

The Point of Repointing

Renewing tired masonry joints can bring
an old brick building back to life

by Richard T. Kreh

Brickwork deteriorates. This is inevitable but not, fortunately, irreversible. Replacing bad bricks and repointing with new mortar can restore a building's original integrity. And repointing, known as tuck pointing in the trade, is a job that can be handled by a careful homeowner. The resulting pride and satisfaction can be as substantial as the money saved.

In any repointing job, the first step is to determine exactly what the problem is. In some cases, the mortar simply has worn out. Old mortar often contains no portland cement, just lime and sand, with animal hair as a binder. These mortars can soften and break down over time, losing their ability to seal joints or adhere to brick. When this happens, they need to be replaced.

In other cases, improper flashing or structural damage to the roof has allowed water behind the brick. This water can be absorbed by the brick and mortar. As the wall dries out, the moisture escaping can cause the bricks to chip and the mortar to pop out. This problem is even more severe in colder climates where the expansion and contraction of freezing and thawing water accelerates the process. Sometimes the ground beneath the wall has settled. This can cause cracks in the wall, which might eventually require rebuilding. Before any actual repointing

is done, find out why it needs doing, and correct these conditions first. If you don't, all the effort and expense of repointing will be wasted.

Preparation—Spring and fall are usually ideal times to do repointing work, because the best temperature for curing mortar is 70°F. Repointing can't always be done when conditions are perfect, but if you have a choice, arrange to do the work when they are at their best.

Never repoint when temperatures are likely to dip much below 40°F unless you can protect and heat the wall. Mortar that freezes before it cures will be brittle, and it will pop out when the wall warms up. Don't fall into the trap of repointing on a warm winter day and leaving the mortar to freeze overnight. If you hire a contractor to do the job, remember that he will schedule it to suit himself. He has a living to make year-round. Be sure to agree in writing that he will not attempt to work in freezing temperatures.

In hot weather, try to work on the shady side of the building to keep the mortar from drying out too fast. You might need to keep the wall damp (not soaked) with a fine mist from a garden hose or tank sprayer. (Never wet a wall in cold weather, because a freeze would cause the mortar to pop.)

For years, sandblasting has been used to remove dirt and old paint before repointing. Sandblasting is the continuous bombardment of

a masonry surface with abrasive particles sprayed through a nozzle in a high-velocity stream of air. Silica sand, the aggregate often used, cuts away part of the brick's surface. Cutting through this outer surface can cause permanent damage. Most disasters occur when inexperienced operators do their own sandblasting. If your brick face needs to be cleaned and you decide to use this method, hire a reputable contractor who specializes in such work.

Clear, liquid silicones can be applied to brickwork after it has been sandblasted and repointed. When reapplied periodically, they will protect the brick face for years. This treatment is especially recommended for historic buildings. Silicones are available from building-supply dealers. Follow manufacturers' instructions when applying them.

Repointing—You can't repoint without making a mess. There will be dust, dirt and mortar droppings to contend with. If you plan ahead, though, you can make cleanup a lot easier. Construction-grade rolls of 4-mil polyethylene plastic are ideal for protecting windows, doors, and flowerbeds and shrubbery near the house. Work on one area of the house at a time, and clean up as you go along. If you have to rent scaffolding, do all the high work first, so you can save money by returning it as quickly as possible.

The traditional method of removing mortar

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Repointing Mortar

You don't need an especially strong mortar for repointing work. Repointing mortars need to bond with the old brick, seal the joints and match the original mortar as closely as possible in both strength and appearance. This is best done by a mortar with a much greater percentage of lime than of portland cement. Mortars with a high percentage of portland cement are often harder than brick; the brick gives under stress rather than the mortar. The result is *spalling*, a cracking and flaking of the brick face. High-lime mortars form a resilient cushion on which the brick can rest. They shrink very little, hold water well during repointing, and are easily worked. They can also heal small hairline cracks when the wall is moistened. During this process of autogenous healing the hydrated lime dissolves in water and is then recarbonated by the atmosphere's carbon dioxide, sealing the crack.

For an excellent all-around mortar with good bonding ability, use Type S hydrated lime, Type 1 portland cement, washed bank sand and potable water. Mix 1 part Type 1 portland cement to 2 parts Type S hydrated lime to 8 parts washed building sand. If the sand is coarse (sharp), add an extra half-part lime to improve workability and bonding. This mortar will test out at about 300 psi after it has cured—strong enough. —R.K.



The author repoints a brick wall.



Removing mortar joints—Mortar joints can be removed using a power grinder (A), but it takes a skilled operator to avoid damaging the brick. To remove the joints by hand, use a plugging chisel (B, top) specially shaped for the job. The mason's all-purpose chisel (B, bottom) has other uses. Cut the joint out squarely (C). Brush out mortar particles with a soft-bristled brush (D). Use the same brush to dampen the joint before repointing.

joints is to use a hammer and chisel. Today, power grinders are often used to speed up the process (photo A). Even with a trained operator using the machine, however, it is all too easy to damage brick edges. The old way is best; repointing is not a job that can be rushed.

To remove mortar by hand, use a joint (or plugging) chisel (at the top of photo B). It has a specially-tapered blade that cleans mortar from the joint without binding or chipping the brick surface. It should be available at any store that stocks masonry supplies. Cut the joint out to a depth of $\frac{3}{4}$ in. to 1 in., depending on the depth of the deteriorated mortar (photo C). Cut it out square, not in a V shape.

After cutting, measure with a rule to be sure you've reached the correct depth. Brush all dust and mortar particles out of the joint with a whitewash or wallpaper paste brush (photo D). Next, use a wet brush to dampen the joint. Don't soak it, or the new mortar will not adhere. The idea is to prevent the repointing mortar from drying out too quickly.

Tuck-pointing mortars should be prehydrated to improve workability and reduce shrinkage. To do this, mix the cement, sand and water thoroughly in the proper proportions. Then mix again, adding enough water to produce a damp (but unworkable) mix that will retain its form when pressed into a ball in your hand (photo E). Leave the mortar in this dampened condition for an hour or two, then add enough water to bring it to a consistency that is somewhat dryer than

regular masonry mortar, as shown in photo F.

When the mortar is ready, apply it to the joint. Use a thin, flat piece of steel, called a striking tool, to press the mortar firmly into the moistened joint, filling it out (photo G). If the joint has been cut out to a depth greater than 1 in., apply new mortar in two layers. Allow time for the first layer to set before beginning the second.

Don't tool a finish on the joint until the mortar has set enough so that it won't smear. If your thumb leaves a clear impression on the mortar, it's time to tool. Doing so too early will cause the joint to streak or sag. Waiting too long will result in a black mark, which is caused by a reaction between the slicker and the chemicals in the mortar. (This is known as "burning the joints.")

Finish the joint by tooling a flat, concave or grapevine shape on the surface. (A grapevine is formed with a steel tool that leaves an indented line in the mortar.) With a little practice, it won't take you long to get the hang of finishing. After the mortar has set well enough to prevent smearing, brush off the wall to remove all mortar particles (photo H).

Replacing bricks—In most repointing jobs some deteriorated brick will have to be cut out and replaced. Use a plugging chisel to remove the mortar joint, and an all-purpose mason's chisel to cut out the soft brick (photo I). Brush away all dust particles. Use mortar to butter the replacement brick and all sides of the wall cavity in which it will be placed. This prevents any

voids in joints after the new brick is inserted. Push the new brick in place and point the mortar joints (photos J-L).

You should make an effort to match the original brick. Look around the site or in adjacent outbuildings for bricks left from the original construction. If they haven't softened with age, they would be the best choice. You can also try your local building-supply dealer. Many companies make new bricks that look like old, handmade ones. Take a sample of the original brick with you and compare for size as well as color.

Salvaged brick may also work, but be careful. If reclaimed bricks are soft, they won't last long once exposed to the elements. You can make sure a brick is hard enough to use in repointing by holding it in your hand and tapping it lightly with a hammer. A soft brick will give off a dull thudding sound; a hard one, a metallic ring.

Cleanup—If you've been neat, only a little cleaning will be necessary after repointing. Wait at least two weeks to let the mortar cure completely, then scrape particles and clumps off the wall with a wooden paddle or a chisel. Hose down the wall and give it a good scrub with a stiff-bristled brush.

If stubborn stains remain, or you have splashed mortar down the wall, you may need to scrub it with a solution of 1 part muriatic acid to 20 parts water. Wear hand and eye protection, cover the flowers and shrubs near the house, and hose off the wall when you're done. □

Mixing mortar and repointing—Basic tuck-pointing mortar is composed of portland cement, lime and sand. Mix the dry ingredients in the proper proportions, then dampen until a ball of the mix squeezed in your hand retains its shape (E). This prehydration improves the mortar's workability and reduces its shrinkage. After an hour or two of prehydration, add more water to bring the mix to its final consistency, somewhat dryer than regular masonry mortar. After wetting the joint, press the tuck-pointing mortar firmly into it with a slicker (G), then tool the finish. Once the mortar has set and won't smear, brush off any particles (H).



E



F



G



H



Replacing deteriorated brick—Use the plugging chisel to remove the mortar around the bad brick, then the all-purpose chisel to cut out the brick itself (I). Brush away all mortar and brick particles (J). Give both the replacement brick and those still in the wall a thick coating of mortar, and press the brick into place (K). Then point the mortar joints (L).