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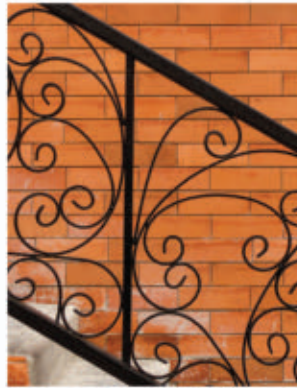
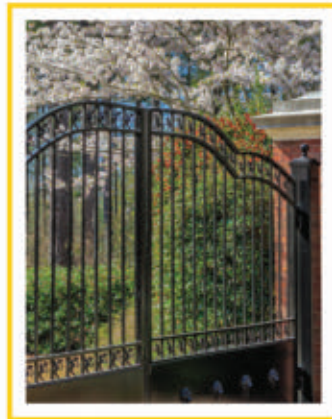
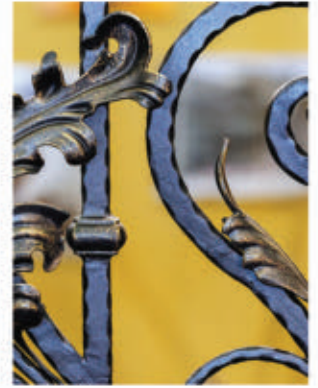
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One of the pitfalls of homeownership is all the maintenance required. I suppose this isn't a problem if money is no object, and you can pay someone else to hassle with the upkeep of your house. But if you're reading this magazine, then chances are you're a do-it-yourselfer, which means you know the aggravation of having to make constant repairs and tweaks to your home as it wears and ages. It's all part of the package but can still be very frustrating.

But frustrations pale in comparison to what I see happening in Southeast Texas as I type this letter. The flooding is unreal. Some of the photography and video on the news look nearly apocalyptic in nature, and not only homes, not only neighborhoods, but large swaths of entire cities appear to have been devastated by Harvey the Hurricane from Hell.

Such a tragedy really puts things in perspective for me. It reminds me of that old saying that goes, "I cried when my house had a leak until I met a man with his house in a flood" (or something like that).

Sadly, a lot of those homeowners will have to start rebuilding from scratch. Let's hope they're insured.

So, keep that in mind as you're griping about making your weekend repairs. Count your blessings, and maybe say a prayer for your neighbors

down south. They could use it, along with your financial assistance. The Salvation Army is a reputable charity that is sure to put your donations to good use. You can find them online at www.salvationarmy.org.

Thanks for reading, and God bless Texas.



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Q: I've read that copper has antimicrobial properties. Does brass have the same properties?

A: The surfaces of copper and its alloys, such as brass and bronze, are antimicrobial, which means they can prevent frequently touched surfaces from serving as reservoirs for the spread of pathogenic microbes.

This is especially beneficial in hospitals and other healthcare facilities where harmful viruses, bacteria, and fungi colonize and persist on doorknobs, railings, faucet handles, etc. These microbes can often survive on surfaces for more than 30 days. However, copper and its alloys have an inherent ability to kill a wide range of these harmful microbes often within two hours or less, and with a high degree of efficiency.

Q: How does LVT differ from vinyl flooring?

A: Sheet vinyl is fiberglass-cushion-backed sheet flooring that is glued directly to the subfloor. The flooring comes in countless patterns and colors, including grouted tile, wood plank and stone. LVT, on the other hand, is not a sheet product. The acronym stands for Luxury Vinyl Tile, a flooring product that usually installs with tongue-and-groove joints and looks like stone or ceramic tile, complete with natural colors and surface texture that feels like the real thing. Some styles are even made to be installed with grout. Similarly, LVP is luxury vinyl flooring that looks like wood planks that often include textures of scraping or embossing that heighten the realism.

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Q: Why can't aluminum and steel be welded together?

A: It's our understanding that the two metals can be bonded using some special techniques that you won't find at the hardware store, but the two metals cannot be welded using standard methods due in large part to their different melting points. Aluminum melts at a much lower temperature than steel, so by the time the steel starts melting the aluminum would be a pool of liquid.

Q: How does an inverter generator differ from a standard gas-driven generator?

A: Inverter generators utilize a different type of alternator to generate very clean AC power. The engine can operate at varying speeds, which reduces noise levels and fuel consumption compared to standard generators. The inverter technology is a fairly new development that also reduces the generator's size and weight. These units also offer cleaner power for sensitive electronics. Small inverter generators produce 1,600-2,000 watts of electricity and are designed to power multiple appliances simultaneously. Larger inverter generators produce enough power to start a rooftop RV air conditioner while simultaneously running a microwave, and some of the newest models offer enough capacity to serve as a home backup generator. You can also pair two inverter generators in tandem to double your power while still benefiting from the clean, quiet power of an inverter generator. **EHT**

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New Tool Accessories



Over the past year, The EHT staff has had the chance to test out a few cool tool accessories we thought our readers would find interesting. After all, nothing makes the stuff you have cooler like having even more stuff to go with it. Here are some highlights.

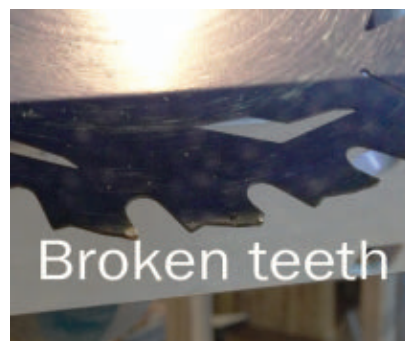
DIABLO DEMO DEMON BLADE

Diablo Tools stole the show at a recent tool exhibition. The newly enhanced Ultimate Framing and Demolition saw blade with Tracking Point Amped tooth design delivers up to 10 times cutting performance in intense applications. This 7-1/4-in. 24-tooth blade includes an industry-first tooth grind sequence designed for extreme durability and effortless cuts; even when cutting abrasive materials such as shingles, bolts or nail-embedded wood.

The Diablo company reps demonstrated the cutting performance of the new blade vs.



a competitor's blade (shown in blue in the photos). When cutting through 2x lumber that had steel bolts embedded every 1-2 inches, the blue blade stalled and sparked and quit cutting halfway through



the test because the blade's teeth began to break off. Once the blade was swapped to the new Diablo Demo Demon, the same saw sliced through the entire yard length of steel-embedded

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Bellawood Red Oak on floor and ceiling
Governor's Estate Oak on fireplace

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2x lumber without ever snagging or slowing. The difference in performance was obvious, and the Diablo blade easily won the contest. (www.diablotools.com)

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wireless speakers to have music while you work. Wireless speakers may no longer be a groundbreaking technology, but Ryobi adds versatility with a new expandable



system. Powered by the same lithium-ion batteries as Ryobi's popular cordless tool line, the new Hybrid Score Wireless Speaker Set contains one P760 Primary Wireless Speaker, and one P761 Secondary Wireless Speaker. By connecting your Bluetooth device to the Primary Speaker, you can control up to four additional speakers instantly using SKAA technology. The secondary speakers can be placed within 150 feet of the primary speaker to cover virtually anywhere in the home or jobsite, streaming through your walls and floors. The P760 Primary Speaker also features an FM tuner, as well as an integrated auxiliary port for direct connection. Adjust volume with independent controls on every speaker, or control all the speakers' volume simultaneously right from your mobile device. (ryobitools.com)

MILWAUKEE AX BLADES FOR RECIP SAWS

Makers of the original Sawzall reciprocating saw, Milwaukee Tool has a new carbide-tipped recip saw blade that's billed as the fastest cutting blade on the market. They boast more than 30X the life of standard bi-metal blades and twice the cutting speed of competitive carbide blades. The Ax blades feature a Nail Guard tooth design to prevent nails from breaking the teeth on impact, and an 5-tpi design for fast, aggressive cuts. While ordinary plunge-tooth designs bounce or skate along

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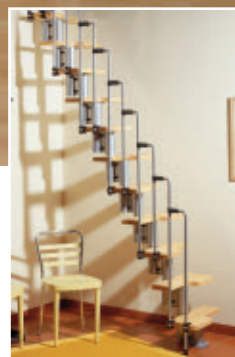
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the work surface, the Fang Tip design bites into the wood on contact to make the cut virtually effortless. The pair of fang-like teeth plus an extra-large gullet deliver the fastest plunge cut in the industry, according to the manufacturer. The combination of these features allow users to cut through a wide range of standard and abrasive materials without sacrificing the life of the blade. And, by optimizing the geometry of each and every carbide tooth, Milwaukee is able to deliver 25 percent more cuts per charge.

To show off the cutting action of the new Ax blades, the Milwaukee reps at a recent Home Depot tool demo took the opportunity to saw a competitor's recip saw (surrounded in plywood) completely in half. It only took a few seconds to make cut. Visit milwaukeeetool.com.

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aluminum oxide grit for fast material removal. The mesh reduces buildup, and once it accumulates too much dust, you can clean the disc by simply shaking it out, vacuuming or rinsing it. Then reuse the same disc multiple times. The 10-pack of SandNet discs includes a free application pad (a \$5 value) for easy attachment to a sander, and the discs are ideal for sanding wood, metal, plastic and solid surfaces. The SandNet discs fit all 5- and 8-hole orbital sanders, and they're available in 80-, 120-, 180-, 220-, 320- and 400-grit.

ONEIDA DUST-FREE ROUTER HOOD

Oneida Air Systems won the prestigious AWFS Fair Visionary New Product Award for its



Universal Dust-Free Router Hood, a router accessory that captures nearly all of the dust, chips and shavings generated by portable routers. This accessory enables a woodworker, contractor or DIY'er to have a virtually dust-free routing experience. Unlike other

products on the market, the Universal Dust-Free Router Hood features both a universal base plate to fit nearly any make and model of portable router, as well as an upper dust dome and lower chip cover that combine to fully encapsulate the router bit. This enables superior dust capture at two different collection points, simultaneously, and ultimately helps to extend the useful life of the router bit. (www.oneida-air.com)

VETO PRO PAC TECH OT-MC TOOL BAG

A compact open top tool bag, Veto Pro Pac's innovative Tech OT-MC includes a centrally located injection molded compartment that can be left open or fitted with removable and repositionable insert boxes that allow users the ability to customize their bags. Each insert box can be filled with different tools or accessory parts, and the central box can accommodate 1, 2, or 3 insert boxes. If only one box is needed, the box can be placed in six different locations. Other key features include an over-molded grip, compact stainless steel tape clip holder, extra-wide padded shoulder strap, 3mm-thick waterproof base, and 28 interior and exterior tool pockets. (www.vetopropac.com) **EHT**



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Beyond interior floor heating, radiant systems have outdoor applications as well, such as installed in a sidewalk or driveway for ice-melting applications to create a safe, slip-free walkway. Some systems can even be installed at the roof line to prevent ice dams.

There are different methods of installing radiant heat, including water-based hydronic systems and all-electrical systems, and the method you choose will depend heavily on the design of the house and the rooms in which you want to add radiant heat.

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For new construction and remodeling additions, hydronic systems circulate hot water through a looped system of PEX piping beneath the floor. Hydronic systems can be powered by gas, oil, electricity or solar energy, making them both flexible and economical when used for whole-house applications. They can also go under most types of flooring, including wood, carpet, stone, tile and laminates. Today's systems have simple yet incredibly smart controls that can target and maintain the level of comfort in specific areas of the home.

While hydronic systems are sometimes considered too complicated, manufacturers are simplifying the installation process.

The concept of radiant heat flooring has been around for ages. Instead of relying solely on noisy forced-air systems or a radiator that creates pockets of hot and cold air throughout the room, these energy-efficient radiant systems heat the floors of a home, which then transfers heat evenly throughout the rest of the room. In addition to eliminating the shock of cold floors on bare feet, the other objects in the room

(couches, chairs, etc.) are heated via the floors, allowing the average temperature of the room to be lower while maintaining a higher level of comfort for the people in it. These systems save on heating bills, eliminate visible heating components, and operate silently. Also, because air is not forced through the home, radiant systems do not circulate dust and allergens that can cause respiratory problems.

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Manufacturers of hydronic heating systems are making installation easier than ever. Infloor Heating Systems offers services such as original LoopCAD plans, customized and pre-assembled system components, and free design consultations.

“We are revolutionizing the entire radiant heating process, from beginning to end, making it quicker and easier than ever before,” says Michael Willburn, president of Infloor Heating Systems.

Infloor reduces the complexity of the systems while offering services such as original LoopCAD plans, custom-made mechanical boards, and free design consultations. The LoopCAD design plans give



installers all the calculations, the loop layout with exact tube spacing, placement and length, the manifold placement, zoning, and routing of supply and return lines, a complete list of materials needed, and more. The company's cus-

tom-made, pre-piped, pre-wired mechanical boards come fully assembled with a diagram that identifies each part, and is ready to be mounted to the wall, which drastically reduces the installation time. (www.infloor.com)

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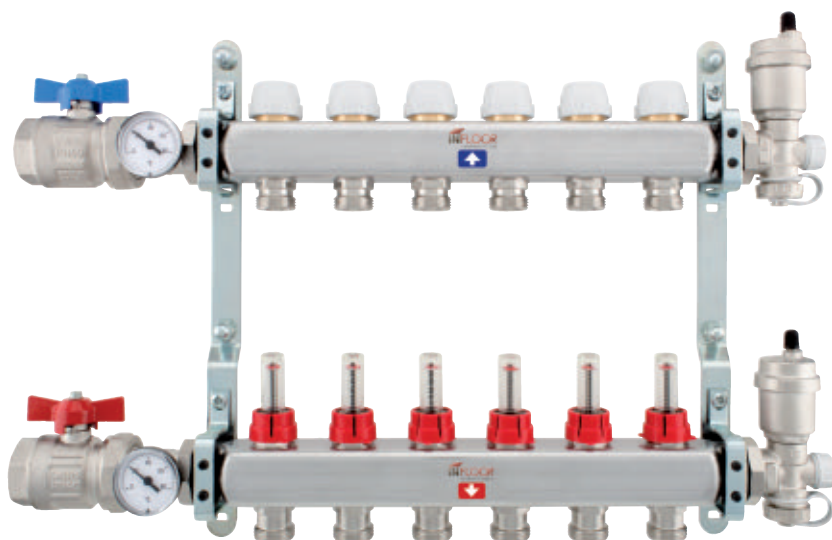
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SPOT LIGHT



Infloor stainless steel manifolds come pre-assembled with mounting brackets attached, temperature gauges already on the supply and return lines, and are equipped with flow-rate regulation valves (flow meters). The ball valve and air vents are not attached, allowing the option to tie into the manifold from the right or left, or a combination of both, which is a great installation benefit.

Another supplier of hydronic systems, The Radiant Floor Company, designs and builds hydronic radiant heating systems especially for do-it-yourselfers and small contractors. The company offers three heating designs:

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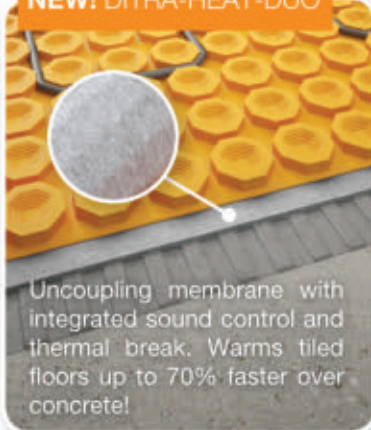
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SPOT LIGHT

liquid heats the other, by way of an efficient heat exchanger, which separates the potable domestic water from the floor's anti-freeze mixture. (www.radiantcompany.com)

NEW ELECTRIC RADIANT SYSTEMS

For retrofit applications, electric radiant systems make an attractive alternative because they can be wired into the home's existing electrical system. They work much like an electric blanket beneath the floor, and the low-profile heating elements are very thin, so they do not significantly raise the height of the finished floor (whereas the PEX piping of a hydronic system is often installed in 1-1/2-in. thick concrete).

New from Warmup, the DCM-PRO Floor Heating System uses pre-spaced channels on the DCM-PRO membrane to make it easy to space the heating cable evenly. This ensures consistent, even heating throughout the floor and protects the cable from mechanical damage caused by walking on the system. The membrane can be attached to wood and cement subfloors using any tile adhesive thanks to a patented design with Hydration Vents. The DCM-PRO membrane can then be covered with self-levelling mortars (SLU's) to allow installation of small format tiles and other floor types such as glue-down wood and luxury vinyl tiles to be laid on top of the system.

Warmup's DCM-PRO system is controlled by the 41E thermostat, billed as "the smartest line voltage thermostat on the market." It can program itself using your smartphone location and the occasional override. Its WiFi capability also allows users to vary the heat settings by zone, based on recommendations from the thermostat. (warmup.com)



Smart controls are a hallmark of the new floor heating systems. Warmup offers the 4iE Thermostat that allows you to zone your heating, set different comfort levels, and be able to manage all these zones from your smartphone using the MyWarmup app.

For ceramic and stone floors, DITRA-HEAT provides fast installation in a thin profile that serves double-duty as an uncoupling layer. Whereas many floor warming systems do not address concerns about potential cracks in tiles and grout, DITRA-HEAT is the first electric floor warming system to directly incorporate essential uncoupling technology into a floor warming system to provide heated floors that are not susceptible to cracking.

The frequent fluctuations in temperature caused by the floor warming can lead to more expansion and contraction of materials, which stresses the tile and



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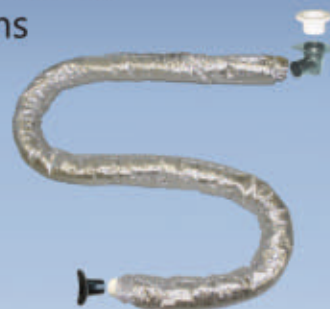


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increases the need for uncoupling. Traditional installation methods require the installation of two separate systems—a floor warming system and an uncoupling system. DITRA-HEAT does both jobs; the heating cables are easily snapped

into place on top of the uncoupling mat with no clips or fasteners. The installer has complete flexibility on where the cables are placed so every installation is customized to suit the exact requirements of the owner.

Because they are held securely within the DITRA-HEAT mat, there is no need to use self-leveling compounds to encapsulate the heating cables. Instead of waiting for a leveling compound to set, tile installation can begin immediately, resulting in a much faster installation. The matting is available in rolls and sheets, and heating cables are available for 120V and 240V circuits. A digital touch-screen thermostat controls the floor temperature and features a built-in Ground Fault Circuit



For easy installation of heated tile floors, DITRA-HEAT combines a floor-warming system with an uncoupling layer that protects tile and grout from unsightly cracks.

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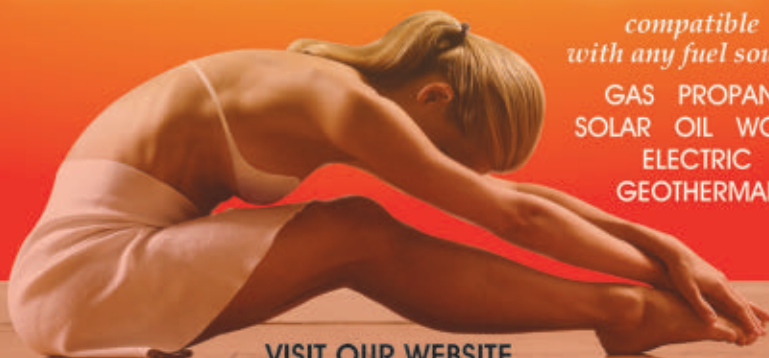
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EXPECT THE UNEXPECTED

By Matt Weber

Murphy's Law states, "Anything that can go wrong will go wrong," and that holds true with most kitchen remodels. With all the modern appliances and amenities, kitchens are usually the most complicated rooms of the house, which makes remodeling them a multifaceted challenge. Pro remodelers get paid big bucks to renovate a kitchen, and they typically use a crew of subcontractors to do it. It's not uncommon for a bold DIY'er to undertake a kitchen remodel, but even the handiest of homeowners should go into the project expecting the unexpected.

Here's a rundown of some unforeseen challenges we encountered on a recent kitchen remodel, so maybe you won't get blindsided if you attempt the same.

THE FLOOR IS ALL FUNKY

Our recent remodel involved a lot of demolition, which included ripping up the old sheet vinyl flooring, removal of the kitchen cabinetry, and disassembly of a wall to reframe it with a larger opening. Tearing things apart is a lot easier than putting them back together, especially when the demolition phase reveals those hidden problems you hadn't expected to address.

The problems started with the floor, and getting the subfloor level and flat is fundamental to the entire project. Ours needed some work.

*Hidden
Challenges
of a
Kitchen
Remodel*



EXPECT THE UNEXPECTED

On removing the old cabinets, we found the subfloor had been scabbed around the old cabinet base, leaving a recess in the floor. The low spots either had to be filled in, or the surrounding plywood would have to be removed to establish a flat, even plane for the new floor. But we soon discovered that was the least of our worries...



As we removed the cabinets and floor, we found the subfloor consisted of multiple uneven layers. Relocation of electrical outlets and plumbing fixtures is another concern.

On further inspection, our floor took a dip. In fact, it took lots of them. See, one advantage of the sheet flooring we removed from this kitchen is that it easily installs over uneven floors, which can disguise problems like a room with a sloping floor. We discovered that one corner of this second-story room sank considerably, possibly due to a sagging joist or maybe an uneven foundation slab. Either way, such a condition poses a big problem for tongue-and-groove flooring, which requires an even subfloor for the joints to connect.

In addition to the floor, your cabinets must be leveled, too. If you encounter minor dips or low spots in the subfloor during cabinet installation, use wood shims beneath the base, which you can later cut off and conceal with floor trim.



The cabinets must be level even if the subfloor isn't. Use shims to make things right, then cut away the excess wood and conceal with floor trim later.

You can't shim the entire room, though, and the click-together luxury vinyl tile (LVT) we planned to install required us to level the remainder of the subfloor surrounding the cabinets. The most egregious problem lay beneath the refrigerator area, so we applied a



We used liquid floor leveler to correct a sloping subfloor, but even after the liquid cured, we still had to add felt paper to even things up.

liquid floor leveler to build up that corner. After the leveler cured, it hadn't quite done the job, so we still had to build it up further with sheets of felt paper.

Roofing felt came in handy for several dips we found throughout the floor. You can detect the dips

by looking for daylight beneath a long straight edge laid over the floor. Felt paper can fill dips up to 1/4 inch deep. To fill a low spot, lay a sheet wide enough to bridge both sides of the problem area, then stack further sheets cut to progressively thinner widths as you fill the gap level with the surrounding floor.



Fill dips in the floor using layers of felt paper cut to tapering widths.

PLUMBING AND ELECTRICAL

Before you complete the cabinet installation, you first must contend

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EXPECT THE UNEXPECTED

with the rough-in utility work to prepare for the furnishings. This might require relocation of electrical outlets or switches, or alterations made to the supply lines or drain plumbing of the kitchen sink,

all depending on the design of your new kitchen.

We didn't expect to find a fully corroded drain pipe beneath our kitchen sink but soon learned that it was almost completely blocked

with rust, and the metal was disintegrating. This saddled us with a new unexpected task: Replace the pipes with a new PVC trap and drain. So, if you're undertaking a kitchen remodel but aren't very skilled at DIY plumbing, then prepare to get familiar with PVC primer and cement.

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We discovered a corroded drain line that had to be replaced with new PVC plumbing.

CABINET & COUNTERTOP ISSUES

When a homeowner replaces their cabinets, they usually choose a different size or design. This means the new cabinets likely won't fit exactly like the old ones. Along these lines, we discovered mismatched paint issues at the ceiling level. Will your new cabinets cover the mismatched colors, or will you have an extra paint job on your hands?



Upon removing the cabinets, we found areas of grime and mismatched paint. If the new furnishings don't conceal these problems, you'll have an extra paint job on your hands.

Do the new cabinets fit against the wall and maintain even reveals? Cabinet manufacturers often include filler strips made with the same cabinet finish. You can cut the strips to size to fill gaps around cabinets for a flush installation when the new units don't otherwise fit perfectly.



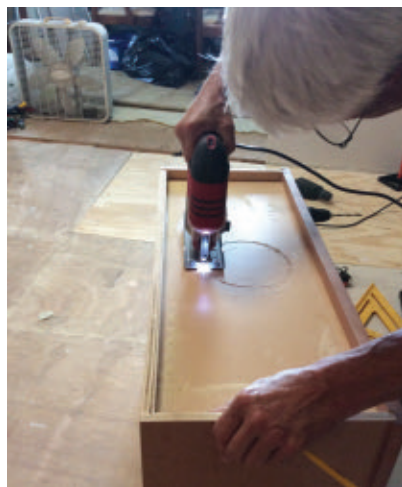
The new cabinets don't always fit perfectly in the same space as the old ones. Attach stain-matched filler strips to fill any gaps against walls or other adjoining features.

Another surprise issue we encountered with the cabinets: missing wall studs when mounting to a wall. The wall framing wasn't exactly missing, but it was oddly located on uneven centers. We were working on an older home that had been remodeled in the past, and during a remodel, carpenters can sometimes get creative with their framing. In a few frustrating cases, this delayed our progress as we searched for solid blocking in which to screw the cabinets.



In some cases, the wall studs weren't located on 16-in. centers, which made it tricky to locate solid blocking behind the drywall to mount the cabinets.

Your cabinets might also need modification. For example, if you plan to route a HVAC register or range hood through a cabinet case, then off-the-shelf cabinet units generally require modification to fit the specific requirements of the jobsite. These mods require accurate measurements and careful cutting.



You might have to make on-site modifications to your cabinets, such as cutting access for a range hood.

On our project, the walls behind the cabinets were also out of whack. In a few spots, the drywall panels wavered unevenly.

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EXPECT THE UNEXPECTED

When you slide a straight countertop against an uneven wall, it will show gaps along the seam. One option is to scribe the countertop to the shape of the wall, but the contractor who installed the granite top in this project didn't bother to do that, so we had to come up with an alternate plan.

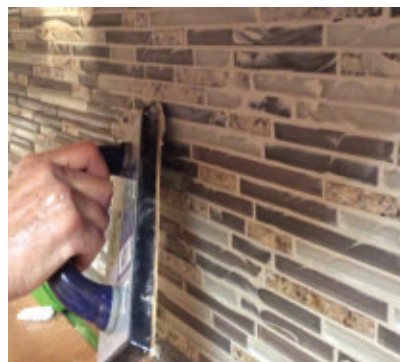


Walls that aren't flat and show dips pose another problem.

A backsplash that extended from the countertop to the upper cabinet case provided a good solution for hiding the uneven wall. We concealed the problem behind a mortar bed, which we troweled to an even surface, and then installed mosaic tile.



Installation of a backsplash can conceal wall problems between an upper and lower cabinet case.

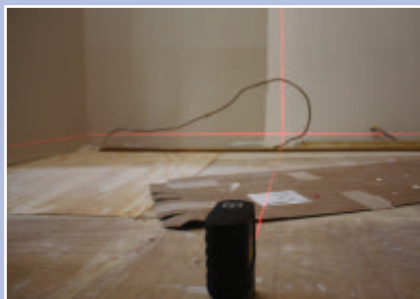


FRAMING BASICS

Speaking of walls, we tore one down during this remodel. Be advised that you shouldn't take out a wall unless you have a basic understanding of house framing. Load-bearing walls support the weight above them, and this weight must be supported with a continuous load transfer to the floor when the framing studs are removed. This is usually accomplished by erecting a temporary stud wall to support the ceiling during wall reconstruction.

Load-bearing walls must always be reconstructed with an adequately sized header. A header is doubled 2x material above the door that distributes the weight of the structural framing above. Always make the header exactly as thick as the wall frame; for instance, two 2x4 boards sandwiching a plywood board cut to the same dimensions. Half-inch plywood or drywall is usually used as a middle board to make the doubled header the same 3-1/2-in. thickness as a standard 2x4 stud wall. The required size (height) of the header will be determined by the span of the opening, and the size increases as the span gets wider. Enlarging a door or opening an existing home's floor plan are prime examples of where you'll need to build a header.

LASERS MAKE THINGS EASIER



We used a self-leveling cross-hair level from Bosch Tools to help determine if the kitchen's subfloor was level (and discovered it was not). The trick is to cast the horizontal beam around the room's perimeter and measure down from the beam to the floor at various intervals. If you get different measurements while the laser tool remains in the same location, the floor probably isn't level.



We used the same laser level atop a tripod to lay out the height positions for the cabinets. The horizontal guideline ensured we kept the countertop surface at a consistent elevation throughout the room, as well as an even distance between the upper and lower cabinet cases.



if you plan to widen a doorway or open a room's floor plan, you'll need to construct an adequately sized 2x header for any load-bearing wall.

A LOT TO CONSIDER

This batch of problems is far from a complete list of challenges to expect during a kitchen remodel.

When you undertake such a large-scale project, be prepared to serve as rough carpenter, floor installer, cabinet specialist, plumber, electri-

cian, painter, trim carpenter and interior designer. If that sounds like your cup of tea, then good luck on your new kitchen. **EHT**

DIY COUNTERTOP OPTIONS

Walk into any big box store and you'll see that the most popular kitchen countertops are engineered quartz (think Silestone), natural stone (think Granite), and solid surface (think Corian®). Of these three, solid surface happens to be the most workable, and versatile, surface for a DIY countertop. Below are a few reasons why solid surface is a solid DIY choice.

- **Easy to work with** - Standard woodworking tools can be used to cut and shape solid surface
- **Huge selection** - Numerous brands offer a variety of colors and patterns
- **Antimicrobial** - Solid surface does not support the growth of bacteria, which makes it a great choice for wet environments, such as kitchens and bathrooms
- **Stain resistant** - Most stains can be wiped or scrubbed away
- **Renewable** - Easily repair scratches, chips, gouges or cracks
- **Invisible seams** - Using color matched adhesive, gluing two pieces together results in a more attractive and more bacterially-safe surface
- **Thermoformable** - When this material is heated to around 300-350 degrees it becomes pliable, like rubber, and can be formed into unique shapes



- **No sealing** - Unlike natural stone, solid surface never requires any sealing
- **Touch and feel** - Solid surface has a "warmer" feel to it than the cold feel of concrete, quartz and granite
- **Available online** - SolidSurface.com offers remnant, overstock, discontinued, and premium grade material online to contractors and the public

Once you've decided that solid surface is the right direction to take, the next step is to learn how to work with it. Novice and experienced woodworkers can find guided instructions on templating, cutting, shaping, finishing and installing solid surface countertops at solidsurface.com/solidsurface101.



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*Planning
the Layout
of a
Tile Pattern
Floor*

BEST LAID PLANS

By Matt Weber

To lay out flooring with a repeating tile pattern takes careful planning, and these days, it's not just ceramic or stone tile that has the repeating pattern. The look of a tile floor comes in the form of resilient sheet flooring, stick-down resilient tiles, and tongue-and-groove laminate planks, all of which boast the look—if not the material characteristics—of genuine tile.

The uniform joint spacing that achieves the popular bricklike pattern in tile means you don't have much flexibility to adjust place-

ment where a row meets a wall or obstacle. The objective with layout is to install a tile field that highlights full, unbroken tiles on the most conspicuous areas of the floor, while any partial "sliver" tiles along the edges of the floor are strategically located in hidden or less noticeable areas of the room.

This doesn't sound so complicated if you're laying square tiles in a grid pattern inside a square room. But once you change the shape of the room, change the shape of the tiles, or stagger the

joint spacing from row to row, things start to get complicated.

TILE LAYOUT BASICS

For those new to laying a tile pattern floor, the temptation is to pick the straightest wall and start laying the floor along it. While that may work with other flooring materials, tiles should begin from the center of the room. This gives you plenty of space to work outward to the walls and ensure a symmetrical pattern.

Begin by checking the room for square. Use the 3-4-5 rule to



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BEST LAID PLANS



Begin your layout by marking crosshair layout lines that divide the room into quadrants.



Take measurements from front to back and left to right to determine tile size along the edges of the room. Lay out a dry row of tiles for the best visual aid.



Rooms such as kitchens that are “chopped up” with lots of obstacles make tile-pattern layout a challenge.

check that the corners form right angles. Measure and mark a point that is 4 feet from the corner along one wall. Measure and mark a second point that is 3 feet from the corner on the intersecting wall. A diagonal line between the two points should measure 5 feet if the walls are at 90 degrees. In large rooms, you can double the ratio (i.e., 6-8-10). If one wall is significantly out of square, then lay out the floor so the tapered

tiles will run along the least noticeable wall.

The first and foremost rule of tile layout: Make sure your pattern is square even if the room isn't. A standard procedure for floor tile layout is called “the quarter method,” in which the room is divided into quarters to help sequence the layout (see sidebar pg. 46). First step is to measure and mark the midpoint of all four walls. Snap intersecting chalk

lines at the center point of the site, forming a square cross to guide the layout. Check that the crossing lines form right angles.

You can plot your layout to scale on graph paper, but for a better visual representation, lay two intersecting dry rows of tile in a cross-pattern along the chalk lines. Run a full course of tiles in both directions all the way to the perimeter walls (use tile spacers if including grouted joints).

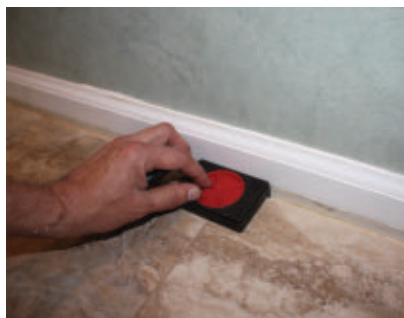


Planning the layout is a matter of prioritizing tile placement. In the short hallway shown, we wanted a full tile on display at the entrance to the room. The 24-in. tile size left us with partials on each side, and “slivers” on one side or the other. Because the door (behind the installer) opens to the left on entering the room, we placed the slivers on the left side where they would be concealed by the open door, so the larger, more attractive tiles would be prevalent on the more visible side of the hall.

For this floor, we laid floating vinyl tile in a running bond pattern with joints staggered every 8 inches. With the 24-in. tiles, this means the joints from every third row should align with the joints in the first.

Look at the tiles at the ends of each course. Is there space for large, attractive tiles around the perimeter, or only room for a partial sliver? Very small tiles in a field of much larger tiles are generally considered unsightly and give the impression of poor craftsmanship. In some cases, they simply cannot be avoided, but the goal should be to reduce their number and mitigate their prevalence in the floor design.

To eliminate the small “sliver tiles” along the room perimeter, shift the cross pattern on the floor from left to right and front to back until the rows end with whole or larger tiles that don’t break the pattern quite as obviously.



If your tile-pattern floor is a wood, vinyl or composite product, don’t forget to account for expansion gaps along the walls and at obstacles. On this project, we used adjustable flooring spacers from Bessey Tools.

The quarter method is a standard procedure for laying out all tile sizes, shapes and materials. To lay the tiles in a staggered fashion, such as a running bond pattern, lay the first row of tiles only along one axis of the intersecting chalk lines. Then, working from the center, fill in the quadrants and offset the grout joints from row to row.

As shown in the diagrams on page 46, once the joint pattern is

STONE-PATTERN PLACEMENT

When it comes to vinyl tiles that mimic the look of natural stone, there’s another aspect of layout to consider: Stone-pattern placement. Unlike natural materials that have unique grains and colors, most manufactured tiles will have repeating patterns in the product line. If you put two of these identical tiles next to each other, the floor will look less like natural stone because two identical tiles would never come from a quarry. Therefore, you should take time to position these recurring styles strategically in your layout, slotting dissimilar tiles between patterns. This is most easily done by laying the whole floor out dry.



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BEST LAID PLANS

altered with different sized tiles and/or different spacing intervals from row to row, you're more likely to end up with partial tiles on the ends of the rows. Planning a layout that minimizes those slivers becomes more difficult—even when laying tiles in our hypothetical square, uncluttered room.

But we know rooms aren't all square and empty. In a real-world situation, you'll need to consider where other fixtures and wall projections will intersect the tile, and you'll find you have many more problem areas to contend with. Rooms such as kitchens, with all their cabinets, islands and appliances, pose a particular challenge by throwing all those extra obstacles in your way, with all those extra places to get a dreaded "sliver tile."



The luxury vinyl tile shown in this project clicked together with tongue-and-groove joints to form a waterproof floating floor. Here, we've moved from the kitchen into an adjoining breakfast room.



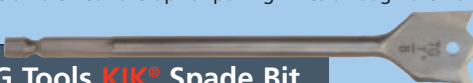
TG Tools KIK® HS Brad Point Bit

The KIK® HS Brad Point Bit has a unique tip design allowing it to bore wood, plastics and sheet metals exceptionally fast, clean and easy. The tip contains 20% more cutting surface. To accommodate the speed with which this bit drills, the flutes have an additional extraction ridge to clear the bore continuously and efficiently. The tip design permits plastics, laminates and even acrylic sheet to be drilled without melting, clogging or melting. Sheet metals are drilled with no burr left behind. KIK® HS Brad Point Bits are available in standard jobber lengths and 8-1/4 extended length. The extended lengths have a hole near the tip for pulling wires through the hole with the bit that made the hole!



TG Tools KIK® Spade Bit

Conventional spade bits can only drill holes in wood and can only go in a single direction. The "revolutionary" design of the KIK® Spade bit from TG Tools allows it to drill, wood, laminates, plastic and even non-ferrous sheet metal. In wood, the KIK® Spade bores faster due to 30% more cutting surface. By eliminating the brittle tang found on common spade bits, the KIK® Spade can even bore curved holes for those tight plumbing and electrical installations. On plastics and laminates, the KIK® Spade bores efficiently without melting the material and will not "slip" or "skate" from the start. With six cutting edges and more cutting surface, Chrome Vanadium 40 Steel was chosen for manufacture to allow the bit to flex when necessary in those tough situations when others simply bend and break.



KIK® Forstner Bit

Made from 60 Carbon Steel and Titanium-coated, the KIK® Forstner Bit from TG Tools drills, routs and channels wood, plastic, acrylic and more. The bit operates smoothly in any direction—even curves—making it easy to control. Bore the hole the way the conduit or pipe bends. Correct misaligned inlets. Bore blind holes without piercing thin laminate. It's a great bit for hinge or anchor inserts. Plus, the open cap design prevents clogging, and the three-flat shank means less chuck slip-page. Also, the bit includes a free heavy-duty protective case.



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BEST LAID PLANS



To help connect the T&G joints, we cut a customized hardwood block on our table saw that matched the edge profile of the flooring. This allowed us to hammer tap the block without damaging the edges of the flooring.

And, since you're restricted to maintaining that repeating pattern, you can't simply adjust a single row to accommodate your layout plan. Nope—unlike wood flooring, you've got to shift the entire floor, and it works like the proverbial bedsheet: Pull it in one direction, and it gets shorter on the other side. You might have eliminated partial tiles on one wall only to create them on the opposite side of the room.

If the job is particularly complicated (meaning the pattern is complex or the room is cluttered with obstructions), you'll probably discover that eliminating all the small tiles is an impossible feat. A perfectionist might start pulling

out their hair. But you shouldn't do that...

The key to successful tile layout is to prioritize.

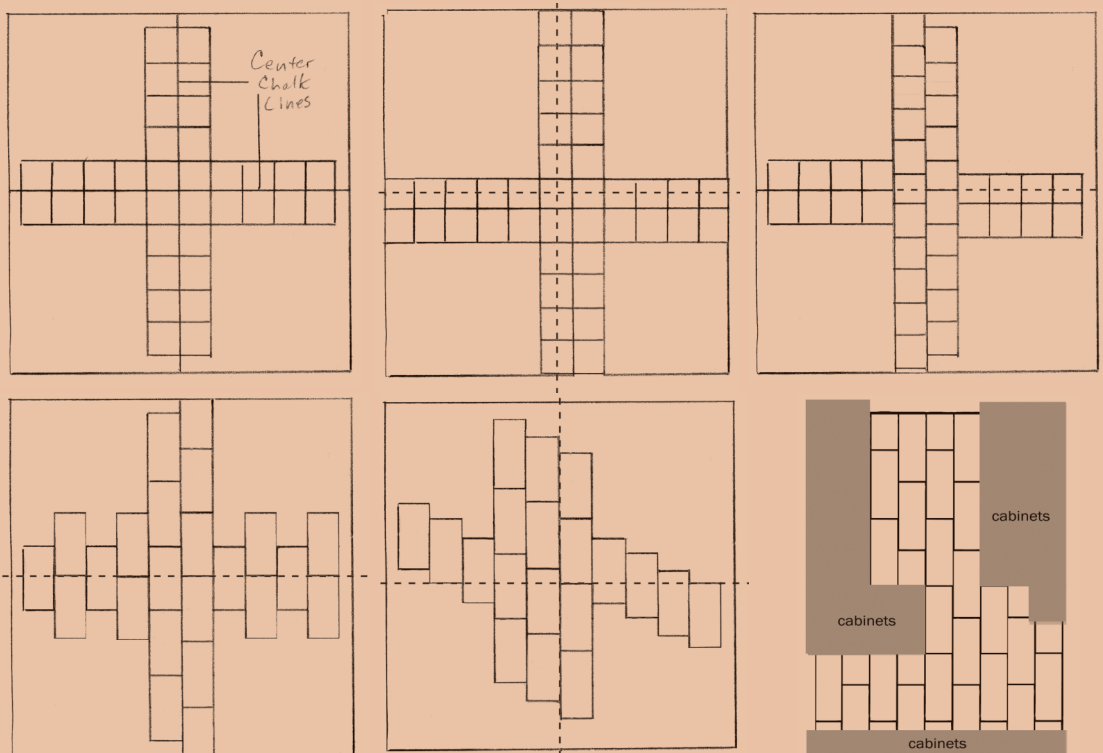
PRIORITIES

Priority #1: Most homeowners prefer a full tile in the middle of the entrance to a room. The entrance gives the first impression of a room, so you want to present the flooring's "best face," so try to avoid using a partial tile in the primary doorway. By establishing a full tile at the entrance, you now have a working control point, meaning you can shift the floor layout to the right or left to make necessary accommodations.

Priority #2: Hide conspicuous

THE QUARTER METHOD

When using the "quarter method" for tile layout, the room is divided into four quarters by chalk lines that intersect like crosshairs at the center point of the room, forming a square cross to guide the layout. Lay two full courses of tiles (dry) along the chalk lines all the way to the perimeter walls (use tile spacers if including grouted joints). If this results in small sliver tiles along the edges, you can shift the layout accordingly to reduce unsightly partial tiles in along the most noticeable walls or other obstacles in the room.



sliver tiles—and how to do so is entirely situational. For example, on a recent kitchen remodel, we laid 24-in. luxury vinyl tiles. The entrance to the room began with a short hallway from the door leading into the kitchen. This narrow hall combined with the wide floor tiles meant we had unavoidable partial tiles visible as soon as someone entered the room. So, what do we do?

We figured that the larger the tiles, the better the look. The size of our big tiles in our narrow space meant that we had to arrange narrow partial tiles on one side and wider partial tiles on the other. In this particular case, the door hung on the left-hand side of the doorway, and when opened it would cover part of the floor on the left-hand side of the hallway. Since our partial tiles were only a few inches wide, the open door would hide most of those tiles on the left-hand side, so that's where we placed them, leaving the wider partial tiles visible on the right-hand side.

And that's an example of the kind of give-and-take evaluation

LASER LAYOUT ASSISTANCE

Misplaced chalk lines can get confusing, so it's nice to have a laser tool that generates a temporary line, so you can adjust its final position before snapping the chalk. When establishing the layout for our tile floor, we used the new Ryobi

ELL1750 Multi Surface Laser Level to project a line on the floor.

Another advantage of the laser: If the beam disappears at some point along the floor, that means it has encountered a high spot in a floor that isn't level.



you need to apply to all edges of the room. If, for example, laying those sliver tiles on the left-hand-side of the hallway created partials elsewhere in the room which would be even more noticeable and egregious, then maybe you should prioritize full tiles in that more prevalent area of the room than in the hallway.

How do you know where to prioritize? Look down when using

the room. This doesn't mean just stand in the room and look down. If you're the homeowner, pay attention to the floor during daily activity to get a feel for how people move through the living space, which areas get more traffic, and which areas get less attention. Aim your full tiles for those high-profile areas and hide your partials under barstools, countertop overhangs and toe-kicks. If you can't eliminate the slivers completely, then hide them along the most unnoticed wall you have.

And don't forget to factor in your wall trim. A very thin partial might be completely concealed by a combination of base and shoe molding, which can cover a gap about 1-1/4 inch wide.

Carefully planning the placement of your tile-pattern floor will go a long way toward achieving an attractive, professional-looking installation you can be proud to show your friends and neighbors. **EHT**

An oscillating tool with a flush-cut blade makes a handy tool for undercutting door jambs to fit the new floor beneath.



BUILD FLAT PANEL CABINET DOORS

By Rob Robillard

*How to Make
“Cope and
Stick” Doors
for Cabinets*

The terms “cope and stick,” “frame and panel,” and “stile and rail” are synonymous with a certain construction technique for doors. These terms are interchangeable and have long been a hallmark of fine cabinetry. I use “cope and stick” joinery because it makes a good looking and sturdy frame for cabinet doors.

“Cope and stick” construction is not new; it’s been around for hundreds of years and is useful to negate the effects of moisture on solid wood used to make doors, furniture and wainscoting.

I recently was asked to make a built-in cabinet for a remodel to match a client’s Shaker style doors, which featured flat panels and beveled stiles and rails.

DOOR CONSTRUCTION

In “cope and stick” door construction, the cabinet door frame is held together by a joint between the edge of the “stiles” (the vertical members of the frame) and the “rails” (the horizontal members of the frame).

The stiles are the longer parts of the door frame and receive the “sticking” (milled profile), and the rails are the shorter parts which receive the coped profile.

The “sticking”—the panel groove and the decorative profile on the interior edge of the frame—is matched by a special cut in the end of the rail called a “cope.”

To complete the joint, the two matching profiles are simply



BUILD FLAT PANEL CABINET DOORS

glued and clamped together. The strength of the joint relies on a near-perfect match between the cope and the sticking, which is achieved by using bits designed specifically for a shaper or router table.

The door panel is always sized slightly smaller than actual dimensions of the grooved style and rail frame. This allows the panel to expand and contract with seasonal humidity without affecting the stable shape and size of the door.

Construction consists of five members:

1. Door panel
2. Left vertical stile
3. Right vertical stile
4. Top horizontal rail
5. Bottom horizontal rail

Larger doors may require a mid-rail or stile.

SIZING THE STILES AND RAILS

I used Poplar wood for my stiles and rails on the cabinet doors. I ripped all the parts on a table saw to 2-3/4 inches and ensured that I had one or two extra in case of a mis-cut or tear-out.



Rip legs and stiles to width on a table saw.

Once all the parts were ripped to width, I cleaned up the edges on a jointer before cutting them to length on a miter saw.

Note: Lay out the rails by adding 1 inch to the final inside width of the frame. That measurement will allow for a 1/2-in. sub-tenon on both ends of each rail.

Making multiple identical sized cuts, over and over again, is time consuming and can also lead to mistakes in measuring through

graduated error. When cutting parts to the same length on a miter saw, it's best to use a jig that allows you to measure once and make your repetitive cuts. I use a stop-block jig, either clamped to my miter saw fence or screwed to the miter table. When setting up this stop block, make sure you measure from the edge of the saw kerf to your block.

REVERSIBLE SHAPER BIT SET

In order to make the “cope and stick” joint you either need a special router bit or use a shaper table with a shaper cutter.

There are a variety of matched bits available to use such as; ogee, bead edge, round edge and traditional. I'm a fan of the bead edge.



For these shaker-style cabinet doors, the legs and stiles measured 2-3/4" wide.

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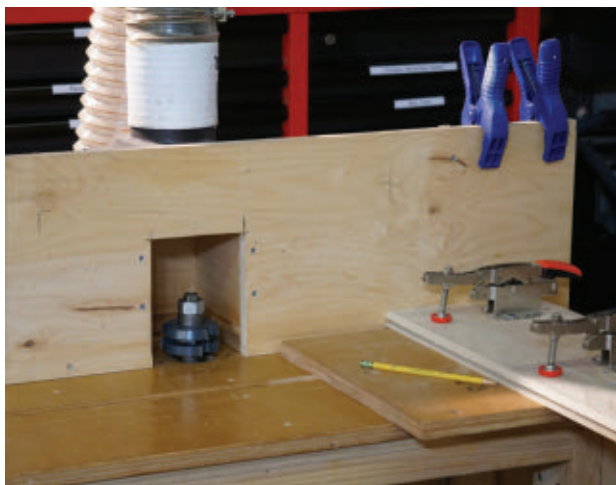


In “cope and stick” door construction, the “sticking” is the panel groove and the decorative profile on the interior edge of the frame. A special cut made in the end of the rail is called a “cope.”

There is a wide variety of bits and shaper cutters available that cut “cope and stick” joints for cabinet dimensioned stock (3/4-in. standard thickness). These cutter sets are often called “stile and rail” sets.

A typical reversible set includes one cutter that cuts both the sticking and the cope, and one slot cutter for cutting a panel groove. Some manufacturers offer an additional kit with one more slot cutter which allows you to cut a rabbet below the sticking instead of a slot. This method is useful for making doors with glass or mirror panels.

I use my shop-made shaper table and sleds with hold down clamps to cut all of my copes and sticks.



In order to make the “cope and stick” joint, you either need a special router bit or use a shaper table with a shaper cutter.

To make the raised panels, I use an old radial arm saw that I modified to become a permanent “panel-cutter.”

Construction steps:

1. I start by making my cope cuts on the ends of my rails.

Tip: Use scrap wood and a “hold-down” sled to get the correct fit prior to cutting into your project wood.

2. Reverse the shaper bit and rearrange it to cut the stiles profile.

Tip: I use the coped end to assist me in setting the bit's height, aligning the slot-cutting wing with the tongue on the coped end.

3. Cut a test board and check for fit. Although you can do this cut without a hold-down sled, I still use one.

4. Holding your pieces, face-side down, cut the profiles on your stiles and rails.

5. Dry fit your pieces and measure for your panel.

6. I make the panels on my panel cutter, taking several passes to get it to the right size to fit in the grooves. For flat panels, I simply put the bevel side in reverse.

Tip: Only apply glue to the joints between the rails and styles. No glue on the panel, it needs to “float”



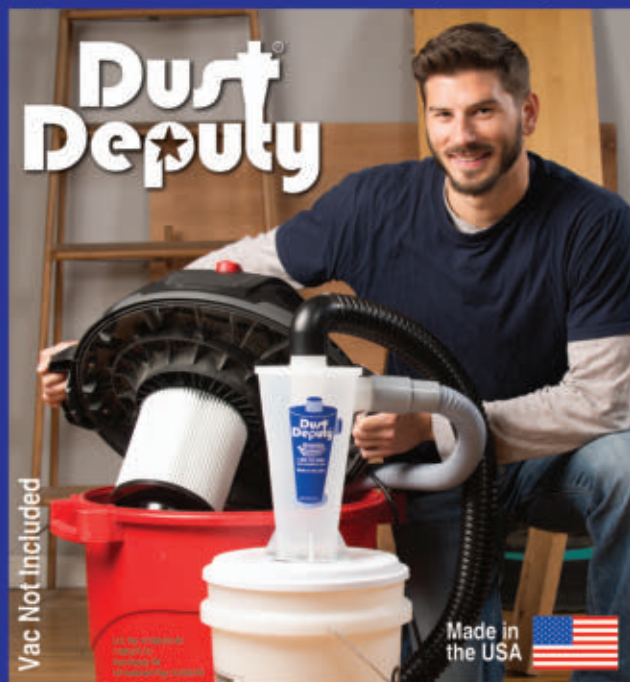
A typical reversible bit set includes one cutter that cuts both the sticking and the cope, and one slot cutter for cutting a panel groove.

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BUILD FLAT PANEL CABINET DOORS

as it expands and contracts with seasonal movement. I allow 1/16 inch all around the panel for expansion.

SOURCING THE FLAT PANEL

Typically, if I were doing this “old school,” I would glued-up panels of Poplar stock. Making a flat panel this way I have two choices:

Use a raised panel cutter to create a raised panel on one side with a continuous tenon. Then, orient the raised panel on the inside of the door (hidden from view) in order to get my flat panel look, or...

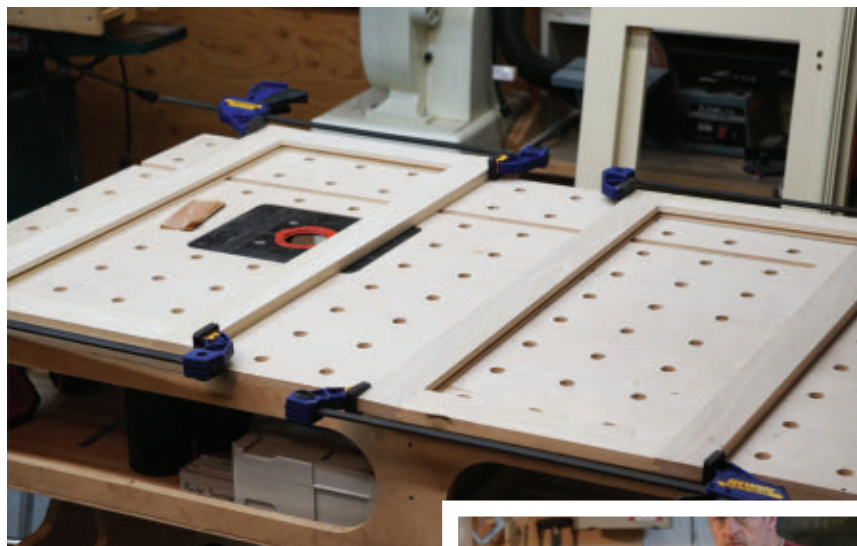
Run the stock through a thickness planer, bring the wood to 1/2- or 3/8-in. thickness, glue it up and achieve the flat panel. I would finish off this panel by using the shaper to create the



When cutting the rails and stiles to length, add 1" to the final inside width of the frame. That measurement will allow for a 1/2" sub-tenon on both ends of each rail.



Use a stop block to ensure the repetitive cuts are made at the exact same length.



Dry fit all connections before gluing.

Rip the panels to size on a table saw. These were made of 1/2" birch plywood.

tongue (continuous tenon) to insert into the groove of the stiles and rails.

On this project, we neither had the time nor the budget, so we used 1/2-in. birch plywood and used a Rockler rabbeting router bit to create the tongue (continuous tenon) to insert into the groove.

Tip: On the shaper, use a power feed or a clamp-down sled system like the ones in the photos. It's safer and more accurate.

DRY FIT THE DOOR PARTS

Prior to making the raised panel, I dry fit the stiles and rails and ensure that I have the proper measurements. I also take into account a 3/16-in. reveal at the hinge side of both doors and between them.

Once the flat panel is made, I again dry fit everything prior to glue up.

Using a glue brush, I apply wood glue to the “cope and stick”



On this project, we used a Rockler rabbeting router bit to create a continuous tenon along the panel edges to insert into the groove.

portion of the stiles and rails. I do not put glue in the panel groove or on the panel tenon.

GLUE AND CLAMPING

Once the glue is applied, I place the unit onto two pipe clamps. The pipe clamps are applied at the joint connections only.

Prior to applying clamping pressure, I ensure the doors are square and also that the connections are flush.

To check square, I use diagonal measurements, a framing square and also 90-degree clamp blocks.

It's also important to ensure that the door is not bowing: Look along the pipe clamp edge to see if you have a consistent reveal between the pipe and door stiles and rails. Sometimes I push the parts tight against the pipe.



This photo shows how the panel connects with the frame. The panel is always cut slightly small than the inside of the frame to allow for movement and expansion.

The "cope and stick" joints should fit together snugly.



SAND AND FINISH

Allow 24 hours for the glue to dry, remove the clamps and sand all the faces of the door. I like to flatten any raised edges at the "cope and stick" joint first. Then, I move on to sanding the flat surfaces to remove mill marks.

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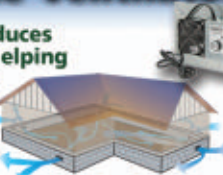
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For More Information

BUILD FLAT PANEL CABINET DOORS

If left on the board face, mill marks often show up once the door is painted. **EHT**

Editor's Note: Robert Robillard is principal of a carpentry and renovation business located in Concord, Massachusetts, and editor of the blog, A Concord Carpenter, www.AConcordCarpenter.com.



Glue the rail and stile connections but do not glue the panel in place.



Clamp the connections while the glue dries.

In addition to side clamps, face clamping the connections will help ensure a smooth joint on the front of the door.



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PRODUCT PROFILE

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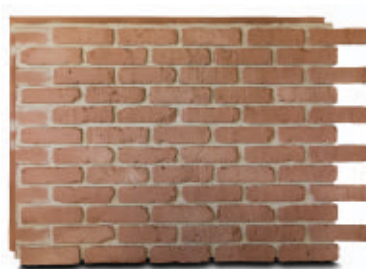
Joe Weilnau is a do-it-yourselfer who purchased a Forney Easy Weld 125 FC and has successfully built a few projects around his house; "I've always wanted to learn how to weld and had a few metal projects in mind. I couldn't believe how simple it was to use this machine. So far, I've made a garden trellis for my cucumbers, a chiminea pizza smoker, and have been able to make small welds while building my motorcycle," Weilnau said. "The Forney Easy Weld machine plugs right into my garage outlet. It offers convenience, portability and it is easy to set up and instantly use. For my next project, I'll be making a trophy out of scrap car and metal parts, and I have a few ideas to build my own smoker." The price is just right and the possibilities are endless. If you're thinking about giving welding a try, start with a Forney Easy Weld.



HOT PRODUCTS

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EASY CLICK AND CLEAN: Easy to assemble snap and click baseplate-to-pole connection makes assembly and cleaning quick and easy. The retractable handle hook allows for easy storage.

PROVEN CLEANING SOLUTION: Every mop comes standard with a full-size cartridge of the Bona Hardwood Floor Cleaner. This long-time fan favorite

cleaning solution has GREENGUARD GOLD certification so it's safe for use in your home and around your family. Safe for all unwaxed, polyurethane finished wood floors the Bona Hardwood Floor Cleaner dries fast with no dulling residue. The next generation Bona Hardwood Floor Mop comes with a sturdy bag-in-bottle cartridge design with a wider opening and flat bottom for an easy refill experience.

FEATURES & BENEFITS

- Durable, light-weight design delivers a fine mist to properly clean hardwood floors.
- Refillable cartridge and machine washable microfiber pad.
- Mop has been redesigned for easy assembly with an audible click to ensure that the cartridge has been put into place. The easy click button also ejects the cartridge for removal.
- The base has a larger mop head for easier cleaning.
- Soft flexible corners protect baseboards and furniture.
- A secondary grip for comfort and extra scrubbing.
- Comes with a full-size cartridge of Bona Hardwood Floor Cleaner Original Formula.
- Cartridge has been redesigned with bag in the bottle technology to optimize the performance and offer an easier refill experience.

AVAILABILITY

The Bona Hardwood Floor Mop is available at most major retail outlets including Bed, Bath & Beyond, Target, Walmart, Home Depot, Kroger Lowes, Ace Hardware and True Value stores. The Premium Bona Hardwood Floor Mop retails for \$39.99 MSRP. The Standard Bona Hardwood Floor Mop retails for \$29.99 MSRP.



HOT PRODUCTS



ZIRCON LEAK ALERT WIFI

The Leak Alert WiFi from Zircon utilizes Wi-Fi connectivity to provide email, audio, and visual alerts to homeowners, renters, business owners and property managers as soon as a water leak is detected. At home or away, owners of the Leak Alert WiFi can now be assured their home is protected and potentially save thousands of dollars in water damage and



repairs. With no hub required, the self-contained, battery-powered unit can send notifications to up to 5 email addresses as soon as the device is triggered. Owners are alerted when a leak is detected, without having to be physically present at the detector's location. The Leak Alert WiFi can be placed in multiple locations throughout the home or property. Place the detector near sinks, refrigerators, washing machines, sump pumps, aquariums, and in basements. When a leak is detected, the detector will send alert(s) via Wi-Fi to notify all configured email addresses, emit a 105 dB alarm, and flash two bright red LED lights. Visit zircon.com.

HOMERIGHT FINISH MAX FINE FINISH HVLP SPRAYER & SHELTERS

This new HVLP sprayer from HomeRight will make painting and staining furniture easier from application to cleanup. The Finish Max will spray most solvent (except lacquer) or water-based products—latex paint, milk paint, chalk paint, furniture paint, stains and finishes. Use it to finish, update or repurpose furniture, give



kitchen cabinets a fresh coat of paint, and give all your projects a professional look. Vertical, horizontal and 45-deg. angle settings and an easy-to-select spray pattern (1-6 in. wide) give the user precision control during application. The Finish Max comes with a viscosity cup, cleaning brush, instructions and a 2-Year Warranty. To help reduce overspray and paint drift, use the Finish Max with one of the HomeRight Spray Shelters that provide an enclosed spraying area.

5-MINUTE TEST DETECTS HOUSEHOLD MOLD

Exposure to household mold can cause serious health problems including allergies, asthma and chronic sinus infections. Until recently, do-it-yourself mold test kits needed to be sent to a lab (which often required an additional processing fee), and the results could take weeks. A new mold test called 5-Minute Mold Test Kit from Healthful Home is much more convenient because it displays the results in minutes. Using a small sample of household dust from the floor, a cabinet or another surface, this test kit can detect the presence of over 32 different types of harmful mold spores including black molds (while ignoring harmless molds like mildew). The 5-Minute Mold Test Kit is the only fast-acting DIY mold test kit on the market, and it has been licensed by the CDC. The kit lists for \$44.99 and is available exclusively at Ace Hardware. Visit myhealthfulhome.com.





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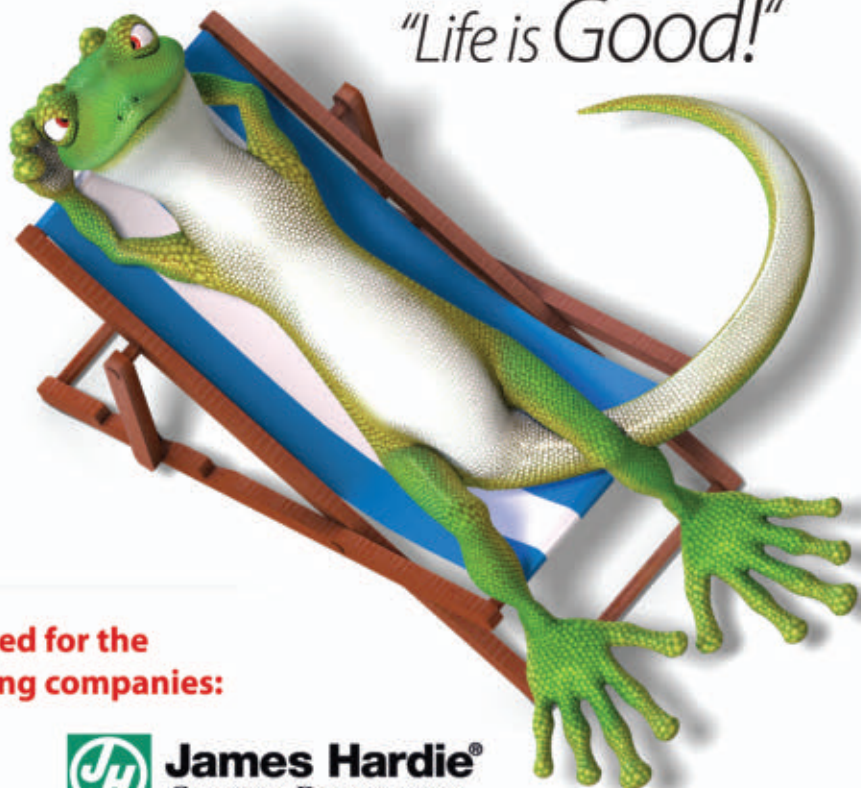
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