Concrete technology 1 pdf

1/52 Shabby stoop can crush your home's overall curb appeal. And although the construction of concrete stairs is more complicated than pouring a simple walkway, it is probably not as difficult as you might think. We spent the day with masons at Above Quality Inc., and they showed us how they pour concrete steps that look great and will last for decades. They gave us simple step-by-step instructions that even beginners can follow and some great tips that longtime professionals will appreciate. 2 / 52 Watch out for wells. In those days, many stoops were built above the well rooms. You don't want to start busting up an old staircase and suddenly find yourself in a basement covered in rubble. Steps built on wells can be identified using the built-in glass access panel. Sometimes the panel has been damaged or removed, but the patch should still be visible. Don't even think about starting the demo process without asking the homeowner or preferably visiting the basement and researching with your own eyes. In addition, always call your local municipality to find out if you need a building permit and inspection. 3/52 If you don't have a hammer, go rent one. Some of these old stoops have been poured ridiculously thick and are extremely hard to bust. Don't order a concrete truck until you know what you're dealing with. Even the professionals we've been out of work have spent most of the day dismantling one stoop. Some stoops had to be seized with steer skids equipped with a hammer hammer. Whether you're using a hammer or a toboggan, it helps you locate the rebar (if any) and strike along its length. Sometimes concrete can be more easily broken if you follow the rebar. 4 / 52 Cut the ugly reinforcing rod with screw cutters or an angle grinder equipped with a cut-off wheel. 5/ 52 It's okay if some old concrete sticks to your house. But it is important to clean the upper surface or show, especially if the new tilt is poured at the same level or lower than the old one. Knock out the remains with a hammer and cold chisel. 6 / 52 If you replace an existing stoop, it is likely that part of the pavement will have to be replaced with a slope, even if the pavement is in good condition. The reason for this is that the distance from the top of the new tilt down to the top of the walkway may not accommodate the allowed height and width of each riser of the stairs and tread, as is the case under current building regulations. Check out this story to find out what's allowed in today's stair code. If part of the old sidewalk is to remain, prevent the jagged intersection by cutting the sidewalk with a concrete saw cut off. 7/52 Stoops are not one solid monolithic concrete hunk, or at least they shouldn't be. You'll need a little fill in the center, so you might as well leave the concrete just busted in place. Remove or reduce pieces larger than football. 8 / 52 Tilt must sit on the bases. If the are not foundations, new bases should be added. This crew usually installs pier foundations, such as those that some decks and porches are served by. For sloping of this size they would have installed four, one on each corner. The depth of these foundations varies depending on the climate in the area. The basics in this part of Minnesota must be 4-ft. deep to prevent frost from heaving tilt. New foundations and tilt can pour at the same time. This stoop will be built on existing foundations, which are an integral part of the foundation of the house. 9 / 52 Use 3/4-in plywood for side plates. Dig a trench to secure the bottom of the plywood. Secure the sides with 2×4 stakes. Don't worry if the stakes are a little messy at first. This looseness is actually a good thing because it provides some space to move around to make minor adjustments as you go. The stakes will be strengthened when everything is in place. This is fine if the bolts attach the stakes to the form run past the plywood to the stairs. These small holes will be easily filled out when the forms are pulled out and the sides are finished. Leave the stakes closest to the house a few centimeters from the wall so you can knock them back and forth when it's time to remove them. 10/52 Make sure the sides of the forms are pawn, and pitch up from home 1/4-in. at 4-ft. 11/52 If the math on treads and verticals works out, the standard 2x8s work great as form boards for steps. Today's 2x8s actually measure 7-1/4 inches. Install the first step flush with the top of the form and the next steps down 7-1/4 inches below that above it. Since the upper part of the form is already inclined, the slope on each tread will be the same. If you mark the pieces perpendicular to the top of the form, each piece will have a slight posterior stigma at the bottom, which is fine. 12 / 52 When it comes to combining molds, screws work better than nails because pounding in nails tends to knock mold plates out of position. 13/52 Make sure the steps are aligned from one side of the form to the other. 14 / 52 This crew checks to see if the form is square with a high speed square. The framing square would also work or could be measured diagonally from one corner to another, and then compare this measurement with the distance from the opposite two corners. 15/52 Add 2×4 (sometimes called strongback) to the front of each step of the form board. This will keep the concrete pressure from bowing to the boards. 16/52 Add the stakes a few feet from the sides of the mold and secure a 2×4 stake by holding the form in place with a cross buckle. 17/52 Cover the exposed part of the wall with self-truding roofing, commonly known as ice & water. 18 /52 During the tilt rebuild, each flashing situation will be unique. Here's the right way to flash the wall while building steps against a building that doesn't yet have any cladding on it. 19 / 52 Add if necessary. 20 / 52 Compact the soil with a manual manipulator. Don't wait for the entire form to be filled out. Instead, thicken only a few centimeters of soil at a time. 21/52 You can pour a whole stoop 6, 8, 10 or even 12 inches thick if you want, but nowhere inside the form should there be room between the soil and the form boards smaller than 4 inches. 22/52 This crew adds 3/8-in. rebar to their stoops, even if this is not required by code in this area. They tie a rebar, forming 12 to16-in. grid pattern. Continue the rebar down and tie it to the rebar mesh on the sidewalk. Lift the rebar up when pouring or rest on the rebar chairs. No part of the reinforcing bar should be closer than two inches from the surface. 23 / 52 Connect the new walkway with the old one, drilling holes in the old sidewalk and banging in short lengths of reinforcing rods. Tie this rebar to the rebar mesh on the new walkway. Be sure to drill holes inside or below the center of the old sidewalk to prevent the top from cracking. 24/52 Evaporation delayer is designed to slow down the curing process. This product is a must when operating in conditions such as high temperatures, low humidity, strong winds or direct sunlight. This crew covers the entire inner part of the forming plates by delaying evaporation. The delayer keeps the surface in a longer working state and acts as a form release, preventing concrete from sticking to form plates during form dismantling. This product is made by ChemMasters and is called Spray Film. In this application, the delayer is used undiluted with a sponge trove. 25 / 52 Talk to the driver before pouring concrete. Let him know that you want to pour the slope a little thicker, and the sidewalk a little wetter than the normal slab will be poured. The reason for this is that the dense infusion will exert less pressure on the mold and allow you to disassemble it sooner rather than later. Pouring the sidewalk wet will also give you time to let it sit while working on the stairs. Wet walkway pour also provides additional cream, which can be rubbed onto the vertical walls of concrete to smooth them after you start pulling the mold (see below). 26 / 52 Holding an extra bucket of concrete at hand is a smart move. It will be useful if you need to fill in the empty spaces that can lurk behind the form boards. Keep the bucket covered and out of the sun. 27 / 52 Eliminate large voids by burying in concrete on large side surfaces of the plates. 28 / 52 Eliminate smaller voids by touching every part of each board. More taps with a smaller hammer is better than a few taps with a large one. Large hammers can send concrete flying anywhere. You can not overdo this step, especially since the tilt is poured dryer and less likely to comply. 29 / 52 Use a mud rake to pull the reinforcing rod into the center of the concrete (some have hooks specifically for this). Again, make sure that no part of the grid is than two inches from any surface. 30 / 52 Finish the area against the wall with a hand float, sometimes called mag, short for magnesium. This will create a nice even line, where it is most important and will help reduce the risk of splashing concrete on the house during the screed. 31 / 52 Determine which way the screed board is tilted (almost every board has some arch to it), and screed with the crown up. This will create a very small hump in the concrete, which will help to bend down to throw water. Tilt the screed board back just a little as you move it back and forth while pulling it forward. 32 / 52 There is no need to use a trowel on any surface, as they will all receive a broom finish. In addition to the stairs, manually lift part of the sidewalk next to the lower step. This creates a guide edge during the sidewalk screed. Make sure it is at the level with the bottom edge of the lowest plate 2×8. 33 / 52 Use an area that was hand-floated near the stairs as a guide for the screed board. 34 / 52 All surfaces can be finished with a bull float as soon as they are sharpened. The manual float can be used on all surfaces if the tilt is not large enough for the bull float. If possible, start the bull float in two directions perpendicular to each other. Clean all imperfections left by the bull float from the float side. 35/52 Instead of smoothly pulling or pushing the first pass with the float, make a stinging motion down. This will help push the aggregate (rocks) further under the surface, which reduces the risk of chipping. 36 /52 Nowadays many masons prefer saw-cutting control connections in driveways and patios, but creating control joints in sidewalks with groover is still a go-to method. In this case, groover was the best way to match the control connections of the existing sidewalk. Since groover needs to push several aggregates down, it is better to finish this process before starting at the edges. 37 / 52 This step can be performed shortly after creating control connections. Long transitions with an edge will result in a smoother edge. 38 / 52 When should I delete forms? The answer is: It all depends. The temperature, humidity level and thickness of the inpouring will determine when the forms should be removed. The wait can range from 45 minutes to three hours. One of the methods this crew uses is a weight test. They put a hand-held float on the surface and put their body weight on it. If left only small. Indent, it's probably good to go. If it leaves no trace, you may have waited too long. This album was released in early October in Minnesota. The temperature was about 70 degrees, the humidity was low and it was partly cloudy. Since all the concrete was in place, the crew waited less than 75 minutes before dismantling the mold. 39 / 52 This is a double operation. Remove the screws holding the stepper boards place and gently move them 40 / 52 Fill larger voids with additional concrete that you put away in a bucket. 41 / 52 That's why you poured a damp sidewalk. When the concrete is sitting, the cream floats to the surface. This cream is what you want to use to fill the small voids that lurked behind the step form boards. So grab it from the surface of the sidewalk and do it. Small imperfections created on the sidewalk can be easily repaired. If the sidewalk does not give up the cream. Spray to the surface with a sufficiently diluted evaporation delay to increase feasibility. DON'T ADD WATER! Adding water to help smooth the surface almost guarantees chipping down the road. 42 / 52 These pluses have both inside and outside stairway trogs. They work great and you could make them for less than $20 each. But trowel step are not mandatory to achieve a handsome set of steps. 43/52 Building specific steps requires a whole mass of switching back and forth between edges and mags. One trick many professionals have calculated out is that if you leave the tools face down on concrete they don't dry out as quickly. The tool covered with dried pieces of concrete is good for nothing. 44 / 52 Broom top and sidewalk before removing the side boards. A regular push broom will work well. The whole idea of a broom finish is that it provides traction when wet. But try to avoid too aggressive grooves that will hurt your bare feet and make sweeping sick. Start by griping the broom low to the ground. If the broom does not leave the pattern, lift the broom higher and make another pass. 46/52 Side boards may need a little convincing to go down. Be gentle! Do not pull hard or key on them. Wiggle them back and forth and gingerly tap on them with a hammer if you need to. Aggressively pulling off the side boards can bring large pieces of concrete with them. 47/52 Since the sides of the tilt are the last ones to receive attention, they will probably have to be sprayed with a evaporation retard to fill small voids. Again, DON'T ADD WATER! Adding water to help smooth the surface almost guarantees chipping down the road. 48 / 52 This crew uses a sponge trowel to work in a retardor and smooth over small voids on the sides. The sponge trowel leaves a texture that looks good next to the broom trim. If you don't have a round trowel, just broom the sides as well. 49 / 52 Concrete becomes much weaker if the water in the mixture evaporates before the chemical curing process is completed. You can spray the stairs with water every day (after hardening) for at least a week to slow down the curing process. A better solution is to spray acrylic curing and sealing of the product. Surface sealing also protects concrete from scaling and splashing in cold climates. Apply the sealant immediately after the broom. 50/52 It may sound like a no-brainer, but when you're done, take the time to tape off Work. It is also a good idea to talk to neighbors You can start and ask them to let your little kids know and corral their pets for a bit. In addition, let the homeowner put a sign on the inside of the door as a reminder not to go out on a new step for at least one day. 51 / 52 The day after the end of this tilt, one of the crew members returned and cut the control connection between the lower step and the sidewalk. Tell homeowners to wait at least two years before applying any deicer on the stairs or sidewalk. 52 / 52 Glenn Anderson is the owner/operator of Above Quality in Prior Lake, MN. For 27 years, he has been finishing slabs, pouring tilts, laying blocks and laying stones. Disclosure: This post is provided by editors of The Construction Pro Tips who aim to highlight products and services that may find you interesting. 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