Tips for Pouring

Know what to expect, prepare for the worst, and the rest is easy

BY MIKE GUERTIN

For the first 15 years of my building career, my partner and I subcontracted all the flat work: basement, garage, and patio slabs; driveways; and sidewalks. But as labor prices went up and scheduling concrete pours became harder, I figured we could do it ourselves. Pouring concrete slabs didn't look very complicated.

Luckily, our first foray was on my own house. The look on the ready-mix truck driver's face showed that he knew we had only half a clue. What I learned during that 17-yard pour was that the same critical ingredients for any construction project—planning, preparing, and having the right equipment—apply to even the seemingly simple task of placing concrete.

It took a few pours, but we picked up some basic knowledge and a few handy tips that don't come easily to someone not working with concrete every day. I hope the following information will take some of the anxiety out of your next slab pour.

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PREP FOR THE POUR WITH SOLID FORMS, WIRE MESH, GRADE STAKES, AND SPLASH PROTECTION

Keep the slab separate

When a slab is poured against an existing foundation, use a bond break to keep the new slab independent of the foundation. If the slab moves, it shouldn't affect anything else. Here, I nail strips of ½-in.-thick asphalt-impregnated fiberboard to the foundation at slab height. A bond break can also be made from a strip of plastic, tar paper, or foam sill seal.

Cover anything you don't want to get splashed

I cover adjacent sidewalls with housewrap. Plants, lawns, columns, and posts also need protection. If you intend to reuse form lumber and want to keep it clean, cover it with plastic. And don't forget to cover yourself. Concrete is caustic; wear gloves and boots to wade into the mix. Long pants are a good idea even in the summer.

a Concrete Slab

Contain the concrete

I like to use straight 2x stock for slab forms so that I don't have to straighten out warps. After screwing together the corners, I screw splice blocks across any joints, then run a dry string between the corners to establish a straight line. Stakes that are 18 in. to 24 in. long are driven outside the forms every 3 ft. to 4 ft., shimmed so that they're straight and level, and screwed to the stakes. It's better to provide more support than to risk bows in the slab.

Grade stakes are visual depth cues

Large slabs need intermediate elevation points to guide concrete placement. I divide large slabs into sections about 8 ft. to 12 ft. wide, and run a stringline between the forms at those intervals. Wooden stakes driven 3 ft. to 5 ft. apart along the string become depth indicators; the position of the string is marked with a screw partially driven into the stake. A second screw located 1 in. above the first is a backup indicator in case the first screw is buried. I leave about 4 in. of stake above the string so that I can pull it out during the pour.

Reinforce slabs with welded-wire fabric

During layout, I cut the fabric about 6 in. shorter than the size of the sections divided by the control joints (see Step 6, p. 85). This reduces the chance of exposing the wire at the edges and allows the concrete to crack along the control lines. Overlap wire sheets by a couple of inches, and wire-tie them together. Once the fabric is complete, carefully inspect the formwork to make sure everything is in place before the concrete arrives.

Most concrete cracks can be minimized if the base is well prepared

- The soil must be well drained, especially in frost-prone regions. Remove any organic material (wood, leaves, tree roots). If possible, I dig out any large rocks within a foot of the surface.
- If the soil has problems, it's better to remove the unsuitable material and place at least a 12-in.-deep bed of gravel beneath the slab area, extending it about a foot beyond the forms. (Also note that the IRC 2006 Section R506.2.3 requires plastic to be laid beneath slabs under certain circumstances.)
- Compact the base evenly by running a plate compactor over the top of the existing soil or at 6-in. to 8-in. intervals of any replacement fill. Another way to consolidate the base is to water the area generously a couple of times a day over the course of several days.
- Avoid placing a slab in any area that has been backfilled recently, such as the perimeter of a basement foundation. Unless the site was mechanically compacted at 6-in. to 8-in. intervals during the backfilling process, surface compacting won't be enough to prevent settling of the deeper soil. It's best to wait a year or more after backfilling to place concrete in these areas.
- A patio base should be sloped away from the foundation and graded evenly. Water drains well from a slab at a slope of ¼ in. per ft. High spots and low spots create strong and weak areas in the slab. After compacting, knock off high spots, and fill in low spots so that the entire area is within ½ in. of grade.
- Finally, if the weather is hot, keep the base wet. In winter, rake calcium chloride into the soil to lower the soil's freezing point.

HAVE SCREEDS AND FLOATS READY TO GO WHEN THE TRUCK COMES

When the concrete arrives, spread it evenly

I place concrete in sections roughly 12 ft. square, beginning at the extreme reach of the truck's chute and against any adjacent walls. The driver discharges the mix a foot or two away from the forms and walls, and we use concrete rakes to push it into place.

Don't let the wire sink

We grab the wire mesh every 2 ft. to 3 ft. with the rake hook and pull it into the upper third of the slab.

Establish the grade with a wet screed

I smooth out a 12-in.- to 18-in.-wide strip along the wall and forms with a magnesium float, then fill in the middle of the slab section and work toward the row of grade stakes and the front of the form. After raking the concrete close to level along the grade stakes, I use a long screed to float an 18-in.-wide strip along the grade stake line. This strip of surfaced concrete (sometimes called a wet screed) becomes a guide to screed off the concrete within the section.

Screeding is even-handed work

After pulling the grade stakes, it's time to screed across the surfaced strips of concrete. Two people can work a straight, stiff board in a sawing motion to grade the surface, or one worker can use a jitterbug screed (shown above) to shake, drag, and grade the surface. Someone else working ahead with a concrete rake can push concrete into low spots and pull out excess concrete to speed the screed. In addition to grading the surface of the concrete, screeding pushes the aggregate near the surface down just a little. This makes the finishing process easier.

Finesse with a bull float

Bull-floating pushes the aggregate down and draws up the finer particles of sand, cement, and water (also referred to as concrete paste, fines, or cream). This step also smooths ridges, bumps, and small dips left by the screed. Bull-floating takes a little practice. The wide magnesium trowel is usually at the end of a long pole that amplifies any leverage, so it's tough to control the leading edge of the float on both the push and pull strokes. Target ⅛ in. to ¼ in. of feather by lifting and lowering the handle as you push or pull the float across the surface. Too much feather, and the heel of the float drags and leaves ridges of cream on each side. Too little feather, and the lead edge digs in. Just right, and you have a wet, smooth-as-glass surface. Don't fuss; you can work a float too much over the surface. One stroke out and one back; then move the float over for the next glide.

Control joints direct cracks

When spacing control joints, closer is usually better than farther apart. For narrow slabs like sidewalks, I usually limit cross-slab joints to 1½ times the width of the walkway (4 ft. wide would result in 6-ft. control-joint spacing). I divided this slab into sections of about 12 ft. square. With a straight 2x4 as a guide, I use a jointer to cut the initial line of the slab's control joints, running the tool back and forth until the groove looks smooth. Later, I use a worm-drive saw with a diamond blade to cut a 2½-in.-deep kerf along the score line to ensure that a shrinkage crack will follow my intended path rather than one of its own choosing.

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Measure twice, order once

When ordering concrete, it's a good bet that given the particulars of any job, the concrete company can specify the mix that works best. I rely on the following mix elements.

- Concrete is ordered by the cubic yard. I typically measure in feet first: length times width times thickness. Then I divide by 27 to get the correct cubic-yard measure. Always round up or plan to order a little extra.
- The minimum-strength mix used for weather-durable exterior slabs is 3000-psi concrete.
- The slab-mix aggregate can range from ⅜ in. to ¾ in. dia., but smaller aggregate is easier to place and finish.
- If you're pouring concrete in cold temperatures, you need air-entrained concrete to make the slab less prone to freezing cracks.
- I target a slump of 4 in. to 5 in. A lower slump makes the pour too stiff to work on large slabs without power equipment; a greater slump means concrete like soup.
- Resist the impulse to loosen the mix with a lot of water when it arrives. Although the water can make the concrete a little easier to place, it reduces the strength of the concrete and increases the risk for shrinkage cracks. Place the concrete as stiff as possible.
- Ensure good access for the concrete truck. Although small sidewalks and slabs can be managed with a wheelbarrow train, large slabs make for brutal hand work. The closer the truck can get to the slab, the better off you are.