Home Repair Resource center

HOMEOWNER REPAIR GUIDE

CONCRETE REPAIR & REPLACEMENT

For do-it-yourself or contracted repairs

Concrete is one of the marvels of this modern world. We use it in so many ways that we don't always recognize it. The most common uses for concrete around the house, however, are for driveways and sidewalks. As tough as concrete is, it doesn't last forever, even with regular maintenance. The question that often arises is when to patch and when to replace. Let's start with that issue.

REPAIRING CRACKS

When concrete cracks, you have two or more chunks of concrete moving, independently of each other, through the freeze and thaw cycle that we have in our area. Anything that you put into the crack will be a temporary repair, at best. The longest-lasting materials will be ones that will remain flexible for a long time at various temperatures.

Rubberized crack filler	Usually works best. This liquid filler is sold in a gallon container with a pour spout. There are two viscosities: use the thin solution for cracks up to 1/2", and the thicker solution for larger cracks.
Silicone caulk	Another option for small to medium-size cracks. Some caulks have cement mixed with silicone; these will stay flexible and blend in well with the existing concrete.
Larger cracks	It may be necessary to fill to 1/4" from the surface with either sand or a styrofoam rope (known as "caulk backer rod") before adding the crack filler or caulk. This will minimize the amount of filler you'll need to use.

REPAIRING SPALLING

If the concrete isn't cracked, but has round, bowl-like depressions – or if the surface that was once smooth now has a layer of pebbles on top – you have a different problem (called "**spalling**"), where the top layer of concrete has peeled off. This problem is not so easily solved. **Latex patching cement** (i.e., "Top 'n' Bond") is designed to be used as a patch, and will bond to existing concrete. You can use this material to fill in the holes and return the surface to a level condition. You can also apply a skim layer across an entire spalled block. **Latex bonding additive** can be painted on the old work to create a stronger bond with the new patch. This repair, however, may not last forever; after a couple of years, it may peel away.

PREVENTION

So, as you can see, there is no quick fix for concrete problems. To prevent both cracks and spalling in the first place, seal your concrete annually with a **masonry sealer** (such as Thompson's®) to keep the water out. It is the action of water that usually causes the disintegration.

REPAIR OR REPLACE?

Once damage has occurred, however, it is often better to replace the concrete than to repair it.

> **RULE OF THUMB**
> In a block of concrete the size of an average sidewalk section, you should generally replace the block if it has **two or more cracks**, or if **more than 25%** of the surface area is pitted or has depressions.

Having determined that your concrete does indeed need to be replaced, let's look at how to do that, step by step.

PERMIT & REMOVAL

First, in most communities you'll need to get a **permit** for the work you are planning to do, and a copy of the specifications for that particular repair. (If the work is contracted, the contractor should obtain the permit and be responsible for meeting code requirements.) Then, you'll have to remove the bad concrete. A heavy **sledge hammer** is usually the best tool for this job. If you can get the concrete slightly off the ground with a pry bar, it will break much more easily.

FORMS & EXPANSION JOINTS

After you have removed all the old concrete, you'll need some forms to hold the new concrete. Forms are basically a mold to hold the wet concrete until it hardens. The forms should be straight and level, and secured in place with stakes. (When the concrete is poured in, there is a lot of outward pressure, so your forms need to be braced against it.)

When working with a large area of concrete, you need to include some **expansion joints**, which allow the concrete to move slightly (from temperature changes, for example) instead of cracking. These joints are generally made of impregnated sheathing.

Sidewalks & service walks	Will usually need to be 3-1/2 inches deep (the width of a 2 x 4)
Driveways	Need to be thicker
Expansion joints	Generally required every 30 feet of length on a drive, and every 15 feet (approximately three blocks) of sidewalk and/or where a new section of concrete meets an existing wall or another section of concrete

REINFORCEMENT

In areas where code requires, **wire reinforcement mesh** (at least 10-gauge, 6-inch squares) must be imbedded in the concrete. (Reinforcement fibers can be mixed with the concrete as an alternative to the mesh – see below.) The mesh is placed in the forms, and then, as the concrete is poured, it is pulled into the middle of the concrete. Wire mesh is usually required for drives, garage floors, and runs of sidewalk, but is not required for single sidewalk blocks. Check when you get your permit.

GETTING THE CONCRETE

There are several ways to get concrete, each of which has advantages and disadvantages; the best source of concrete for a particular job will largely depend on its size.

Truck delivery	Have a truck deliver the concrete (either pre-mixed from the plant or mixed from the dry materials on site)
Trailer	Purchase concrete already mixed and poured into a special trailer that you haul home yourself
Bagged redi-mix	Buy bags of redi-mix concrete that you mix with water

Code may require that reinforcement fiber for larger jobs be added at the plant—*not* mixed in at the job site. (The load ticket should indicate which additives have been mixed into your load. For contracted jobs, make sure the contractor shows you the load ticket.)

To purchase the right amount of concrete, you'll need to measure the width and length of the area you are replacing, and then multiply these dimensions together to get your square footage. The square footage and thickness of the job will enable the supplier to give you the right amount of concrete. (If you are doing a small job with redi-mix concrete, the chart on the bag will use these same figures to let you figure out how many bags you'll need.)

CHECK THE SAC MIX

Whether you are contracting the work or doing it yourself, be sure to check the **sac mix** (a measure of the amount of Portland cement in a cubic yard of concrete) your city requires for the specific job you are doing. Cleveland Heights requires a **6.5 sac mix** for most concrete work.

POURING & FINISHING

1. Before pouring the wet concrete, the earth inside the forms should be soaked thoroughly with a hose.
2. Once the concrete is poured into the forms, the first step is to "**strike it off**" with a level board that spans the form and rests on top of the sides. As the board is worked from one end to the other with a sawing motion, the concrete will be leveled off. Then, it is ready to be finished.
3. Use **metal trowels** to smooth and finish the concrete. Work the trowel in slightly overlapping half-circles around the entire surface. During this process, the rocks on the surface will become embedded deeper in the concrete, and a layer of pure cement will be drawn to the surface, along with the water that is being displaced by the rocks.
4. After the concrete has set up some (an hour or so, depending on the temperature), an **edging tool** can be used to finish the edge.
5. If you have poured two sidewalk sections as one block, use a **control joint trowel** to install control joints (the lines that go across the width of the concrete to control cracking) between the sections.
6. Finally, create a non-slip finish by using a **wooden trowel** (for a rough, sandy texture) or a **broom** drawn across the surface (for a "combed" look).

COLD-WEATHER CODE REQUIREMENTS

Check the code in your community for other requirements that may affect your job.

CLEVELAND HEIGHTS EXAMPLE

The City of Cleveland Heights, for example, does not allow concrete to be poured when the temperature is below 40°; if the overnight temperature will drop below 40°, the concrete must be covered with plastic and hay or straw to retain the heat created by the curing process. The addition of **calcium chloride**, a chemical sometimes used with cold weather pours, is not permitted in Cleveland Heights, because it shortens the life of the concrete.

CURING & SEALING

Unless your contractor has coated the concrete with a curing agent that impedes the evaporation of water, concrete has to be kept moist for **one week** after pouring to allow it to cure properly. To do this, keep it covered and water it twice daily (more often when it's very hot). Car traffic needs to be kept off during this time, as well. When the concrete has set long enough, you should seal it with a masonry sealer, following the directions of the sealer manufacturer.

Attention to the whole process – obtaining quality materials, constructing the necessary forms, finishing the concrete carefully, and allowing it to cure properly – can give you an attractive and long lasting job, one that you won't have to repeat any time soon.

Home Repair Resource center

Home Repair Resource Center empowers homeowners to maintain their homes for sustainable and diverse communities.

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