

Concrete Countertops



I read all the time how complicated and almost impossible it is for a homeowner or carpenter like us to build a concrete countertop.

If you can run a circular saw and have some carpentry/concrete abilities you can build any kind or size of a concrete countertop.

Above is a countertop I built in a new office for a Livestock Company. He wanted it to look a brindle cow hide, and when we finished, it did.



To get where we are going in this article I want to show you where we started. The preceding picture shows the old 50 year old house he bought next to his property and we remodeled it.



This is what we had to work with. Remodels will test your ability and patience at times.



The first thing we did was to tear out the cabinets and the wall then built a header as the old common roof frame was sagging 4" where we took the wall out and built a pony wall.

I built this frame below then put a good bead of Titebond glue on the frame and stapled 1/2" plywood on it. 8' piece in the center, fillers on the ends.



If you will look below and see that we put a block and built a $\frac{3}{4}$ " crown/camber into the truss header.



I knew the load this beam had to lift and hold, and it was going to have to carry the 14' span plus the weight of the roof, roof frame, lots of dead weight.

For this beam to sag, these two 12" stop blocks have to go out, they won't, with the bolts and glue.

I installed the stop blocks on the end of the bottom 2x4 with glue, nails and carriage bolts and these blocks transferred the load compression into tension in the bottom 2x4.

For this beam to sag it will have to pull this bottom 2x4 apart, takes about 10,000# to do that. Won't happen.



You can see the 3 bolts we put in and along with some wood glue; this block is not going to move. See above where the bottom 2x4 is on the line and in the picture before that it is $\frac{3}{4}$ " from the line, $\frac{3}{4}$ " crown.

When we took the hydraulic jack and stiff leg out the beam sagged about a $\frac{1}{4}$ ". Next day I checked and it had come down another $\frac{1}{4}$ " and it never moved after that. Good truss header.

Not as good as 2 microlams; but we built it for (labor and material) about a fifth of the cost.

This is the same way I framed the elliptical header in the Carpentry Book. There are over 100 framing procedures in the book and this is just one of them. I thought this would be an interesting beginning before we pour concrete. Your first job could involve building a header to span 14' and now you have got this to go by.

Now after that intensive framing section we are going to form

and pour some concrete on top of some brand new cabinets.

I really want to emphasize that before you start a project like this you want to build some small 2x2' tops and experiment with them and learn the procedures, and you will also have some samples of colors.



We'll start with a 38"x25" OD framed concrete top to go in the utility room.

I took a piece of 1/2" plywood and cut a 36 1/2"x23 1/2" base, and then I wrapped it with mitered 1x2's, white pine.

I stained and sealed the 1x2 completely before we poured the concrete in it.

I laid chicken wire in it and stapled it down then with a brush I coated the inside with concrete adhesive, all the wire and wood.



As you will notice, I am using all Quikrete products on this

project. They are readily available.

A lot of concrete people say that sacked concrete is no good. They need to take a lesson in concrete engineering. Quikrete concrete mix is a very good mixture, about a 4000 psi mix, but for tops I add a gallon of pure Portland cement to a bag, makes it about a 7-8000# psi.



Next picture shows that we are mixing a batch of concrete in a bucket. This is easier than a drum mixer and your concrete is a lot fresher than mixing a big batch. Mix about a 5" slump.



Let me tell you something you may not know. If you are using 80# bags of concrete mix, there is 80 cups of mix in the bag, by volume. 40#=40 cups, 60#=60 cups.

The mix for regular concrete is 1-1-2-3. One part water, one part cement, two parts sand and 3 parts of gravel for regular 4000psi concrete. The mix for a countertop is somewhat different.

You will have to add more water to this basic mix formula. We had to over double the water because of the gallon of cement we added.

So to calculate this, you add up your parts, 9 total parts. $80/9=8.88$ about 9 cups for one part. So we need about 24-28 cups of water, 1½-2 gallons. We usually pour 1½ gallons in a bucket and then add ½ of the sack, then the gallon of cement, then the rest of the bag and nearly always have to add about 6 more cups of water. Never put an additive (adhesive/bonder) in your mix, it won't take stain as well, or not at all, add cement.



As you can see Quikrete carries quite a variety of products. The blue one is countertop mix, about 5-6000# psi (pounds per square inch). Good material I have started using it instead of our mix because it finishes easier, and not that much more money.



Here I am screeding off the top with a 1x2, I do this 3 or 4 times to get the rocks down and to have a good plane on the surface.



The next day I lightly sanded it with a 120 grit sponge sander.



This is sanded, blown off and ready for filler.



On this one I used straight Portland to fill the small holes I made sanding. Then I sprayed a light coat of water on it left it over night.



I then sprayed it with **Liquid Iron**, a tree fertilizer or you can buy **Copperas granules** and mix with water for a stain, same thing, only this liquid is handier to use.



I then let it dry and applied 3 coats of sealer. This sealer above is one of the best for water and stain resistance.

This next picture is the installed counter top. This is the easiest top you can build. It does not have to have the edges rounded or finished. There are a 1000 ways you can stain a top and also instead of using straight Portland for your filler you can use colored unsanded grout in a variety of colors, makes a beautiful top. Quikrete has many different colors of stains. You can stain your base concrete, sprinkle the liquid stain on the wet concrete and trowel it in, many different ways to do it.

I will show you later how to form a sink in a top. In the carpentry book I show you how to draw an elliptical (oval) sink opening, say for a 19x17 oval sink. You can draw it, form it, pour then cut the opening out and install your sink.



This is the finished top. For a Ranch Style office like this one, the tops fit in perfectly.



This is a close up of the top. These pictures don't do these counter tops justice. This picture shows how the Liquid Iron brings out all of the colors of the soil that concrete is made of.

Your top will have red, gold, black, brown, greenish tans, and many other colors. Only God knows what color it is going to be.

Now we will get started on the kitchen tops.



We built the cabinet (pony wall), wall then installed the uppers and then we installed the base cabinets. As you can see (osb cantilevered top support on the left) I made a breakfast bar wall and cantilevered support 34½" high so it would come out even with the base cabinets.



Here we are building the plywood base 5/8" AC exterior plywood. Every piece is getting adhesive. Look at the uppers over there, how high they look. It This is a 2½" thick concrete top. Everyone needs 18" plus of space below the uppers. Don't forget this, large microwaves are 17¼ high.



Don't skimp on the adhesive. It acts as a spacer more than an adhesive.



Here the carpenter is marking the plywood, easiest way to do a lazy susan corner/cabinet.



We cut $\frac{1}{2}$ " outside of the line and now he is installing a $\frac{5}{8}$ "x1" form (lip) to the substrate plywood base.



I am certain you know about installing plywood and making a 45° mitered extension. This extension is what we will nail our outside form to.



This is where we came to the 30" range, so we stopped flush with the face frame.

I always leave $30\frac{1}{4}$ " for a small range and $24\frac{1}{4}$ " for a dishwasher.

You can now buy a 18, 24 or 30" dishwasher.

If you build cabinets or do anything for a woman, that has kind of a bad attitude anyway, get it in writing.... I know.



To get a rounded bottom corner on this top we used silicone that we molded in a radius.



We used a jumbo popsicle stick to make a rounded corner in the form. You can attach anything you want in your form, rope, corner bead, any trim you come up with.

We coated the form with concrete adhesive (bonding glue) to all wood surfaces that we wanted bonded to the concrete, the ones we did not want bonded the concrete (outside 1x3, lip extension) we applied a coat of transmission fluid to them, then the form pieces will separate easily.



This is wire mat we used for reinforcement steel; this is a must to install. Tie it as you would rebar and pick it up about $\frac{1}{4}$ " as you pour.



Here are attaching the sink form. The outside of the oiled form is exactly the opening we want for the sink. If you want an oval sink for a vanity, mark it as I said earlier (Draw an Ellipse, Carpentry Book) then cut out the mark, and form it by tacking a strip of masonite to the inside of your opening at proper elevation. This will give you the opening for your oval sink. You don't have to oil the masonite and it is easy to remove.



This is the completed form for the 33x22" sink opening. The form is actually 32 1/4 x 21 1/4". The form has to be exactly square off of the front of the form or else your sink will not go in the opening. This is a 1 3/4" form that is exactly level with the outside form. What you form is what you get, so be careful when install any inside form.



We didn't skimp on the steel; we installed a #3 piece of rebar around all the edge. Look at the shingle nail I put under the cross bar of the mat steel, it is there to hold the steel up so I can raise and vibrate the steel mat to get it embedded in the concrete.

This is one of the most important parts of a pour, vibrating the concrete to get a filled form and not have any honeycomb edges.



We used a piece of our form to tamp the corners and edges. A point trowel will work too. Also you want to tamp the concrete in the center of the top, tamp all of it, tamp one direction the tamp 90° in the other direction. This ties all of the concrete together.



We tamp and use this vibrate screed as we go. This is simply a (no blade) jigsaw mounted to it. The vibration settles the rock for a smooth planed top. Very important procedure.



I run the edger's first pass as I go; you usually have to make 2 or 3 passes. This is a 3/8" radius edger and it matches our silicone form corner.



I finish with a pool trowel; your concrete top does not have to be perfect. The top is manmade, so nothings perfect. Anyway, we are going to sand it tomorrow. When concrete starts bleeding (water coming to the surface) means that it is snapping, it is going into a chemical change. The molecules are binding together and the temperature of the concrete increases. You want to float the surface with a mag float first, and then before it starts bleeding you

want to do a least one pool trowel float.

By the way look below; these are stainless steel trowels we are using. If any rust from carbon trowels gets into the concrete you are going to see it. Use stainless trowels.



This is the concrete tool section at Lowes. Very low prices and they are mostly stainless steel.



This is what I sand with, a sponge sander and a 120 grit hand sander. I want to tell you something about this hand sander.



I have about 7 or 8 of these sanders. This wire clamp is the best clamping system I have ever seen. The wire gets the paper tight and I can load a piece of sandpaper in 20 seconds. The old bolt/wingnut type never gets the paper tight and is hard to load. I buy these at Walmart for about \$5.



This is the mini 6x6 Saltio Tile I found at Lowes. It fit in with our southwest style countertop perfectly. I laid out how much tile I needed and then some and then I shot 3 coats of sealer on them before I

laid the tile. I also built the window stool with tile.



This is the stool I built and below is the sink install, you plumbers don't get alarmed, before I clamped it down I installed valve.



You need to go back and look carefully how I built a mitered corner on the sink form. You need to buy the sink and know what you are going to install before you make the form.



If your milk cow is a brindle you ought to be able to relate to this top's color. Remember what I told you, build 8 or 10 1'x1' or

2'x2' sample forms and pour them and experiment with colors, fillers, different stain application methods. This copperas color is only one of the hundreds of ways you can stain concrete. Quikrete has some absolutely beautiful epoxy finishes. There is one thing about using Quikrete products, and it is the most important thing to consider when you are doing a top, you can always go back and get the same product again. I don't know how many times I have went to Sherwin-Williams and find out they had discontinued the product I had only bought 3 months before.

I sprayed two coats of Liquid Iron on this top and as you can see it really brought out all of the mineral colors in the soil.

Notice in the last picture how I laid the tile behind the stove opening and how I raised the row up. This tile will be seen when they install the range, which is usually about 44" high.

This completes concrete counter tops. If you have any questions, even the smallest detail, email me at carpenterbooks@live.com.

Here is something I have to show you. An architect came by and commented how beautiful the oak doors were. The owner and I just smiled at each other. Then he went to a door and saw what we did.



These are masonite doors, 2-8x6-9 door and jamb cost \$72, an oak unit would probably run about \$400. Lowe's paint department can show you how to do this stain application. This is red oak stain, we just took a \$1 hair brush and brushed it on and then applied 2 coats of poly.

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