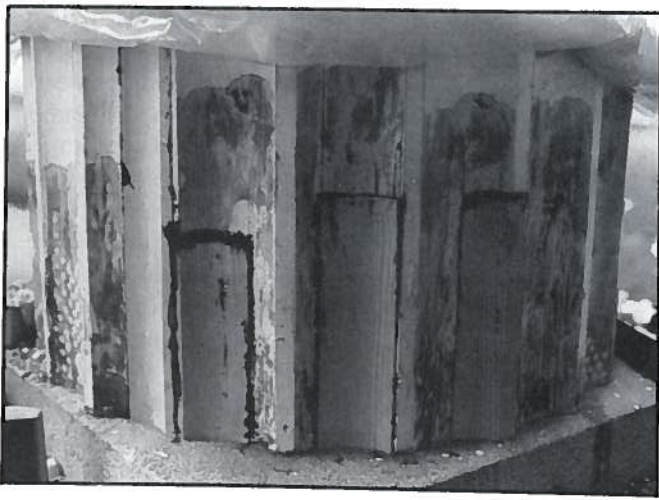
In making replacement stave sections, use wood stock that matches the column in species and end-grain orientation (for the same reasons outlined above). Measure the angle of the adjacent stave joint surfaces with a tool comprised of two pieces of sheet metal and a C-clamp. Then transfer the angle to both ends of the stock. Plane the stock down to form a new stave with a cross section that corresponds to the transferred angles, leaving just enough wood so that the block is slightly too large to fit. Next, cut off both ends to the correct length with the same slight angle used to cut out the decayed section. Again, make the stock just a little oversize.

The result should be a block of wood beveled on all four sides. Test fit the block into its opening and trim the sides until the face of the block seats nearly flush with the highest outer surface of the column.

While the block is still in place, scribe both ends with a pencil to match the curve of the shaft surface. After scribing, take the block out again and plane the face to match the curve of the shaft surface. Leave the surface a little proud of the end grain-scribe marks.

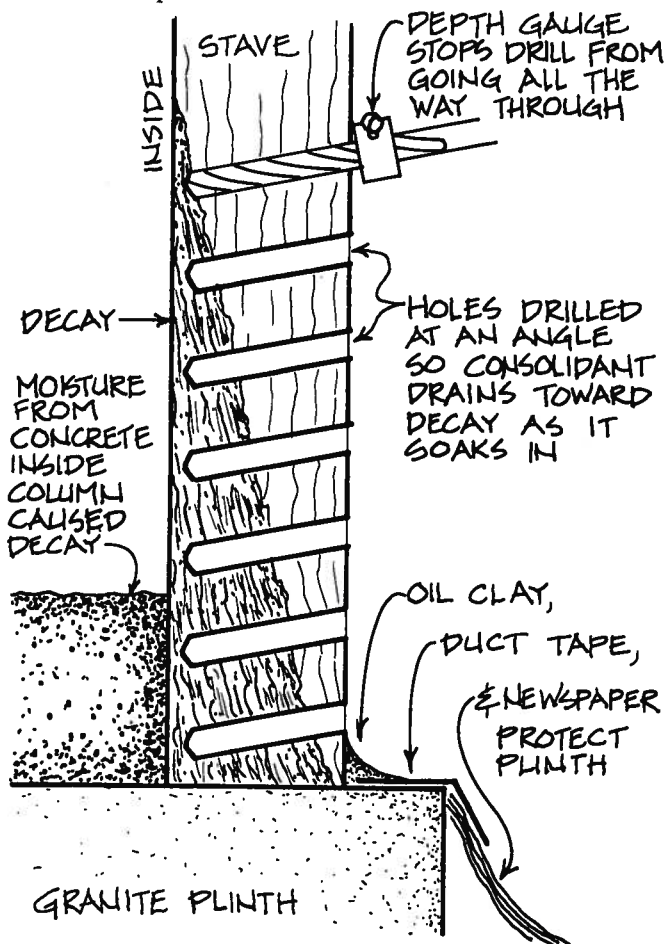


Once the block is shaped, it can be clamped in place with weatherproof glue. After the glue is set, the face of this new stave section can be finish-trimmed with a hand plane so that it is level with the surface of the shaft.



STABILIZING DECAY WITH EPOXY

Treating decayed wood in big columns often can be a tricky assignment because the subjects of repair must remain in place. Not only does it complicate finding ongoing decay in hidden interior areas, but it also means repairing the columns without the luxury of moving them to a convenient workspace.

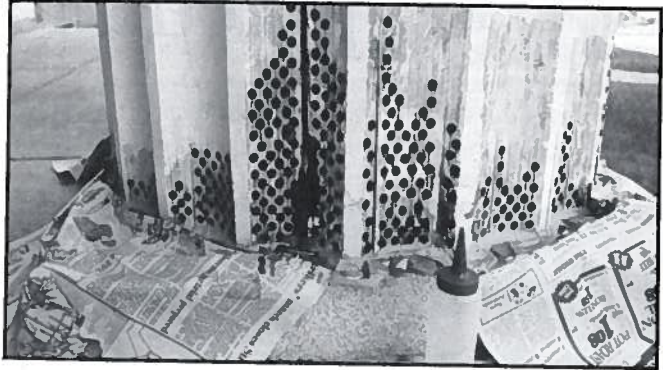


Consolidating decayed wood with epoxies is a technique well adapted to working on stationary columns. If not applied carefully and effectively, however, consolidants can actually *trap* moisture, causing further decay. The decayed

wood must be completely dry to its full depth when consolidating or the epoxy will merely form an impervious shell. This shell then holds moisture in the wood where it still causes (now hidden) damage.

To work successfully, consolidants have to penetrate the fiber of the wood. Specific applications vary from job to job, but often run along the following lines:

- 1) Drill holes (between $\frac{1}{8}$ " and $\frac{3}{8}$ " in diameter) in the decayed wood to expose the end grain — the best avenue for the wood to absorb consolidant. Close spacing of holes (perhaps as close as their own diameter) is a good way to ensure complete saturation.
- 2) Keep holes filled with liquid epoxy consolidant, fed from hair-dye bottles, saturating the wood until no more is soaked up.



This column shaft is ready for the application of consolidant. The newspapers (and a seal made from duct tape and artist's oil-clay) protect the granite plinth from seeping epoxy.

- 3) Check for complete penetration of the consolidant by drilling a hole into the treated wood (or cutting out a small section) before the epoxy hardens. Examine the wood to see whether or not it has been saturated.
- 4) Mix epoxy filler in small batches with a putty knife and use to finish the repair. A plastic funnel and wooden dowel used like a syringe works well for applying the mix to fill the holes. Considerable pressure can be developed with this method to force the filler into the honeycomb-like spaces of the decayed wood.



John Leeke, a contractor and consultant who lives in Sanford, Maine, helps homeowners, contractors, and architects maintain and understand their early buildings. (RR 1, Box 2947, Sanford, ME 04073. (207) 324-9597.)