

Repointing Pointers

by John Leeke

In the last Restoration Primer I covered how historic masonry systems differ from modern ones, how to assess mortar damage, and how to know when more extensive repairs than repointing are needed. This month I'll introduce you to mortar removal methods and materials for repointing.

The object of repointing is to renew the mortar joint. In a sense, the mortar is a sacrificial element that gets worn out as it protects what is really important—the brick. Repointing is a maintenance procedure that might have to be done every fifty or hundred years.

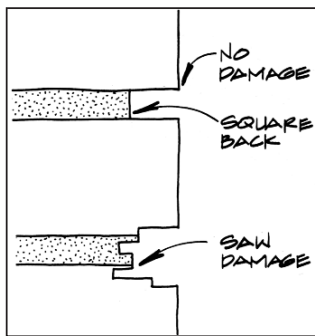


Figure 1. Preparing joints with hand or pneumatic tools is less likely to damage brick than working with a power saw or grinder. With a saw or grinder, it's easy to nip the corners.



Figure 2. The thin blade of a mortar rake slips into narrow joints without damaging them.

Only the joints that are actually worn out need to be repointed. Often whole walls or sections are repointed even though only a third or fourth of the joints are worn out. The excuse usually given for this unnecessary expense is that it's the only way to get an even appearance.

It is possible to treat only part of a wall and still not have the repointing stand out like a sore thumb. If you don't damage the brick when you remove mortar, and if you use the right mortar mix, you can achieve the subtle effects needed for a good match.

Testing

By testing different mortar mixes and going through the complete process of repointing on sample panels, you'll know how the project will turn out before you start. Typically, you need to try out several mortar mixes and repointing methods on small 1x1-foot patches. The most successful materials and methods are adjusted and tried on a few larger 4x4-foot test

panels. Then the best panel shows which materials and methods to use.

The testing phase is best done before bids are submitted. Test panels give the owner a chance to look at a sample of the final appearance and help the contractor develop a good bid on the project. It's true this advance work takes time and money, but on many jobs the amount is far less than the cost of doing unnecessary repointing.

Removing Mortar

The objective here is to clean deteriorated mortar out of the joint to a depth of two or three times the width of the joint (see Figure 1). Whatever method you use, the brick should remain intact. Brick has a hard outer layer that protects it from deterioration. Chipped corners and cut edges lead to untimely failure. How strict you are about brick damage depends on the owner's goals. If the owner has a long-term interest in the property and the main goal is to make joints weathertight, then no damage is acceptable. How could you justify damaging a permanent part of the building—the brick—to install relatively temporary mortar?

In the real work-a-day world, a certain amount of damage is acceptable on many projects. Damage can be kept to a minimum, however, by using appropriate removal methods. Often more than one method is used to meet changing conditions on a job.

Following are four methods you can use, listed from the least aggressive to the most. More aggressive methods are more likely to damage the brick. Use the least aggressive method that gives you economical progress.

Hooked rake. A hooked mortar rake has a thin flat blade offset at a right angle to a 14-inch shank. You pull the rake through the joint, controlling how deep it cuts by varying the angle of the shank (see Figure 2).

The rake is faster than a chisel and hammer, especially on soft, crumbly mortar. The broad flat blade is especially good on the thin joints of early brick work. On stubborn spots you can tap the crook above the blade with a hammer.

Chisel and hammer. If you can't get the mortar out with a rake, you may need a hammer and plugging chisel. A plugging chisel has a wide reverse-tapered blade that is wider at the cutting edge than further up the blade. This helps reduce binding in the joint and brick damage (see Figure 3).

The width of the cutting edge, or any part that can enter the joint, should not be wider than $\frac{3}{4}$ of the width of the joint. If the chisel is wider, brick edges will get chipped out.

Towards the end of the day, hand raking and chiseling give slow progress at best. One solution is switching to cleaning or repointing around the middle of the day. Another is to use power tools to avoid fatigue.

Pneumatics. The Trow & Holden Company, of Barre, Vt., makes a

powered carving tool that works well for joint preparation. The tool is designed for artisans who carve in stone. It's driven by compressed air (8 cfm at 110 psi). The limited power of this tool is well matched to the job of mortar removal. With the appropriate chisels, the carving tool is quick and effective. By covering an air port on the handle, you control exactly how much power goes to the chisel.

Norman Akley, of Trow & Holden, says the carving tool is three times faster than chiseling or hand raking when removing hard mortar. Compared to saws, the tool makes less noise and dust, and is safer.

Saws. Electric grinders and circular saws with carbide-tipped blades are commonly used for mortar removal. They work fast. And that is just about their only advantage.

The power and high speeds demand intense concentration and control. The stress and fatigue from using this tool for mortar removal usually results in brick damage. Clouds of silica dust and carbide tips flying off at 6,000 rpm are also a hazard.



Figure 3. A hammer and plugging chisel may be needed when the mortar is too hard to rake out.

Repointing Mortar

New mortar must match the strength and flexibility characteristics of surrounding mortar. A typical recipe for repointing mortar on historic brick work includes 1 part lime (by volume) and 2 parts sand. Type II (white non-staining) Portland cement can be added (up to no more than 20% of the lime and cement together) to get a quicker set, but adding too much makes the cured mortar too hard and rigid.

Every project requires a different recipe that should be determined by testing. Paul List, a masonry cleaning contractor who repoints early masonry, says you must be sure to let the mortar set completely before judging the results. Color and darkness can change noticeably after a few days or weeks of curing.

Sometimes the type and amount of binder, sand aggregate, and colorant must be adjusted to keep the match good from one side of a building to another.

Tools. A narrow pointing trowel is the standard tool for getting the mortar into the joint. Hold a small amount of mortar up to the joint on a hawk or the back of a large pointed trowel. Slice off a ribbon of mortar with the pointing trowel, and tuck the

mortar into the joint (see Figure 4).

More than one company is developing equipment to speed this work by injecting mortar into the joint. Some are powered by compressed air and others are hand-powered.

Paul List has tried a couple of alter-



Figure 4. The narrow pointing trowel slices a ribbon of mortar off the large pointed trowel and places the mortar in the joint.

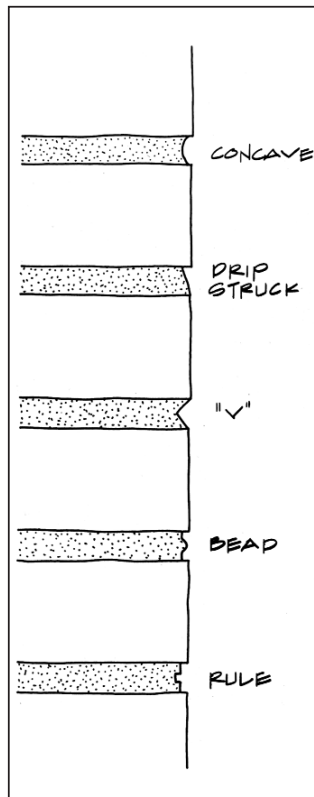


Figure 5. Historic buildings often include decorative joints that are beaded or ruled.

natives to the trowel method. One is hand-powered, and works like a caulking gun. You can load up to a quart and a half of mortar into it. List says it's a real good concept, but it isn't worth using for production. "It's murder on your hands," and constant refilling frustrated his workers.

List has better results with a grout bag. Also known as a baker's bag, this is a funnel-shaped heavy cloth bag open at one end tapering down to a metal tip. You fill the bag with mortar and twist the top of the bag. By twisting the top and working the sides of the bag, you extrude mortar into the joint. The bags are low cost, easier on your hands, and easy to refill.

My own experience is that, while the high lime content helps the mortar flow through these devices, the rather stiff mixes needed to prevent shrinkage and cracks are still easier to apply with trowels.

Technique. Pack mortar into the joints layer by layer. Fill deeper sections first and follow up with at least two layers. Keep each layer less than 1/4 to 3/8 inch thick, and make solid contact with the brick each time you put on a new layer. The adhesive bond between the mortar and the brick is what keeps the joint watertight, and you can only get a good bond if you pack the mortar in there.

Ideally, each layer should be "thumb print" dry. The mortar will begin to set up, but it will still be plastic enough to take an impression of your thumb. Wait for this drying to occur before applying the next layer. This reduces shrinkage that can cause cracks.

A final tooling on the joint "floats" fine particles to the surface, making



Figure 6. Use a brush to give joints a "weathered" look.

the mortar more weather resistant.

Study the original joints to see how they were tooled. While plain concave and drip-struck joints are common, look for fancier "V", beaded, and ruled joints on fronts of buildings and around entrances (see Figure 5). To search for original tooling, look under the eaves or in the attics of early room additions.

To match the appearance of existing mortar, you may have to distress the surface of the new joint. You can use a brush to simulate the effect of weathering (Figure 6, facing page). While this may seem contrary to making as good a seal as possible, as with many other aspects of working on early buildings, you have to find a balance. Here the balance is between performance and matching the visual appearance.

Cleanup. Be very cautious with the use of acid washes to clean mortar smears off brick. Acid seriously affects the performance of lime-rich mortars. Effective repointing requires very little cleanup anyway. The dry mortar that works best for repointing leaves little residue on the brick.

You can also use masking tape to keep brick clean during repointing. This is a silly idea to some masons, and they may resist doing it. But, it works and can save a substantial amount of clean-up time. Be sure to remove tape the same day you put it up, or it will become a clean-up problem itself.

Paul List says repointing historic masonry demands pride in work and an artistic touch to be really successful. I agree.

For More Information

For further information, contact: Paul List, Mobilwash of Vermont, P.O. Box 564, Essex Junction, VT 05453 (802/878-7857); and Trow & Holden Company, Inc., P.O. Box 475, Barre, VT 05641 (800/451-4349 or 802/476-7221 in Vermont). ■

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