



HOW-TO BOOKLET #3069

CONCRETE REPAIRS



TOOL & MATERIAL CHECKLIST

- Concrete Patching Materials
- Baby Sledge Hammer
- Star Drill
- Bricklayer's Trowel
- Safety Glasses
- Hose Hook-up
- Cold Chisel
- Shovel
- Bucket
- Heavy Gloves
- Brick Chisel

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in The Basics Listed Above.

It doesn't take a lot of skill to make repairs in concrete walks and driveways. It takes some muscle, however and you can get wet and dirty. The money you will save and the rewards of doing it yourself are worth it. There is one caution: always, without fail, wear safety glasses and heavy gloves when chipping concrete. In this How-To Booklet you will find patching techniques to make repair jobs go easier. We can't offer any special pointers on how to keep you dry and clean.

PATCHING CRACKS

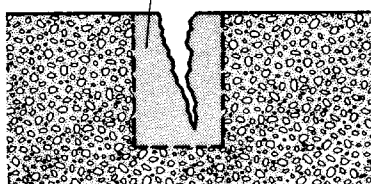
One of the most common masonry repair jobs is patching cracks in concrete. Before you patch the area, first determine what is causing the crack, if possible. If the crack is a structural problem, it must be corrected; otherwise, the crack will simply keep getting larger and larger.

For shallow cracks in concrete, break out all old and crumbling edges from the crack, and, if possible, make the crack about 1 inch deep—if it isn't already. Use a baby sledge hammer and cold or brick chisel for this.

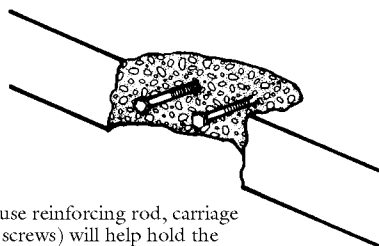
The sides of the crack should be vertical; the hollow will form a sort of key for the patching material. The trick is to create a new area that is wide and deep enough so you don't have to feather out the new cement to a thin edge. Thin edges break.

Remove all dust and debris from the area with a broom. Then flush the surface with clean water. Sweep away the water with a broom, so there is no open, standing water. The area should be damp with water, however. You can buy already-mixed or ready-to-mix concrete patch. Or you can mix your own: 1 part mortar cement to 4 parts sand. Make the mixture "soft" and "mushy."

Chip edge to undercut edge



Sides of break must be as vertical as possible and, if possible, slightly undercut. This configuration makes a good seat for the patch. Remove all crumbly material, and then clean the dust and debris from the cavity.



Steel pins (use reinforcing rod, carriage bolts, or lag screws) will help hold the concrete patch in the break. Drill holes for the pins with a star drill or masonry drill in a power drill.

Fill the crack or cavity with the mixture, using the straight edge of a board to level it. Then let the job set for about 20-30 minutes and finish the surface with a trowel so it matches the surrounding surface. If the patch is in a vertical surface, make the concrete mix thicker. **Note:** You can buy special bonding materials that can be brushed onto the area and mixed with the cement to help hold the patch in place.

Shallow holes. Use the very same technique as above to patch shallow holes in concrete. However, larger surfaces, such as holes, should be roughened first with a cold chisel to help hold the patch in place.

Holes in new concrete walls. Sometimes you will see holes in newly placed concrete walls. This is due to improper tamping or because aggregates in the mixture have lodged in center spots. For these holes patch according to the steps detailed above.

If, when cleaning out the hole, the hole becomes larger and larger (as it sometimes tends to do), you can punch a hole in the good, firm concrete and drive in a metal pin such as a carriage bolt, and then make the patch. The bolt helps hold the concrete in place. The pin must be 1/2-inch lower than the finished surface.

REPAIRING BROKEN CORNERS AND EDGES OF CONCRETE STEPS, WALKWAYS, CURBS, PORCHES

The corners and edges of steps and walks, and other similar surfaces, are another common masonry repair problem that homeowners face. Repair is simple:

- 1 Brush off all crumbling and cracked edges, and any debris. Wash the area with water from a garden hose or bucket and a stiff broom.
- 2 Use a carbide-tipped masonry bit in a portable electric drill, or a star drill and baby sledge hammer to punch 1/4-inch wide holes about 2 inches deep into the edge of the concrete. Space the holes about 1-1/2 inches apart. Two inches is okay if you have the room.

- 3 Force a tad of soupy mortar mix into the holes.
- 4 Drive lag screws or carriage bolts into the holes, leaving the heads protruding about 2 to 3 inches. Do not position them too close to the edge of the work. The technique is illustrated on page 1.
- 5 Build a wood form from boards to create a new corner or edge.
- 6 Remove all dust and debris and hose down the surface with water, or broom it on.
- 7 Mix up 1 part Portland cement and 4 parts sand, with just enough water to allow the mix to be placed into the form readily. Or, you can use a ready-to-mix or pre-mixed concrete patching compound for this job.
- 8 Place, then tamp, the patch into position. With the straight edge of a board, level (screed) off the excess concrete mixture or patch so it is level with the surrounding hard surfaces.
- 9 Let the patch set for 30 minutes or so and then trowel or finish the new patch to suit. If the chip is a small one, and you still have the chipped-off piece, you may be able to “glue” it back into position with a latex-based cement. You can buy this stuff in small packages; it is expensive.

LOW SPOTS IN CONCRETE

If you can't level the low spot by lifting the slab or piece, this technique can be used:

- 1 With a brick chisel and baby sledge, roughen the surface and undercut any edges.
- 2 Drill several shallow holes in the concrete depression, using a star drill and baby sledge or a masonry bit in a power drill.
- 3 Mix a soupy mortar and then place and level it in the depression. Wait 30 minutes or so and then finish with a trowel or broom to suit.

What you are doing is called “veneering.” It is our recommendation, if the patch will be a “thin” one, that you buy a latex-based concrete patch and use

this for the veneer rather than a standard Portland cement mix. The latex (sometimes epoxy) binders will hold the veneer in position longer and the material can be feathered out with a trowel to as little as 1/8-inch thickness (depending on the product; read labels).

BROKEN CONCRETE

If the area is badly broken and unsafe it should be replaced before someone gets hurt.

How much needs to be replaced will depend, of course, on how bad the damage. In all cases, the first step is to dig out the soil at the edge of the slab. Then, with a brick chisel and baby sledge hammer, break away any crumbling edges until you reach firm, solid concrete.

Insert reinforcing bolts or rods in all edges and place the broken concrete pieces in the center of the patching area as “fill” stones. Place a standard concrete mix of 1 part cement, 2-1/4 parts sand, and 3 parts gravel into the hole. On larger patches, insert horizontal metal reinforcing rods across the bolts. E-3 rod is plenty heavy enough for this job; you can use a hacksaw to cut lengths to shorter pieces. Also, this is the type of patch that ready-mixed concrete in an 80-pound bag works to your advantage. An 80-pound bag yields about 2/3 square foot of patching mixture.

Once the patch is in place, level it and then trowel or broom to suit your design tastes.

Keep the patch damp with water for a couple of days. The water will help “cure” the patch and make it stronger. You can cover it with plastic, if you want.

RAISING SETTLED SLABS, WALKS

A “settled” walk or slab is a common problem. It can be caused by the concrete being placed over “soft” fill materials. In most cases, you can re-level the slab or walk without breaking it out and making a new concrete placement—unless it is too large to handle.

Raising walks. Using a walk as an example: the walk will have cracked at the control groove cut in its top surface. If it hasn't, use a brick chisel and baby sledge hammer to crack it along that area. This will provide you with smaller work sections. It's easier.

Put a straight-edged 2X4 alongside the walk as a guide to indicate where you want the top surface of the walk to be. Level the 2X4 as needed to suit the terrain. Then use a steel pry bar and fulcrum, one on each side, to tilt and lift the lowest end of the slab up.

Prop up the slab with a piece of 2X4 or rock. Since this is all hard work, you may need a helper.

Measure the height to which the slab should be brought. Make sure it is propped up a little higher than the finished height will be. Place stones and/or bricks under the slab to support it at the correct height. Then place pea size gravel around the stones/bricks for extra support.

If there are roots in the area, cut as much of them away as possible. They will continue to grow and tilt the slab out of level if you don't do this.

Very gently, and with help, lower the slab into place. Do the rest of the walk one section at a time, until the walk matches the surrounding terrain.

Gridded patios. Slabs in a gridded patio are re-established the same way as walks, using a steel bar and fulcrum to raise them. Use a steel bar or pipe to hold them up out of the way until you prepare the ground underneath for the slabs.

One-piece slabs. A large, badly settled, one-piece slab that doesn't have control joints usually will have to be broken and replaced with a new slab. You can place a new slab on top, after first roughening the surface of the existing slab.

REPLACING WALK SECTIONS

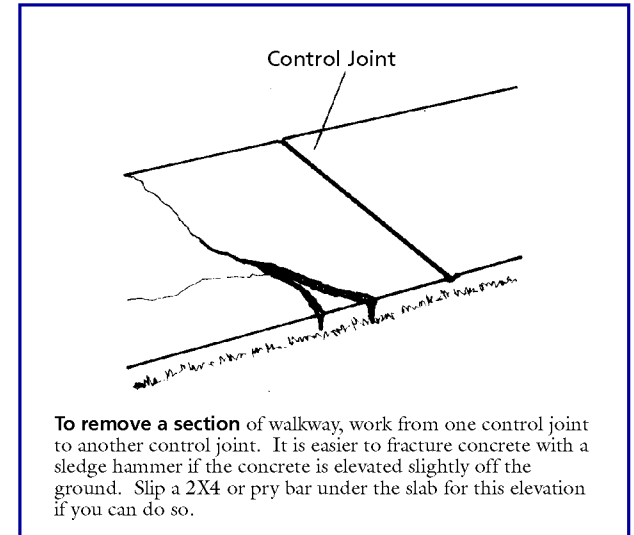
If an entire section of a walk has broken so it can't be repaired properly, use a brick chisel and baby sledge hammer at the control joint to break it

away from the solid part. Then, using a regular sledge hammer, break the concrete into small sections for removal. If you can, try to elevate the slab slightly off the ground. It is easier to break with a sledge hammer this way.

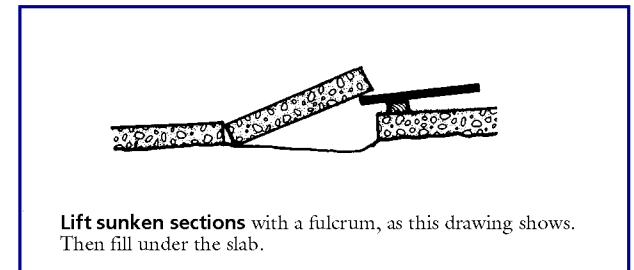
Remove all larger pieces of broken concrete and leave the smaller pieces in the bottom of the area for fill stones. Make sure the new sidewalk will be as thick as the existing sidewalk it will join.

Forms. If you can't use the edges of the old concrete to support the new mixture, build a form using 2X6s. Align the forms so the top edges match the surface of the adjoining concrete. You probably will have to dig a small trench along the sides of the patch area in which to insert the forms.

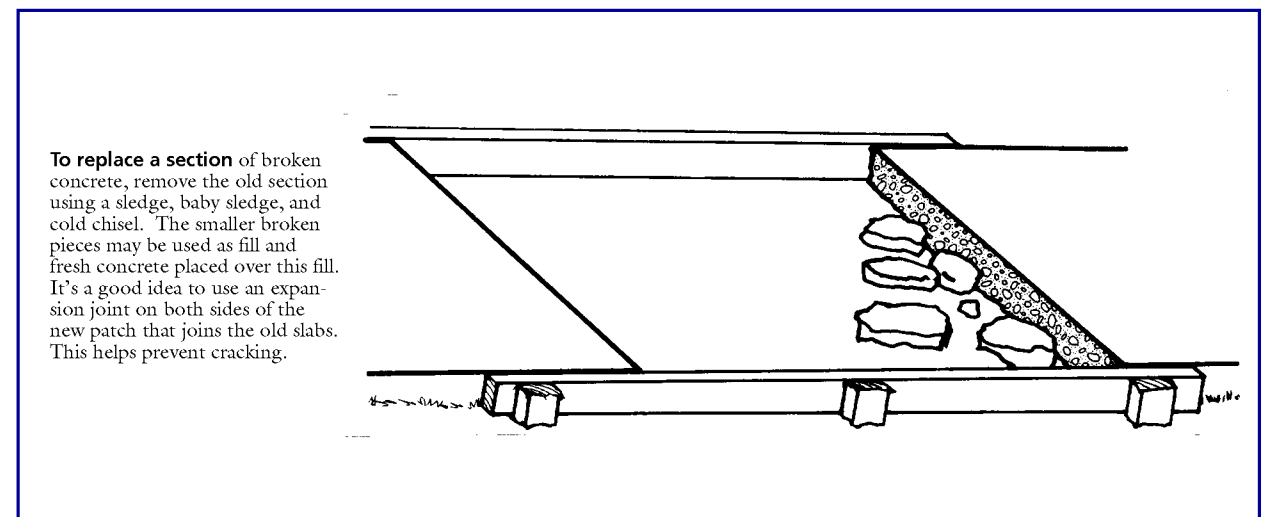
Since the new concrete forms a "patch," you probably won't need expansion or control joints between the old and new concrete. However, if control joints are necessary, make them by slicing through the fresh concrete with the edge of a trowel at the point where the new concrete meets the old. Or use asphalt expansion strips between sections. This product is available at home center, building material, and some hardware stores that stock building materials.



To remove a section of walkway, work from one control joint to another control joint. It is easier to fracture concrete with a sledge hammer if the concrete is elevated slightly off the ground. Slip a 2X4 or pry bar under the slab for this elevation if you can do so.



Lift sunken sections with a fulcrum, as this drawing shows. Then fill under the slab.



To replace a section of broken concrete, remove the old section using a sledge, baby sledge, and cold chisel. The smaller broken pieces may be used as fill and fresh concrete placed over this fill. It's a good idea to use an expansion joint on both sides of the new patch that joins the old slabs. This helps prevent cracking.

Keep the concrete damp with water spray for at least 3 days after it has been placed. You can walk on the patch in about 40 hours; don't drive a car or truck over the surface for at least 3 weeks. Forms can be removed after 2 weeks; replace any dirt and sod you removed to make way for the form boards.

VENEERING AN OLD WALKWAY

Veneering can transform old, broken walks so they look new again. As mentioned above, to veneer a walk you place new concrete over the old walk, using the old walk as the base for the new. The cost of veneering usually runs about the same as installing a new walk. However, you save on layout time, rock-busting, and digging.

For this job you will need these supplies: Baby sledge, crosscut saw, level, chalkline, hacksaw, 2X6 form boards, 2X4s for stakes, double-headed 10d concrete nails, a 2X4 screed, shovel, trowel, asphalt expansion joints, a concrete groover and edger, wooden float, tape measure, the concrete, water, gloves, safety glasses, small reinforcing rods, and reinforcement mesh. See the illustration below.

The concrete mix. Since this job is usually a large one, you may want to mix your own concrete from scratch or order it from an already-mixed concrete company. Give them the dimensions and they will figure out the amount of concrete needed and truck it to you. But be sure your forms and all else is ready to go. The driver dumps the load on arrival; no waiting. Concrete veneer should be 4 ins. thick.

Building forms. Set the 2X6 form boards along the edge of the old walk so the bottom edges of the forms just touch the edge of the walk. Stake the forms with 2X4s that are pointed on one end so they can be driven into the ground easily with a sledge hammer.

Nail the 2X4s to the forms—outside in—with double-headed nails. As the forms are set, level them in position. You can save time leveling by

stretching a line along the edge of the tops of the forms. This serves as a guide while all forms are set. Don't forget to drive the stakes about an inch or so below the top edge of the forms. The 2X4 concrete screed has to move freely along the top edges of the forms.

Adding reinforcing. With a hacksaw, cut the reinforcing rods into approximately 1 ft. lengths. Then drive these rods into the surface of the walkway using the baby sledge or the larger one. Use the cracks, holes, and other breaks to sink the rods so they stick up about 2 ins. from the walk's surface. The rods will help hold the veneer in place. Space the rods about 2 to 3 ft. apart in any configuration. Cut the reinforcing mesh to fit between the forms and tie it to the rod tops.

Placing concrete. Work the mixture with a shovel to remove any air pockets and other voids. Then level the material as much as you can while it is being placed. At 4 to 6 ft. intervals, insert an asphalt expansion strip. When you have placed about 12 ft. of veneer, level it with the 2X4 (screed), using a see-saw, back-and-forth motion. You will need a helper for this. If you find high spots remove the excess and use it to fill low spots.

When the water leaves the surface of the concrete, run a wooden float over the surface. If the float brings water to the surface of the concrete, the material is not ready to trowel. Meanwhile, if the 2X4 screed hasn't leveled the surface to your satisfaction, you can use the float to level it. Floating should be done while the concrete is wet. After you use the float, the surface may then be troweled with a finishing trowel.

For a rough surface, use a broom. Just pull a stiff-bristled broom across the surface. The bristles will form tiny lines across the concrete for a nonskid surface. The finish is also pleasing.

THE CURE

The veneer should cure for about a week before the walk is used. If possible, let it cure for 12-15 days—the longer the better. Keep the surface of the veneer wet with water. You can use a garden hose for this; set the nozzle on fine spray. And you also can cover the veneer with sheet plastic or burlap or even straw to help hold in the moisture. We would suggest plastic since it is easier to use and fairly inexpensive. It is available in large sizes.

Once cured, remove the forms from the project and fill edges of the walk (or driveway) with sod and dirt.

