INSTALLING Stone Counters

For the flawless installation this premium material deserves, provide strong support and carefully plan the cabinet details

by Rick Stenberg

It wasn't that long ago that stone counters were an unusual item only wealthy people could afford. They're still not cheap, but they have come down in price and are increasingly common in high-end kitchens and baths.

I've been in the stone-fabrication business for 20-plus years and counters are one of our bread-and-butter items. Although it's possible to fabricate counters in the field, you can do much better work in a well-equipped shop. Mistakes are costly, so we don't work from drawings or measurements. Instead, we make full-size templates of the cabinet top and take them back to the shop, where they

Figure 1. Counters are transported to the site in sections and glued to a plywood subtop with thick dabs of epoxy. This counter is made from 13/16-inch material. There would be no need for a subtop if it were made from 1 1/4-inch structural stone.

are used to cut pieces from large slabs of stone. When the pieces are finished, we take them to the site and use epoxy to glue them on top of the cabinets (see Figure 1).

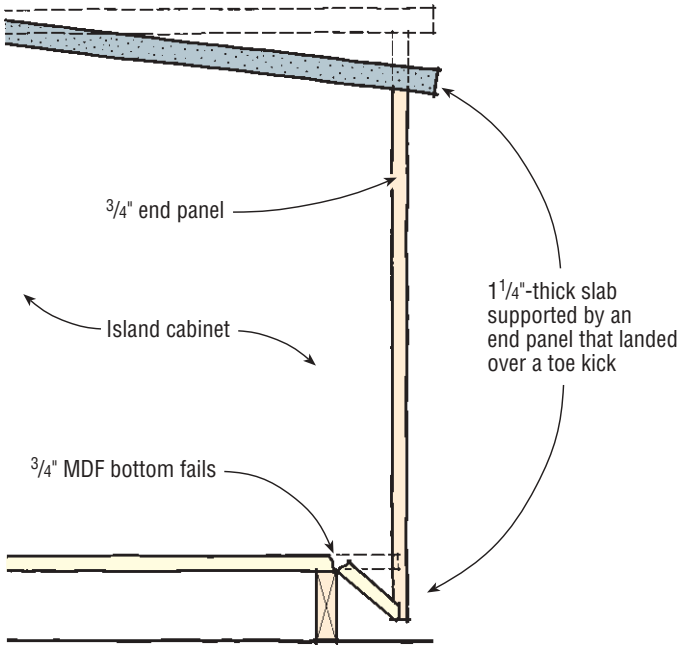
Our work happens late in the job, and counters tie in to the work of many other trades. The tolerances are exacting, so it's not uncommon to run into trouble because something isn't ready or because the details are not fully worked out. This can cause delay at a critical point in the project, or lead to added costs because existing work has to be redone. The purpose of this article is to explain what contractors need to know about stone counters so they can avoid these problems and create a product the client will be happy with.

Materials

Granite is the most common stone used for counters, but there are many other slab materials to choose from. We often use marble, limestone, onyx, slate, and quartzite. Some of these materials are interchangeable, but

Cabinet Failure

Figure 2. Cabinets should be designed to support heavy stone counters. MDF is fine for the sides but may not be strong enough to carry a large thick slab that lands above an overhang.



others require special detailing, either in the stone counter itself or the cabinets below. My advice is to start talking to the fabricator early in the job. A knowledgeable fabricator can explain the pros and cons of various materials and tell you what it will take to do a successful installation.

Most slabs are imported, so they come in metric thicknesses. In the industry we talk about 2-centimeter and 3-centimeter stone. That converts to roughly 13/16-inch and 1 1/4-inch material, which is how I will refer to it in this article. In most of the U.S. the thinner, "dimensional" stone is the norm. However, there are areas on the East Coast and in the South where 1 1/4-inch stone is more common.

Figure 3. Here, the installer applies epoxy to steel angles in the subtop that will support an overhanging section of counter (left). Another way to stiffen the overhang is to support it from underneath. This section of the subtop (below) is carried by steel plates that span the top of the cabinet.

Templates

The clients can wait to select the particular piece of stone they want to use, but every other decision must be made before we arrive to make templates. The cabinets and subtop should be complete, and the sink, cooktop, and faucets should be on site and temporarily installed in their future positions. If there's a freestanding stove, it too should be in place.

Some fabricators make templates by putting strips of plywood along the edges of the subtop and connecting them with hot-melt glue. We make them from full pieces of 1/8-inch plywood, because the glue joints could get knocked out of whack on the way to the shop. If the counter butts to an irregular surface, we scribe the template to fit.

Every detail of the installation is recorded on the template, including edge treatments, overhangs, and the size and location of penetrations. The counters will be identical to the templates, so changes are not allowed once the templates are made. If the client changes something, we have to come back and retemplate the job.

Structural Support

Stone is heavier than many of the materials traditionally used for counters. A 13/16-inch slab weighs 13 pounds per square foot and 1 1/4-inch material weighs 19 pounds per square foot. This is not an incredible amount of weight, but it does mean that base cabinets should be sturdily constructed.

I have visited projects where cabinets failed because they were not strong enough to support the load. In one case this happened because an island cabinet was made from MDF. A 1 1/4-inch slab was supported by an end panel that landed over a toe kick. The end panel was strong enough to

Stone Countertop Edge Details

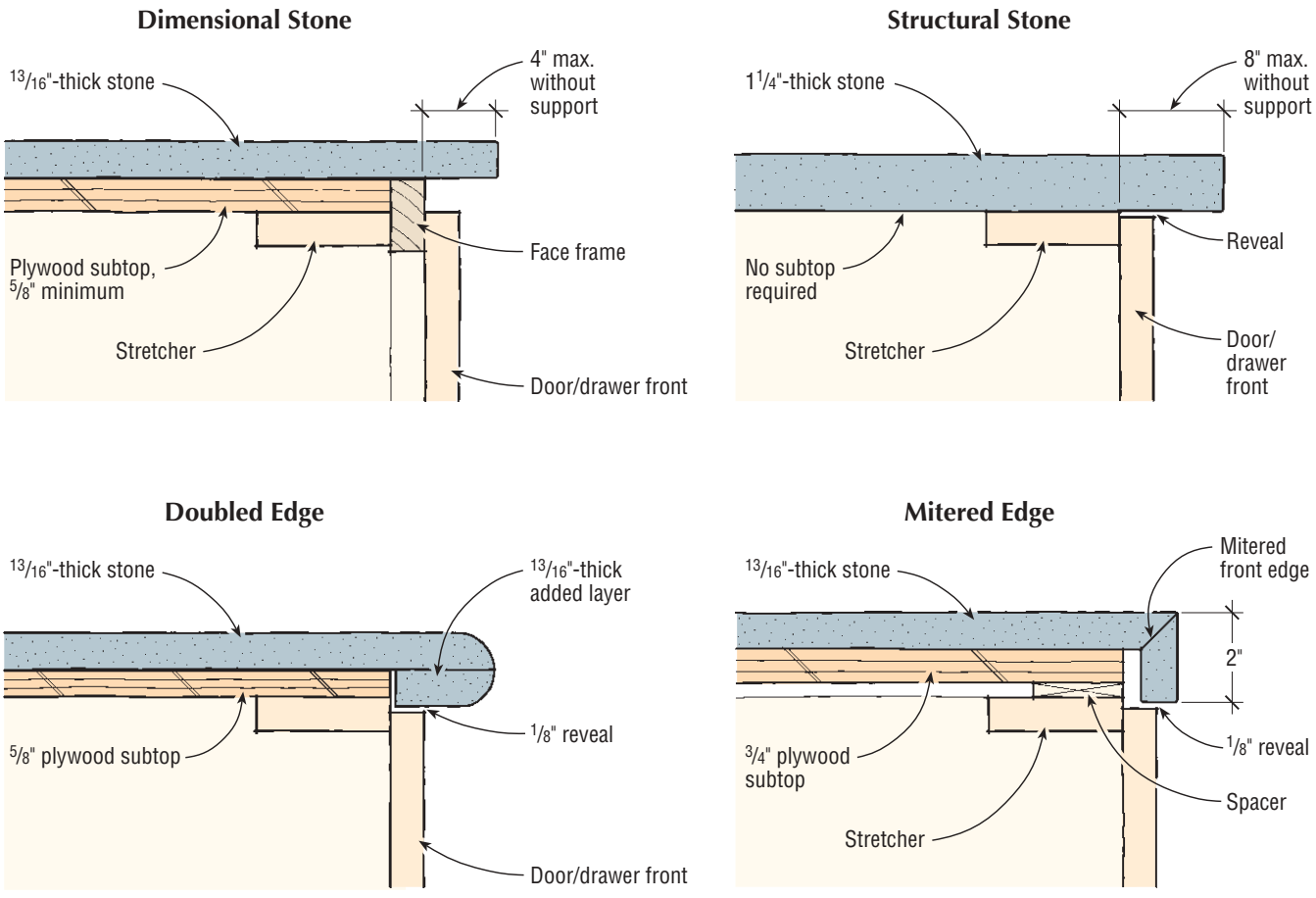


Figure 4. Cabinets should be constructed with the edge detail of the counter in mind. When a plywood subtop is used, it will be necessary to hide its edge. Sink mounting details should also be considered.

support the stone, but the bottom broke where it cantilevered over the kick (Figure 2, page 2). It wouldn't have happened if the bottom had been stronger or the panel had run straight to the floor.

Subtops. The biggest difference between using 13/16-inch and 1 1/4-inch stone is that the thicker material is structural. "Structural" stone is strong enough to be installed over open cabinets and can span openings without any additional support. The one rule for 13/16-inch stone is that it is only as strong as what you apply it to. Dimensional stone should be installed over a continuous plywood subtop that is solidly screwed to the cabinets.

The subtop should be made from 5/8-inch plywood, not particleboard or MDF. Plywood is stronger and resists moisture better. The last thing you want is for the subtop to swell or fall apart because it gets wet.

Overhangs. There's a limit to how far an unsupported dimensional stone overhang can project. According to the Marble Institute of America (MIA), 13/16-inch material should not extend more than 4 inches without support. The thicker, 1 1/4-inch stone is allowed to have an 8-inch unsupported overhang. You could probably go further with the right kind of stone but you would be taking a chance, especially if the MIA installation guidelines are part of the contract.

Deep overhangs are common at breakfast bars but they need to be supported from below. I tell contractors to sit on the edge of the subtop, and if it deflects more than 1/8 inch it's not sufficiently stiff. The easiest way to support the overhang is to put end panels or decorative brackets underneath. If the client doesn't want brackets or panels, you will have to devise a less obvious means of support. In this

Installing an Undermount Sink in Stone

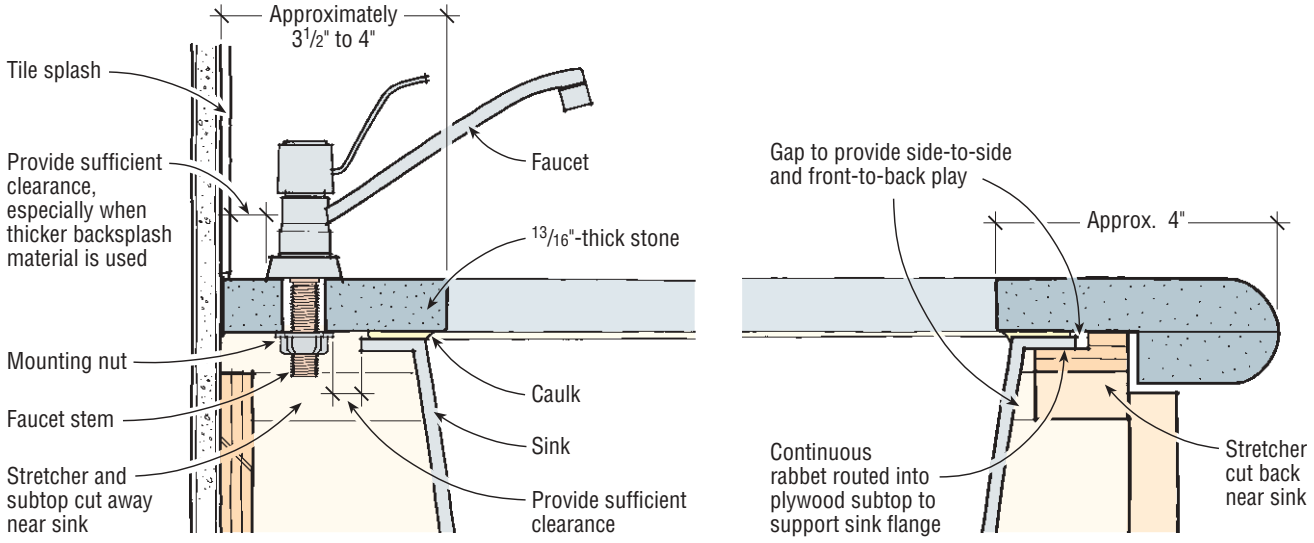


Figure 5. Undermount sinks are supported from underneath the rim. In this kitchen, the front and back edges of the sink will be carried by the lip that is formed between the stretcher and the plywood subtop. Each end will be carried by an adjustable metal bracket (right).

case, we use concealed angles or plates. My favorite method is to route slots in the subtop and insert steel angles so they are flush with the surface. It will probably take several angles to sufficiently stiffen the overhang. The pieces will cantilever over the edge, so one-third should be in the overhang and two-thirds should land on the cabinets (Figure 3, page 3).

Edge Details

We typically double the front edge of dimensional stone counters to make the material look thicker. The added layer also forms a lip that is supposed to hide the edge of the subtop. However, lumps in the subtop and the thickness of the epoxy may prevent the stone from lying tight. That is why the subtop is made from 5/8-inch plywood: If it were any thicker the nosing might not hide the edge.

Some designs call for an even thicker edge treatment. It's common to miter the front edge of the counter and glue on a strip of stone that is 2 or more inches wide. In that situation it's okay to use a stronger, 3/4-inch subtop, because the lip will be tall enough to hide it.

Dimensional stone is sometimes installed with a single-thickness edge. There's no lip, so the subtop will be visible unless you tuck it behind a face frame or edge it with trim (Figure 4, previous page). Structural stone is thick to begin with, so it's almost always fabricated with a single-thickness edge. There's no need for a subtop; the stone is applied directly to the cabinets.

Close tolerances. The tolerances for installing stone counters are very exacting, so it's important for the cabinets to be perfectly level and for the subtops to form a single level plane. The reveal between the nosing and the cabinet fronts will not be even if there are lumps or bumps in the subtop. We

Figure 6. Here, a fabricator is tracing the location of a sink onto the bottom of a plywood template. The opening through the stone will be sized down to create the proper overhang.

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Figure 7. The edge of this counter has been strengthened by gluing metal angles to the back of the nosing. The entire slab has been reinforced with a layer of fiberglass mesh and glue.

can level the slab to some extent, but that means raising it and creating an oversize reveal.

Undermount Sinks

It's easy to cut openings for drop-in sinks because the flange hides the edge. It takes more work to finish the opening for an undermount sink. Even so, undermount sinks are the norm with slab stone counters.

The tricky part for the contractor is figuring out exactly how to support the sink. It needs to be supported by the cabinet and is much easier to install from above before the counters go in. The lip of the sink is typically rabbeted into the subtop and supported from below with cleats or hardware designed for that purpose (Figure 5, previous page).

The sink should be installed flush with the subtop, because the counter is supposed to land on or just above the flange. Sink holes will vary, because they are ground and finished by hand; they need a little bit of play. The hole in the subtop should be slightly oversized, big enough to shift the sink 1/4 inch in any direction. This allows us to adjust the sink to the opening when we install the counter. The counter usually overhangs the sink, and the joint between the slab and flange gets caulked.

Unlike many fabricators, we will not cut a sink opening from the paper template that comes with the fixture.

Figure 8. The stone will be narrow at the front of this sink, so the carpenter reinforced that area by installing a horizontal apron across the top of the opening. A center stile would perform the same function in a face frame cabinet.

Every now and then someone will give us the wrong template, and we don't want there to be any question about where the opening goes. We want the sink to be in place when we template the cabinets so we can trace the opening onto the template (Figure 6, previous page).

Stiffeners. Counters are weakest at the narrow strips of stone along the front and back of large cutouts. We sometimes reinforce these areas by slotting them from the bottom and epoxying in a metal rod (Figure 7, previous page). It's also a good idea to stiffen the subtop under narrow strips of stone. You can do this by installing aprons or posts inside the cabinet (Figure 8, previous page).

A cast-iron sink is very stiff, so if it's held up by the cabinet it will provide some support to the strips of stone above. Stainless steel is another matter. I will not put stone across the divider of a double-bowl stainless steel sink unless there is some kind of reinforcing below.

Faucets

Some fabricators drill the faucet holes in the field. They fear that the counter, weakened by holes, may break in transit. We prefer to drill holes in the shop, because drilling creates a lot of dust and we haven't had much trouble with breakage.

We can't make templates until we know exactly where the faucets will go. Faucets should be dry-fit in the subtop with the sink in place. It's usually a tight fit, so it's important to make sure everything works. Be sure to consider the thickness of the backsplash. It's a good idea to temporarily install the sink and faucet and show them to the clients. Let them manipulate the faucet, and get them to sign off on the location of everything. It's not hard to move things at this point, but once we fabricate the counters the faucet locations will be literally carved in stone (Figure 9).

Figure 9. Sinks and faucets must be located and temporarily installed in the subtop before the templates for the counter are made (above left and right). Here, the author is verifying that the homeowner is satisfied with the location of the faucet (left).

Clearances. The holes through the subtop should be the same size as the holes that will be drilled in the counter. The faucets should be test-fit with the sink in place, because you want to be sure they are not too close to the flange. If they are, the plumber will not be able to install the nuts and washers that hold them in.

Once the counter is templated, you may want to cut out the material that's

under the faucet holes. Most faucet stems do not have enough thread to reach through the counter and the subtop and stretcher below. If you remove this material, the plumber can run the nuts to the bottom of the slab.

Cooktops and Vents

Cooktops are usually easy to put in, because they install from above and have a flange. It's tougher if the client wants to use a cooktop with a separate downdraft vent. Frequently the two appliances come from different manufacturers, which can make for a tight fit in the cabinet. Most vents are slightly narrower than cooktops and are equipped with a minimal flange (Figure 10). There's not much play, so you need to test-fit the units to make sure they fit in the opening and that the flanges will hide any gaps. Some vents have top and bottom flanges that slip over the stone to hold the unit in place. They work fine with dimensional stone but are not sized to fit thicker material. If you want to put this type of vent in a 1 1/4-inch slab, you'll have to cut off the bottom flange.

Figure 10. The top piece is a 1/8-inch plywood template that has been cut to match the opening in the subtop for a cooktop and downdraft vent. The vent is not as wide as the cooktop, which is why the opening is narrower at the back.

Sometimes there's an opening in the counter for a freestanding stove. The stove will not be attached to the counter, but we still expect it to be on site when we make the template. We will not work from cut sheets because the dimensions are frequently incorrect and appliances are allowed to vary slightly from spec. Sometimes they are not even square. The only way to get a good fit with an even reveal is to put the stove where it goes and template to it (Figure 11). The stove should remain in place until the counters are installed. That way, we have something to align them to.

Figure 11. Freestanding stoves should be installed before templating. Otherwise, there could be an uneven gap between the stove and counter. The fabricator is measuring to see if the stove is square to the opening.

Even though it's not supposed to show, we polish the cut edge of the counter that butts to the stove. If the stove is slightly low, the client will see a polished edge.

Cover Your Costs

If you're the GC, you will need to carry something in the budget for tasks that relate to the installation of stone counters. Someone needs to build the subtop and to pre-install the cooktop, sink, and faucets. The schedule will be affected, too. The fixtures, faucets, and appliances need to be on site earlier than usual. The client should be aware that there will be a two- to three-week lag between templating and when the counters go in.

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