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STUFF we love

BY MARK PETERSEN

editors@thefamilyhandyman.com

A welder with a brain

I own a MIG (Metal Inert Gas) welder, but I don't use it often enough to remember all the settings, so I end up ruining a lot of material getting reacquainted with the welder. A steep relearning curve is not a problem with Lincoln Electric's new POWER MIG 210 MP. All you need to do is enter the type and size of the stick or wire electrode and dial in the steel thickness (up to 3/8 in.), and it automatically sets the right power for the job—you can hit the ground running every time.

The kit comes with just about everything you need to do stick, MIG and flux-core welding—including sample wire spools. The welder is super portable (40 lbs.) and works with both 120- and 230-volt power, so you can use it anywhere. The POWER MIG 210 MP welding kit is available for about \$1,200 at local and online welding supply stores.

Rick Muscoplat, Contributing Editor



THE FAMILY Handyman

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DIY WORK WEAR

High-tech work shirt

What's the worst part about working outside on a hot day? We think it's the sweaty clothes that stick to your body, and the dirt and filth that stick to your sweaty clothes.

Dickies has introduced a shirt that can help. It's called the Next Generation Work Shirt, and it's made from a newly engineered fabric that wicks moisture away from your body. It also stretches more and has soil-releasing properties. Maybe best of all, it's still durable like other Dickies work shirts. Next Generation work shirts cost about \$26. Buy one online or pick one up at work wear retailers nationwide.



Better earplugs

I haven't always been good about wearing ear protection when using power tools, and it's taken a toll on my hearing over the years. Earmuffs work great, but they're uncomfortable on hot summer days. And those soft, spongy foam earplugs you find everywhere quickly absorb sweat and become useless.

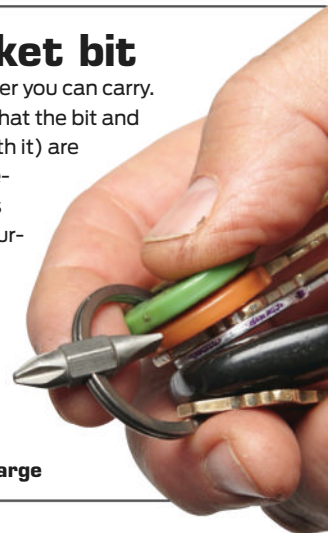
I've tried all kinds of protection, but my favorite is 3M's Tekk Disposable Ear Plugs. They're made from a stiffer type of foam, can handle a little sweat and comfortably mold to the inside of my ears. A box of 200 pairs costs \$44 at amazon.com.

Jason White, Associate Editor

Titanium pocket bit

This is it: the tiniest screwdriver you can carry. The photos say it all, except that the bit and the key ring (which comes with it) are titanium, which means it's tremendously tough and weighs less than pocket lint. Save yourself a trip to the toolbox—tighten loose screws on the spot. The Titanium Pocket Bit was invented by two kids and funded with Kickstarter. Get one from bigidesign.com for \$12.

Ken Collier, Editor-at-Large



A smartphone life preserver

My wife and I are fortunate enough to live on a beautiful lake, and we enjoy being on the water every chance we get. Unfortunately, my wife's expensive smartphones don't know how to swim. In order to protect her *third* phone from an untimely drowning, I bought her a ugo pack, a 100 percent waterproof phone case.

The touch screen works through the clear plastic, and there's enough room inside for credit cards, cash and a key fob. Other phone cases can withstand water, but this baby may be the only one that floats, making it a heck of a lot easier to retrieve. The ugo pack I bought her cost \$149. You can check out the different colors and configurations and buy one at ugowear.com.

Josh Risberg, TFH Lead Carpenter

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FAST FIX FOR PET STAINS

I have a dog, a cat and carpeting, which is why the Bissell SpotBot is the best Internet purchase I've ever made. The SpotBot is a hands-free spot and stain cleaner. The coolest part about this thing is that it does all the work for you. Just fill it full of water and cleaning solution, park it over the stain, push the start button and walk away. It automatically squirts the special cleaner into the carpet, scrubs with a rotary brush, and rinses and sucks up all the mess. When it shuts itself off, the stain is gone, and I just empty the reservoir into the toilet. I love this thing! Search for the SpotBot 33N8A online or buy it at discount stores for \$130.

Sam Larson, Field Editor

Paint-anything spray paint

One spray paint to rule them all—that's what Krylon seems to have developed with its new SUPERMAXX paint. It has special bonding technology that allows it to be used on metal, plastics, wood and plastic laminate, without sanding or priming.

The folks at Krylon say it has excellent rust protection and durability as well, and can be used indoors and out. My own experience is that this paint is a game changer. I found a spray paint color that matched our trim colors and used it to spray electrical cover plates, outdoor light fixtures and GFCI covers. Great stuff. Buy it at home centers and other paint retailers for \$4 to \$10 a can.



Ken Collier, Editor-at-Large

PRO TOOLS + GEAR

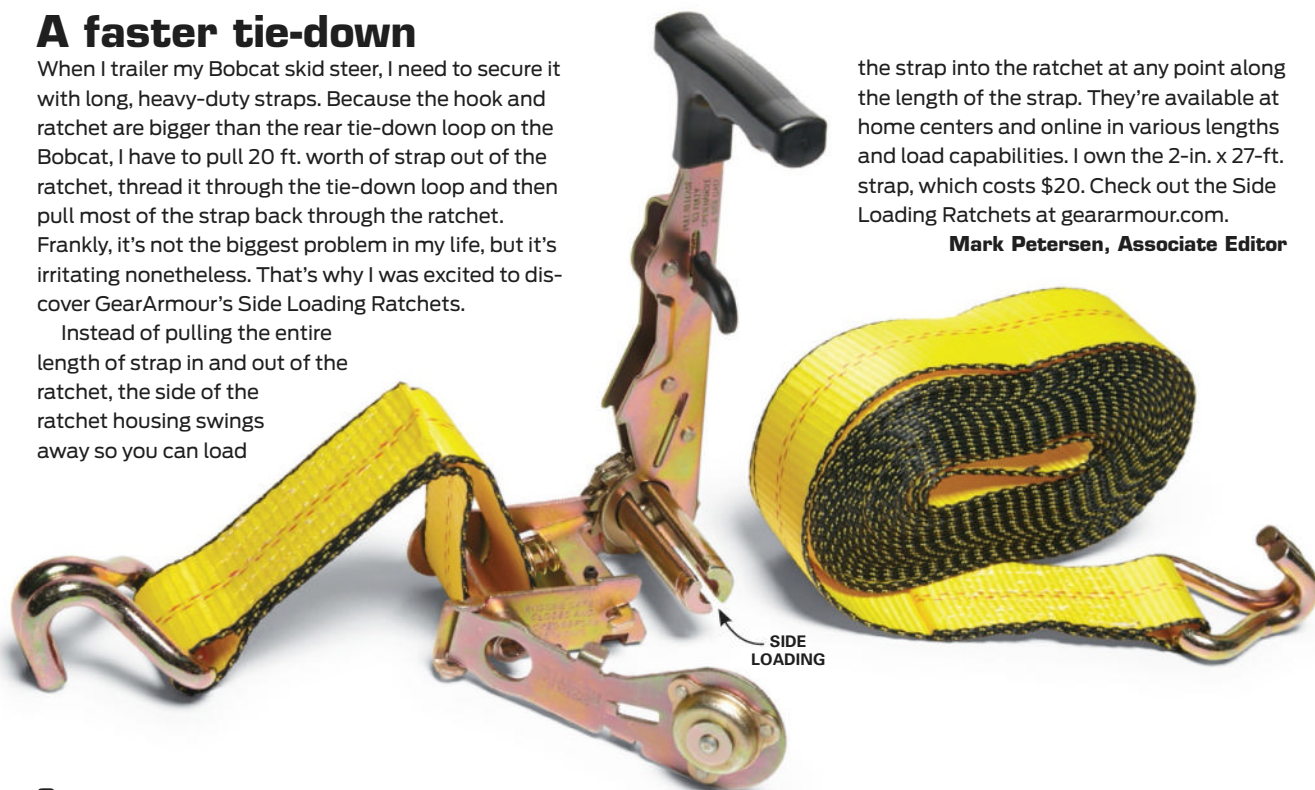
A faster tie-down

When I trailer my Bobcat skid steer, I need to secure it with long, heavy-duty straps. Because the hook and ratchet are bigger than the rear tie-down loop on the Bobcat, I have to pull 20 ft. worth of strap out of the ratchet, thread it through the tie-down loop and then pull most of the strap back through the ratchet. Frankly, it's not the biggest problem in my life, but it's irritating nonetheless. That's why I was excited to discover GearArmour's Side Loading Ratchets.

Instead of pulling the entire length of strap in and out of the ratchet, the side of the ratchet housing swings away so you can load

the strap into the ratchet at any point along the length of the strap. They're available at home centers and online in various lengths and load capabilities. I own the 2-in. x 27-ft. strap, which costs \$20. Check out the Side Loading Ratchets at geararmour.com.

Mark Petersen, Associate Editor





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GRILLZEBO

Grillzebo gril-'zē-bō\ *n*:

A sheltered space similar to a gazebo but designed for grilling

You can entertain and feed your guests without ever having to leave your shish kebabs unattended. This “grillzebo” is big enough to accommodate most standard grills but small enough that it might just fit on your existing patio. Customize your own grillzebo with lighting, grill accessory storage, wine glass racks or built-in coolers.

With the help of a buddy, you can build it in a weekend. All the building materials are available at home centers. We built ours from Western red cedar because it's resistant to rot and insects and it looks great. You could save about \$400 by building yours from pressure-treated wood. The cedar will require some upkeep over the years, but the metal roof is maintenance free. This beefy project is built to last a lifetime...a lifetime of grilling bliss.

by Mark Petersen

editors@thefamilyhandyman.com

WHAT IT TAKES

TIME: Half day staining, 1-1/2 days to build

COST: \$1,500 (not including slab)

SKILL LEVEL: Intermediate

TOOLS: Hammer, miter saw, drill, circular saw, handsaw, 18-gauge trim gun, compressor, masonry bit, wrench, 4-ft. level, table saw, tin/aviation snips, 6-ft. and 8-ft. stepladders, sawhorses

PHOTOGRAPHY: TOM FENENGA • ART DIRECTION: MARCIA ROEPKE • TECHNICAL ILLUSTRATION: FRANK ROHRBACH III



1 MARK POST LOCATIONS

Align the two bottom truss chords next to each other in order to mark the post locations. Mark two 12-ft. 2x4s at the same time. You'll use them later to make a template that will position the posts perfectly on the slab.



2 SCREW THE TRUSS CHORDS TO THE POSTS

The slab is the perfect surface to assemble the ends of the grillzebo. Secure each post to the chords with two 6-in. structural wood screws.



3 MARK THE TOP CHORDS

Use a framing square to mark the long angle cuts at the bottom of each chord. Stair gauges (\$7) placed at 4 in. and 12 in. guarantee correct marking on all four.

Getting started

We poured a prestained slab that was 8 x 14 ft. That leaves about a foot of space on the two open ends, and plenty of room for the chairs on the others. We won't cover how to create a concrete slab in this story. For more information, search "pour concrete" at familyhandyman.com.

Order the roofing components for this project at the lumber desk in your home center. You'll be able to order the roof panels exactly the length you need: 78 in.

It's much easier to finish all the lumber with a good-quality outdoor stain before you assemble the grillzebo. After the stain has dried, set aside the three most twisted and bowed 8-ft. 4x4s. Save them to cut up for the smaller truss webs and angle braces (D and E). We made most of the cuts with a miter saw.

Lay out the post locations

Cut the bottom truss chords (A) to size, and line them up next to each other on a pair of sawhorses. Take a couple of 12-ft. 2x4s and line them up on the horses as well. The 2x4s will be used to build a temporary template to help locate the post bases. Measure over 28-1/2 in. from each end of the bottom chord, and mark a pencil line using a framing square as a guide (**Photo 1**). Measure over from that line, and mark three more lines all spaced 3-1/2 in. apart.

Cut and assemble the ends

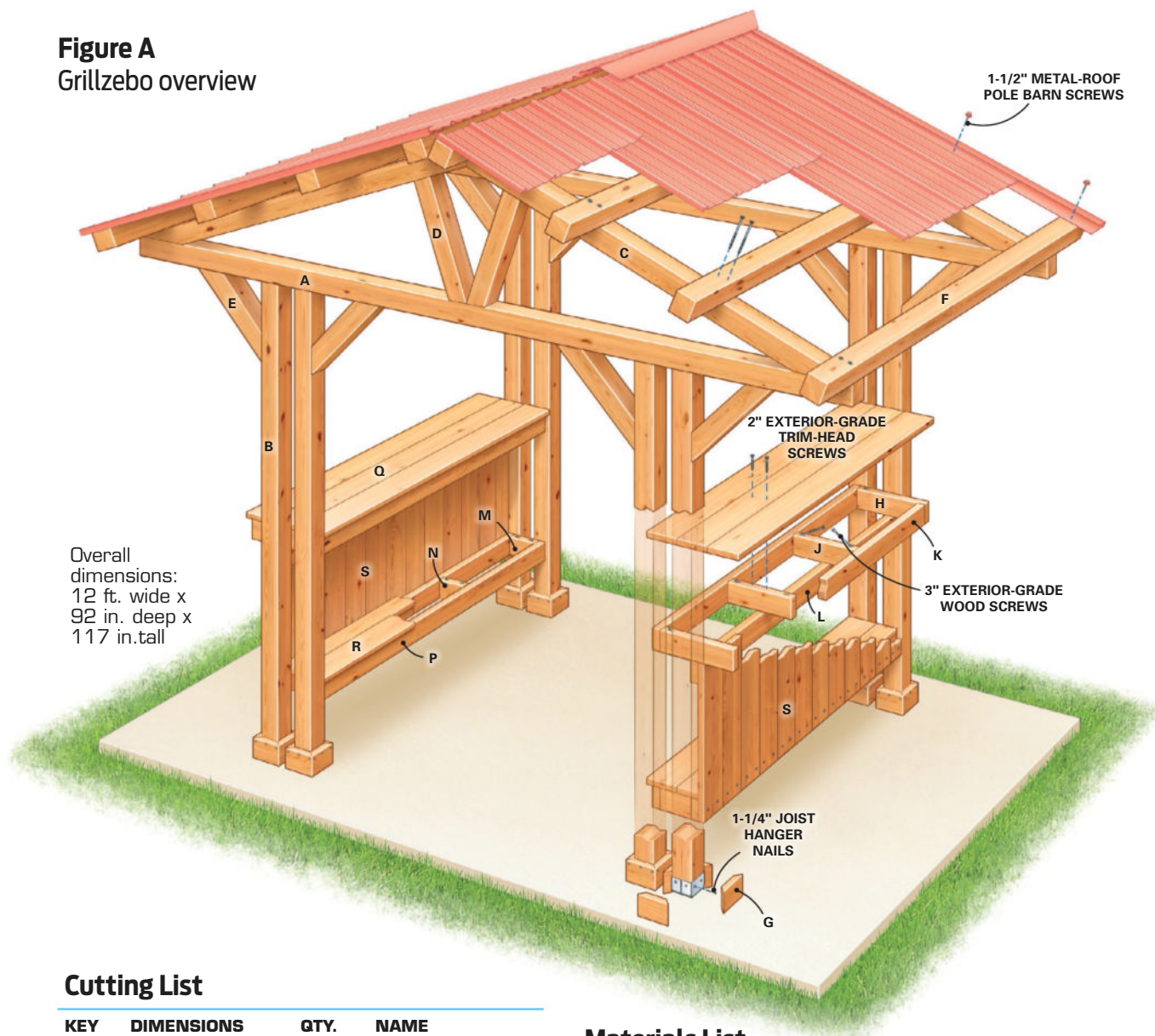
Cut the posts to size (B); line them up with the marks on the bottom side of the truss chord and fasten them

MEET THE BUILDER

Mark Petersen was a hands-on contractor for 15 years in both the new-home construction and remodel industries before becoming an editor at *TFH*.



Figure A
Grillzebo overview



Overall dimensions:
12 ft. wide x
92 in. deep x
117 in. tall

Cutting List

KEY	DIMENSIONS	QTY.	NAME
4x4 x 12' CEDAR			
A	12'	2	Bottom truss chords
4x4 x 8' CEDAR			
B	7'	8	Posts
C	76" (top side)	4	Top chords
D	Cut length to fit	4	Truss webs
E	20"	8	Angle braces
F	92" or cut length to fit	8	Purlins
1x4 x 8' CEDAR			
G	Cut length to fit	32	Post trim
2x4 x 12' CEDAR			
H	13"	4	Table frame ends
J	Cut length to fit	4	Table frame center braces
K	Cut length to fit	4	Table frame sides
L	Cut length to fit	2	Skirt nailer
M	5-1/2"	4	Shelf frame ends
N	Cut length to fit	4	Shelf frame centers
P	Cut length to fit	4	Shelf frame sides
1x6 x 12' CEDAR (DECK BOARDS)			
Q	Cut length to fit	3	Tabletop boards
R	Cut to fit (rip two at 4 in.)	2	Shelf boards
S	26"	24	Skirt boards

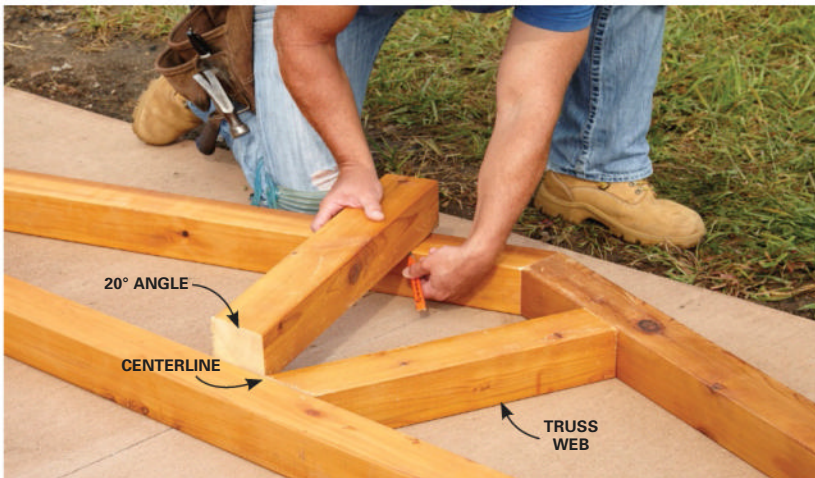
Materials List

ITEM	QTY.
4x4 x 12' cedar	2
4x4 x 8' cedar	23
1x4 x 8' cedar	3
2x4 x 12' cedar	6
1x6 x 12' cedar deck boards	10
2x4 x 12' pine bracing	2
2x4 x 8' pine bracing and roofing stop	8
1x3 x 8' pine stakes	2
4x4 adjustable post bases	8
1-1/4" 12d galvanized joist hanger nails (1-lb. box)	1
1/2" x 3" concrete anchor (10-pack)	1
6" heavy-duty wood/structural screws (50-pack)	2
3" exterior-grade wood screws (1-lb. box)	1
2" exterior-grade trim-head screws (100-pack)	2
18-gauge galvanized brad nails (small box)	1
Construction adhesive (tube)	1
42" x 78" roofing panels	6
7/8" x 10' 6" J-channel	4
14" x 10' 6" ridge cap	1
1-1/2" metal roof/pole barn screws (250-pack)	1



4 FINISH CUTS WITH A HANDSAW

Cut the long angles with a circular saw first. A standard circular saw with a 7-1/4-in. blade won't cut all the way through, so you'll have to finish the cut with a handsaw.



5 MARK THE TRUSS WEBBING

Cut each truss web a little long. Line them up with the center of the bottom chord, and mark the tops with a pencil.



6 POSITION POSTS WITH A TEMPLATE

Center the template on the slab. Square it up by measuring diagonally from inside corner to inside corner in both directions. Attach a couple angle braces on two corners to keep the template square. Use a 4x4 scrap to mark the post base locations on the concrete.

together (**Photo 2**). Completely build one end, including the truss (the next two steps), before pulling the assembly out of the way to make room for the other end.

Cut the top chords

The slope of the roof is 4/12, meaning the angle rises 4 in. for every 12 in. it runs horizontally. To mark the proper angle on the top chord (C), line up the outside edge of your framing square at the 4-in. and 12-in. marks (**Photo 3**).

Cutting this long angle is a little tricky, so make this cut first. That way if you make a mistake, you can move over a bit and try again (**Photo 4**). Once all the cuts are done, line up all the top chords and make sure that every angle was cut the same.

Cut the top angle with a miter saw set to a 20-degree angle. Once they're all cut to length, lay them next to each other and mark the purlin (F) locations on the top side of the top chords. There should be a gap about 20-5/8 in. between all the purlins.

Build the trusses

Fasten the top chords to the bottom chord with two 6-in. screws. Cut the webbing boards (D) a bit long with a 20-degree angle on one end. Hold the webbing boards to the center of the bottom chord and mark a cutting line on the other end using the top chord as a guide (**Photo 5**). Fasten them with one 6-in. screw in each end.

Lay out the post locations and install the bases

Cut two 2x4s (pine lumber) at 72 in. Line them up with the outside post lines you made on the two 2x4s you marked along with the top chords. Fasten them together with 3-in. wood screws. The inside diameter of the frame should be 72 in. x 87 in. Square and center the frame, and mark the post locations (**Photo 6**).

Metal bases like these not only keep the posts secure but also keep up off the concrete so the wood doesn't wick up water and prematurely rot. Drill the holes for the bases and slide them into position. Tap the anchors into the holes and tighten the nuts (**Photo 7**).

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Raise and brace the ends

Raise one end and slip the posts into the bases. Temporarily brace the end upright with 2x4s run from the posts to stakes in the ground. Fasten the posts to the bases with joist hanger screws. After the posts are secured to the bases, plumb all the posts both ways with a 4-ft. level, adjusting the temporary braces to keep them from moving (**Photo 8**).

Once one end is secure, raise the other end and keep it upright and plumb by running 2x4s from the bottom chord of the first end over to the bottom chord of the second. Fasten two 2x4s straight across and a third at an angle.

Install the angle braces

Cut the angle braces (E) to size, with 45-degree angles on each side. Make sure the angles sit flush on the post and bottom chord. Fasten the braces on each end with two 3-in. exterior-grade screws (**Photo 9**).

Cut and install the purlins

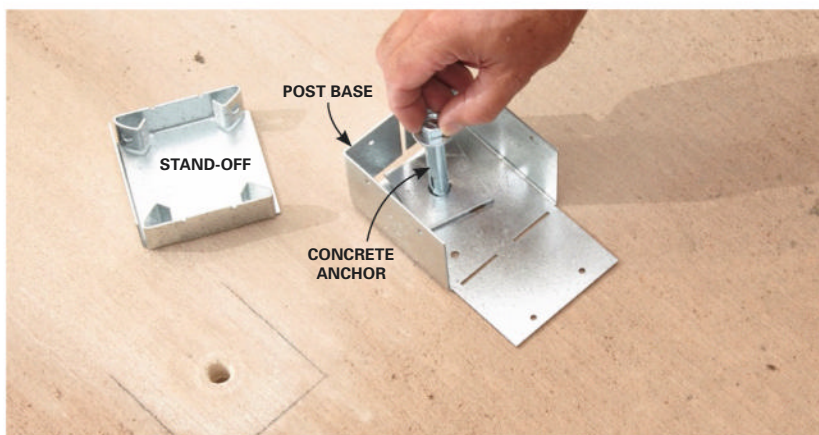
Ripping down metal roofing is no fun, so we cut the purlins (F) to fit the roofing panels. The panels we used were 3 ft. wide, but we increased the overlaps, so the total width of the three panels was as close to 8 ft. as possible (92 in. in our case), and then we cut the purlins to that size (**Photo 10**).

The top and bottom purlins line up with the top and bottom edge of the top chord, and the center two purlins will line up with the marks you made earlier. Install the top and bottom purlins first and check to see that all four overhangs are the same (**Photo 11**).

Install the roofing

Attach a scrap 2x4 with a couple screws to the outside edge of the bottom purlin. Fasten another 2x4 to the first except hold it up an inch (**Photo 12**). This will create a stop that you can slide your roof panels down to, resulting in a perfect 1-1/2-in. overhang.

Install all the J-channels before the roofing panels. Line them up flush with the outside edge of the purlins.



7 INSTALL THE POST BASES

Drill holes for the concrete anchors and fasten the post bases. (Check the anchor requirements for your particular base.)



8 PLUMB AND BRACE THE POSTS

Stand up one side of the grillzibo and fasten the posts to the bases. Make sure all the posts are plumb as you add temporary braces.



9 INSTALL THE ANGLE BRACES

Fasten the braces with two 3-in. exterior-grade screws angled in at the top and bottom of the brace.

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10 FIND THE LENGTH OF THE PURLINS

To avoid cutting the roof panels to width, overlap them. You want them to cover about 8 ft. A little less is fine. Use your roof panel layout to mark the length of the purlins.



11 INSTALL THE PURLINS

It's important that the purlins all overhang the same amount. Secure each purlin to the trusses with two 6-in. structural screws in each end.



12 INSTALL THE ROOF PANELS

Screw two 2x4s to the bottom purlin. The 2x4s will act as a stop, making it easy to install the panels with a perfect 1-1/2-in. overhang.

Cut them to length with a snips so they meet at the peak and butt into the temporary stop. Secure the J-channels with 1-1/2-in. pole barn screws.

Slide the first panel into the J-channel and down to the 2x4 stop. Fasten it with 1-1/2-in. pole barn screws. Follow the screw pattern recommended by the manufacturer. Slide the next two panels into place before fastening them down so you know they fit nicely in the J-channel on the other end.

Let the ridge cap overhang 4 in. at each end. Center the cap and fasten it down with pole barn screws into the top purlins. Space the screws according to your manufacturer's recommendation. Trim back each side of the ridge to the J-channel.

Trim the bottom of the posts

The metal post bases will prevent the 1x4 trim boards from fitting snugly against the posts. Before cutting the trim boards (G), run the full-length cedar 1x4s vertically through a table saw a couple times until about 3/16 in. of material has been removed.

Fasten the trim boards to the posts with an 18-gauge trim gun fitted with 2-in. galvanized brad nails (Photo 13). Strengthen the joint by applying construction adhesive before nailing them together. Secure them with brad nails at the top of the boards and through the miters. Install them up away from the ground to keep them dry.

Assemble the tabletop and shelf frames

Cut the table frame ends and center braces to size (H and J). Use a square to mark a line on both posts up 41 in. from the slab. That will be the top of the frame. Install the ends 1 in. away from the outside edge of the inside post, and secure them with 3-in. exterior wood screws, two in each post.

Measure and cut the table frame sides to size (K). Install the board with screws angled into the post. This keeps them from being visible after the top is installed.

Measure the distance between the posts and cut the cedar 2x4 that will

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serve as the skirt nailer (L). Center it on the outside post, which leaves 1 in. on each side. This will make the skirt boards flush with the outside edge of the posts.

Install the center braces (J) 20 in. in from each post. Secure them by angling two screws into the side boards (so they're not visible) and one down into the skirt nailer (**Photo 14**).

Cut the shelf frame ends and centers to size (M and N). Use a square to mark a line on both posts up 15 in. from the slab. That will be the top of the shelf frame. Install the end pieces so they overlap onto each post 1 in. Cut the shelf side boards (P). Secure them to the end boards with screws. No need to angle these screws because the outside screws will be covered with the skirt boards, and the inside ones are too low to notice. Install the shelf center boards, 20 in. in from both posts.

Install the tabletop, shelf and skirt boards

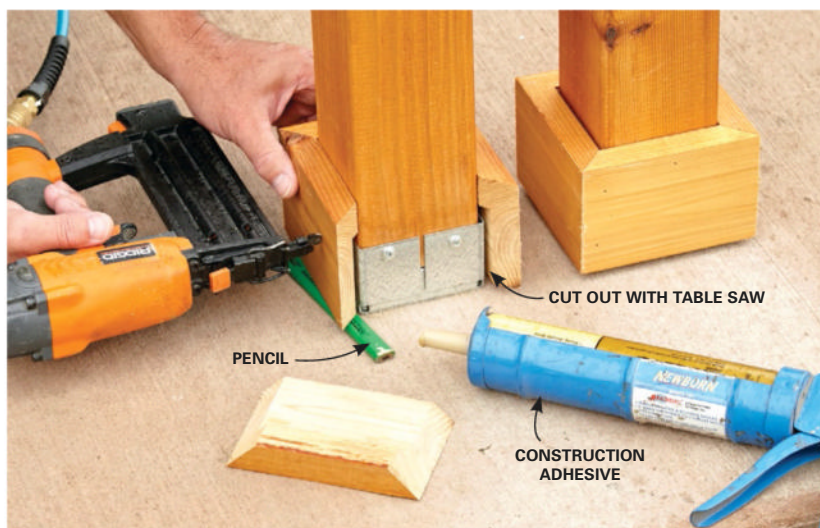
Cut the deck boards for the tabletop (Q) to fit between the posts at each end. Secure them with two 2-in. exterior-grade trim-head screws through each deck board. Keep the screws about 1 in. from the edges of the deck boards. Start with the tabletop board closest to the inside, and line it up with the edge of the inside posts (**Photo 15**). There's no need for a gap between the boards.

Measure and cut the shelf boards (R) to length. Rip two of them down to 4 in. Install the cut end flush with the outside edges of the shelf frame so they're hidden by the skirt board.

Cut the skirt boards (S) to length. Center the first one between the posts and install it with two trim-head screws to the skirt nailer and shelf frame. Work your way in each direction, and trim down the last skirt boards to fit flush with the posts.

Finish up

Remove all the temporary braces and touch up all the cut ends of the boards with stain. All that's left is to slide your grill into place and invite the neighbors over for a party.



13 TRIM THE POSTS

Rest the trim on a pencil while you install it with nails and adhesive. That will keep the trim pieces off the damp concrete. Cutouts on the back of the trim allow it to fit over the post bases.



14 BUILD THE TABLE FRAME

Assemble the table frame by driving screws at an angle from inside the frame. That way, screw heads won't be visible. Install a skirt nailer under the frame to support the skirt boards.



15 ADD THE TOP BOARDS

Fasten the deck boards with trim-head screws. They're less conspicuous than standard deck screws. Fasten each deck board with one 2-in. screw, 1 in. from each end.



Advances in color-treated lumber provide new options

Homeowners want new building products that provide more value with less maintenance and are environmentally friendly. With the advent of an environmentally preferred treating product—micronized copper azole (MCA)—many consider treated lumber the most cost-effective, eco-friendly and easy-to-install decking option. (Plus, it doesn't get that greenish hue that occurs with many older treating products.) And now there's something even better: a newly formulated, color-treated lumber that is on the verge of becoming mainstream, providing a unique, low-cost option for pros and DIYers.

ProWood Dura Color® pressure-treated lumber helps fill the gaps between everyday treated wood decking, cedar and redwood decking, and high-end synthetic decking. It's not a topical stain that fades away; it's a colorant that's driven deep into the wood fibers, creating beauty that's guaranteed to stand up to the elements for years. The Dura Color treating process provides a rich cedar-tone or redwood-tone appearance that doesn't fade to gray, unlike cedar and redwood. The color is part of a treating process that includes an EPA-registered, waterborne wood preservative system to protect against termite attack and fungal decay (rot). In addition, new water-repellant stabilizer additives are helping MCA-treated wood decking like ProWood resist the effects of weathering.



Latest advancements in color-treating technology let the wood's natural characteristics remain visible

So today you can get wood that protects against the elements and offers long-lasting, beautiful color.

Color-treated wood isn't new. Koppers Performance Chemicals (formerly Osmose Wood Preservation) is a leader in wood preservative technologies that has been providing color-treating solutions for years. In fact, Universal Forest Product companies have been producing colored wood fencing for nearly a decade. But with the new color-treating technology, lumber decking has made significant strides, offering a better look for a treated lumber deck. Although composite and PVC decks have gained market share in recent years, pressure-treated wood decking still carries the lion's share of the market. And it's no wonder: It's inexpensive, easy to work with and can be found at any lumberyard.

In addition to decking, ProWood Dura Color is available in virtually any size dimensional lumber as well as finished products (like fencing and pergolas), giving DIYers more building options.

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GRILLING GEAR

5 great products to help you cook better and faster—and take it on the road!

by Mark Petersen
editors@thefamilyhandyman.com



What's up with infrared grills?

It sounds pretty high-tech, but the concept is relatively simple. Infrared grills have a mostly solid, corrugated grate between the flames and the food. The grate protects food from flare-ups—ideal for fatty meats. It also distributes heat more evenly, allowing for consistent cooking across the grill. More control also means less gas consumption, up to 30 percent less. The one downside is that you can no longer blame your burned burgers on a hot spot. A three-burner Char-Broil model like the one shown here is available at Wal-Mart for about \$285.



Grill on the go

A lot of grills are claimed to be “portable”—usually that means they’re just small. But Char-Broil’s rugged Grill2Go has actually been designed to be hauled around. It has a sturdy base and a top that snaps closed for transport, and it runs on portable propane bottles. For those big grill-outs, it can run on larger propane tanks using an optional hose and adapter. It comes with an infrared grill surface, which makes sense because of the necessarily close proximity of the burners to the grate. It’s a perfect grill for camping, tailgating and road trips. You can get a TRU-Infrared Grill2Go X200 online for \$110.

A grill-cleaning robot

Is a robot that cleans your grill grate necessary? Absolutely not. Is it super cool? Heck, yeah! The grill-cleaning Grillbot runs on a rechargeable lithium-ion battery and has three spinning, brass-wire brushes to do the dirty work. The brushes are removable and dishwasher safe. It actually does a good job of cleaning the tops of the grates but doesn't get down inside quite as well as hand scraping would. But then again, that would require scraping...by hand. It takes 15 to 30 minutes of steel-drumlike racket to get your grill clean. You can buy one online for \$130.



Infrared upgrade

Infrared grills provide a more controlled grilling experience with even heat and no flare-ups, but they're not for everyone. Some folks like to see the dancing flames tickling their tenderloins. The GrillGrate is an interconnecting paneled system that can convert all, or part of, your existing grill into an infrared surface. So now you can sear your sirloin on one side of the grill while you slow-roast your rutabaga on the other. You can get one to three GrillGrate panels in various size sets to fit your particular grill. A set of three 13.75-in. x 5.25-in. panels costs \$70 online.

Skip the lighter fluid

Here's a product for you grilling purists who abhor even the notion of contaminating your charcoal with lighter fluid. It's called the Bison Airlighter. It has a butane torch to ignite the coals, along with a built-in blower that literally "fans the flames." It can take your coals from cold to cook time in five or six minutes. The butane reservoir is refillable and the fan motor runs on a rechargeable battery. Buy a Bison Airlighter online for \$80. Check out the video at thebisoncompany.com.





WHAT IT TAKES

TIME: 1 weekend

COST: \$120 per sofa,
plus cushions

SKILL LEVEL: Beginner

TOOLS: Drill, jigsaw, circular
saw, basic hand tools



PERFECT PATIO COMBO

Comfortable seating with built-in end tables

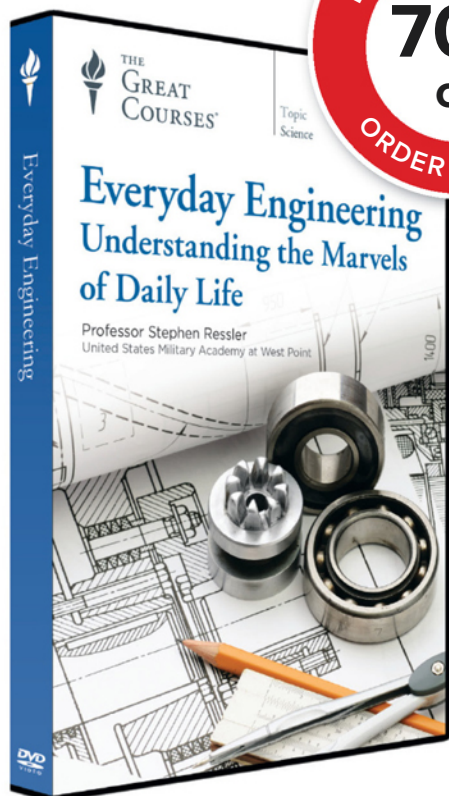
by David Radtke

editors@thefamilyhandyman.com

My original plan for this patio set included sofas and separate end tables—because every patio needs seating and a place to set cold drinks! Then it hit me: Why not combine both into a simpler, sleeker, rock-solid design?

The result is a sofa with extra-wide armrests

that double as small tabletops. It's easy to build and easy to customize: You can adjust the width to suit both your space and the seat cushions you choose. I've provided dimensions for two sizes (see p. 34), but you can make it any size you like.



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JUST THE BASICS

This project requires only the most basic tools and materials: a few hand tools, three power tools and standard dimensional lumber. The skills needed are basic too: Just cut parts and screw them together. There are a few tricky cuts, but they don't have to be perfect. And if you make a mistake during assembly, you can remove a few screws and try again.



Choosing lumber

Except for the seat cushions, all the materials you need are available at home centers. I chose cedar-colored treated lumber. Naturally rot-resistant woods like cedar and cypress would also be good choices, though they'll cost you an extra \$80 or so.

Treated lumber is notorious for warping as it dries, but I've had good luck with this approach: I buy treated lumber about three weeks before I plan to build. I carefully select good-looking boards and buy about 25 percent extra so I can cut out large knots and other imperfections. At home, I stack the lumber on sawhorses in the shade. I don't want the sun to bake the wood—fast, uneven drying leads to warping. Every few days, I rearrange the stack so that all boards get some surface air exposure.



1 CUT THE LEGS

Mark the cutouts on the legs. Drill holes at the corners of each cutout and use those holes to start and stop your cuts.



2 ASSEMBLE THE TABLES

Screw the legs to the bottom shelf, using 3-in. blocks to position it. Then simply screw on the arm.



SELF-DRILLING SCREWS

work great for this project. The screws drill a pilot hole into the soft wood as they turn, allowing for quick assembly. Use the slim 2-in. trim-head screws for the seat and back slats and the taper-head 2-3/4-in. and 3-1/8-in. construction screws for the thicker lumber. You can hide the screw heads with filler or leave them exposed. Be sure to use exterior screws that are rated for treated woods.

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MEET THE EXPERT

David Radtke is a designer and builder of custom woodworking projects as well as an author and illustrator.



Buy seat cushions first

If you don't find any seat cushions you like, look online. I bought bull-nose rectangular 18-in.-deep cushions at homedecorators.com. I picked a 48-in. cushion (about \$60) for the short sofa and a 59-in. cushion (about \$75) for the long one. If you find a style you love but it isn't quite the right size, you can adjust the sofa dimensions. Notice that parts D, K, L and H can be customized to any size you'd like.

Building tips

This is one of the simplest furniture projects I've ever designed. Still, it has a few steps that might challenge beginning builders. Follow these tips to get yourself over those hurdles:

- Here's how to avoid mistakes when making the legs (**Photo 1**): Mark and cut one leg, then double-check the measurements and use that first leg as a template to mark the other three.

- Don't worry about getting exact bevel cuts on the seat struts (**Photo 3**); they'll be covered by the seat slats. So even if they're not perfectly straight or smooth, they'll still allow the seat slats to lie flat.

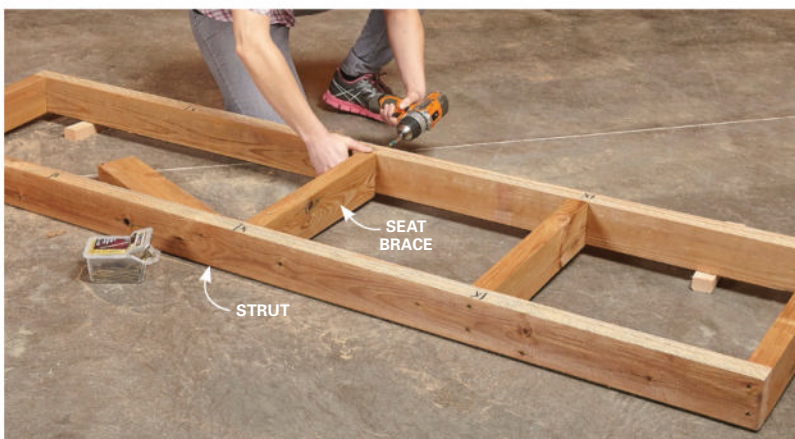
- If you're not using a miter saw to make angled cuts on parts E, F and G, you'll need a protractor or similar tool to mark the angles. You'll find various angle marking tools at home centers, starting at about \$10.

- When you're assembling the seat frame (**Photo 4**), install the two seat braces at the ends first. Then make sure the seat frame fits easily inside the tables. If not, you can easily cut all the seat braces just a bit shorter.



3 BEVEL THE SEAT STRUTS

Make a tilted "bevel" cut along one edge of each strut. Set your saw to 5 degrees and install the saw's rip guide to steady your cut.



4 ASSEMBLE THE SEAT FRAME

Screw the seat frame together with the bevel cuts on both struts facing up.



5 INSTALL THE SEAT FRAME

Screw the seat frame to the tables from inside with 2-3/4-in. screws. Drive them at an angle so they don't poke completely through the table legs.



6 ADD THE BACK BRACES

Screw the back braces to the seat frame. Make sure the tables are standing perfectly square before you screw the braces to them.



7 INSTALL THE SEAT SLATS

Cut notches in the front and rear slats to fit around the front legs and back braces. After the front and rear slats are installed, space the other three slats evenly between them.



8 FINISH THE BACK

Screw the back rail and cleats to the back braces, then screw on the back slats, using 3/4-in. spacers to position them.

The exact dimensions of treated lumber can vary slightly, so the brace measurements in the Cutting List may need to be altered.

■ The back braces look complicated. But like the seat struts, they don't have to be perfect. Cut one brace, use it to mark the other two, and then cut 3/4 in. off the middle brace.

■ If it's difficult to slide the seat frame into the tables, back out two of the screws that fasten the bottom shelf to the legs. That will allow the legs to spread slightly. Then, when the frame is in place, retighten the screws.

■ When you mark the seat slats for notching, don't determine the notch locations by measuring. Instead, set the slats in place and mark the notch positions along the back braces or table.

Finishing your bench

The cedar-tone treated wood needed a bit more color, so I used a closely matching waterborne semitransparent outdoor stain. The slight pigment evened out the appearance.

Use long, even brushstrokes and stain the boards and panels one at a time to keep the stain from pooling or blotching. I set the bench on a drop cloth and rotated it to brush the back and undersides as I went.

Let the finish dry at least two days. Finally, nail a pair of plastic furniture guides onto the bottom of each leg to help keep the legs dry.

Materials List (Long Bench)

ITEM	QTY.
2x10 x 8' pressure-treated pine	2
2x4 x 8' pressure-treated pine	5
1x4 x 8' pressure-treated pine	5
1x4 x 10' pressure-treated pine	2
1x2 x 4' pressure-treated pine	1
2-3/4" exterior screws	12
3-1/8" exterior screws	60
2" exterior trim screws	80

Materials List (Short Bench)

ITEM	QTY.
2x10 x 8' pressure-treated pine	2
2x4 x 8' pressure-treated pine	3
2x4 x 10' pressure-treated pine	1
1x4 x 12' pressure-treated pine	3
1x4 x 8' pressure-treated pine	2
1x2 x 4' pressure-treated pine	1
2-3/4" exterior screws	12
3-1/8" exterior screws	60
2" exterior trim screws	80

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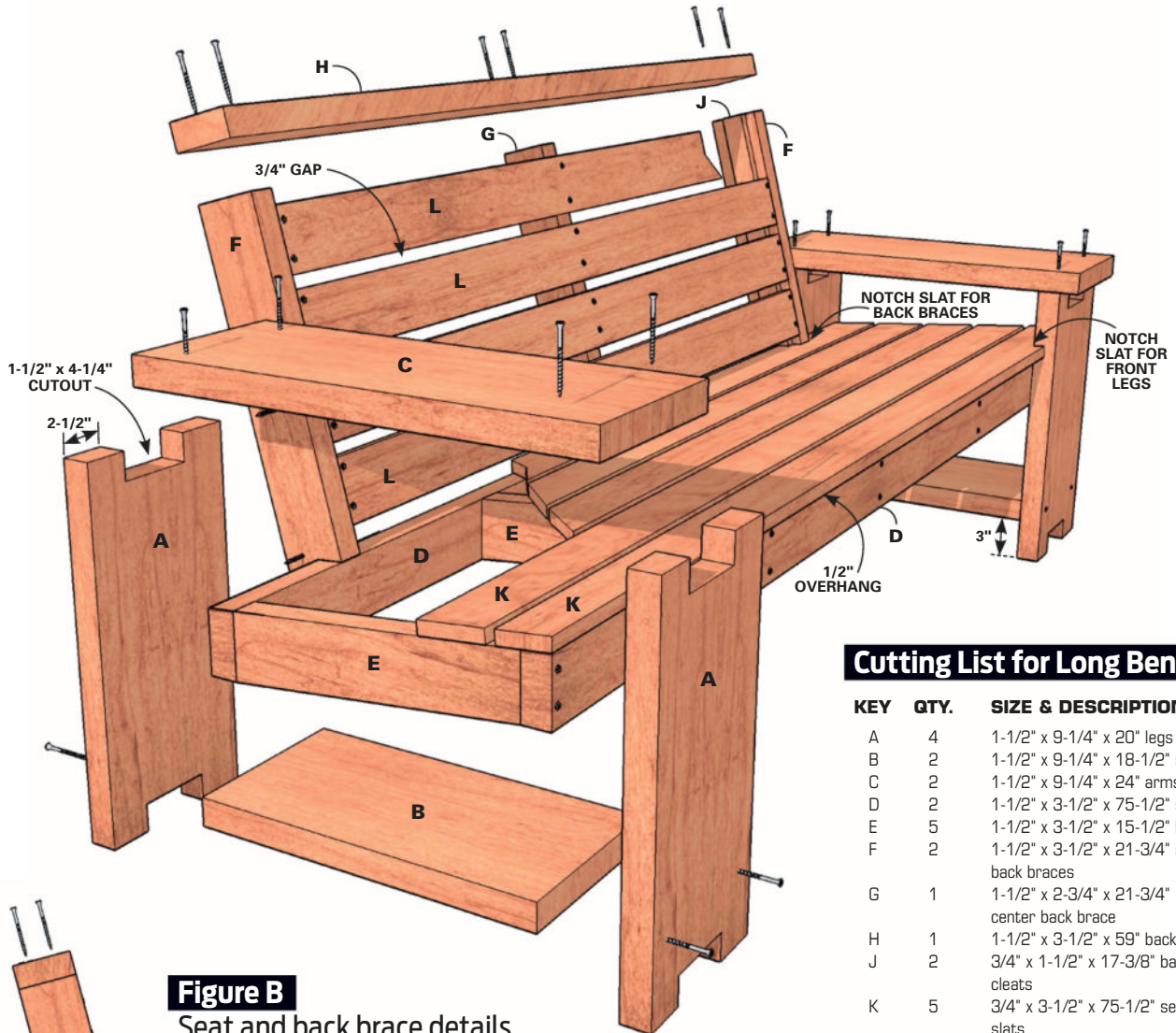
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Figure A

Outdoor sofa

Overall dimensions of long version: 77-1/2" wide x 33-1/2" tall x 28-1/2" deep
The short version is 67" wide x 33-1/2" tall x 28-1/2" deep

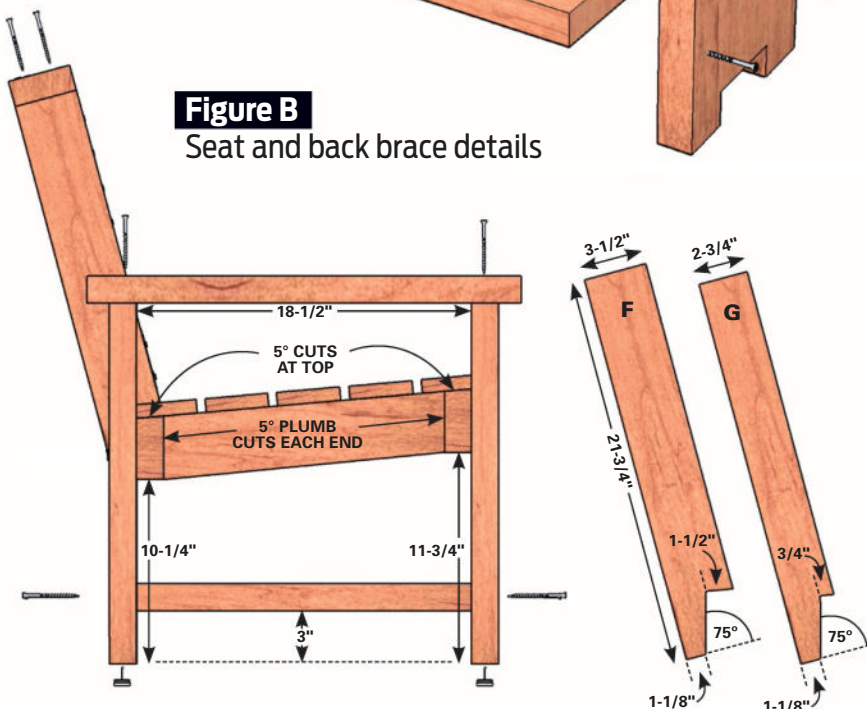


Cutting List for Long Bench

KEY	QTY.	SIZE & DESCRIPTION
A	4	1-1/2" x 9-1/4" x 20" legs
B	2	1-1/2" x 9-1/4" x 18-1/2" shelves
C	2	1-1/2" x 9-1/4" x 24" arms
D	2	1-1/2" x 3-1/2" x 75-1/2" struts
E	5	1-1/2" x 3-1/2" x 15-1/2" braces
F	2	1-1/2" x 3-1/2" x 21-3/4" side back braces
G	1	1-1/2" x 2-3/4" x 21-3/4" center back brace
H	1	1-1/2" x 3-1/2" x 59" back rail
J	2	3/4" x 1-1/2" x 17-3/8" back cleats
K	5	3/4" x 3-1/2" x 75-1/2" seat slats
L	4	3/4" x 3-1/2" x 56" back slats

Figure B

Seat and back brace details



Cutting List for Short Bench

KEY	QTY.	SIZE & DESCRIPTION
A	4	1-1/2" x 9-1/4" x 20" legs
B	2	1-1/2" x 9-1/4" x 18-1/2" shelves
C	2	1-1/2" x 9-1/4" x 24" arms
D	2	1-1/2" x 3-1/2" x 64-1/2" struts
E	5	1-1/2" x 3-1/2" x 15-1/2" braces
F	2	1-1/2" x 3-1/2" x 21-3/4" side back braces
G	1	1-1/2" x 2-3/4" x 21-3/4" center back brace
H	1	1-1/2" x 3-1/2" x 48-1/2" back rail
J	2	3/4" x 1-1/2" x 17-3/8" back cleats
K	5	3/4" x 3-1/2" x 64-1/2" seat slats
L	4	3/4" x 3-1/2" x 45-1/4" back slats

Here, our 9 to 5 seems a world away.

From the chopping of wood to the sudden silence of a freshly oiled barn door,
the sounds of country life are filled with comfort and pride.

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EDITOR JASON WHITE • ART DIRECTION MARCIA ROEPKE • PHOTOGRAPHY HSP UNLESS NOTED

FUR FILTER FOR DOG BATHING

I used to pay to have my dog bathed because if I washed my dog in the bathtub or shower, I'd end up with a clogged drain. Not anymore. To keep fur out of the drain, use a mesh-type scrubbing pad. In a shower, clip the pad to the drain plate with a bobby pin. In a bathtub, wedge two pads under the stopper from two sides. The pads catch fur but let water flow through.

Lucy Rusert

SCRUBBING PAD



A sure fix for loose screws

To secure a machine screw that keeps coming loose, add a few drops of superglue to the screw's threads. Put the screw back in quickly; you have only a few seconds before the glue sets.

Joe Patto

Note: If you may want to remove the screw someday, use a removable thread-locking product like Loctite Threadlocker Blue 242 instead.

Easy flag storage

Storing my American flag in a dusty corner of the garage didn't feel very respectful. So to keep it clean and protected while it's put away, I store it in a length of PVC drainpipe hung on the wall. The pole-mounted flag slides inside the pipe, which I loosely cap on each end.

John Hana



READER PHOTO

Moisture? No problem.

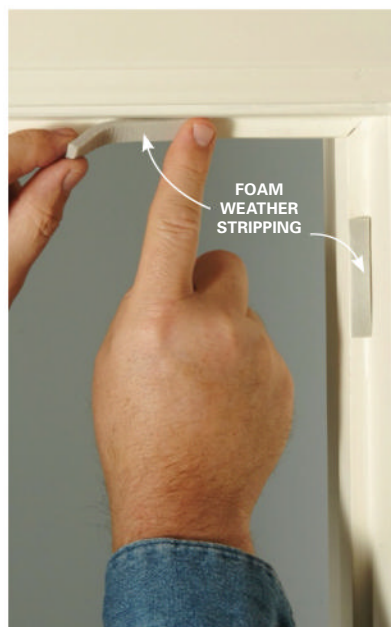


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Slam begone

We have very heavy solid-core interior doors that are quite noisy when slammed shut. To cut down on the ruckus, I stuck small pieces of foam weather stripping on the door side of the jamb's stop. If the door won't close all the way after installing the weather stripping, you might need to adjust the position of the jamb's strike plate. There are a few different thicknesses at the home center, so try to figure out the ideal thickness before you shop.

Jim Steiner



Self-stick paint shield

Glad Press'n Seal plastic wrap (\$4) goes on fast and stays right where you put it. Paint can seep under the edges, though, so it's no substitute for masking tape in spots where you need a sharp edge.

Cheryl Roos



Plywood cutting station

When cutting full sheets with my circular saw, I use plastic shelving units as sawhorses. The height is just right and by using three of them, I can make cuts in any direction and the plywood is fully supported. And because the shelving units are made of plastic, I can cut right into them without worrying that they'll damage my saw blade. Plastic shelves are available for \$20 at home centers.

John Tinger

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Replace a small concrete pad

You can do it
in just a day!



A sagging, cracked concrete pad at an entryway says anything but welcome. And it can go from eyesore to disaster if it slopes toward your home's foundation and directs rainwater right into your nicely finished basement! If your old pad needs replacing, you'll be happy to know it's a fairly easy task. In fact, you can replace one in a single day. Here are some tips for building a new home for your welcome mat.

by Jason White

editors@thefamilyhandyman.com

1 Start with a sledgehammer

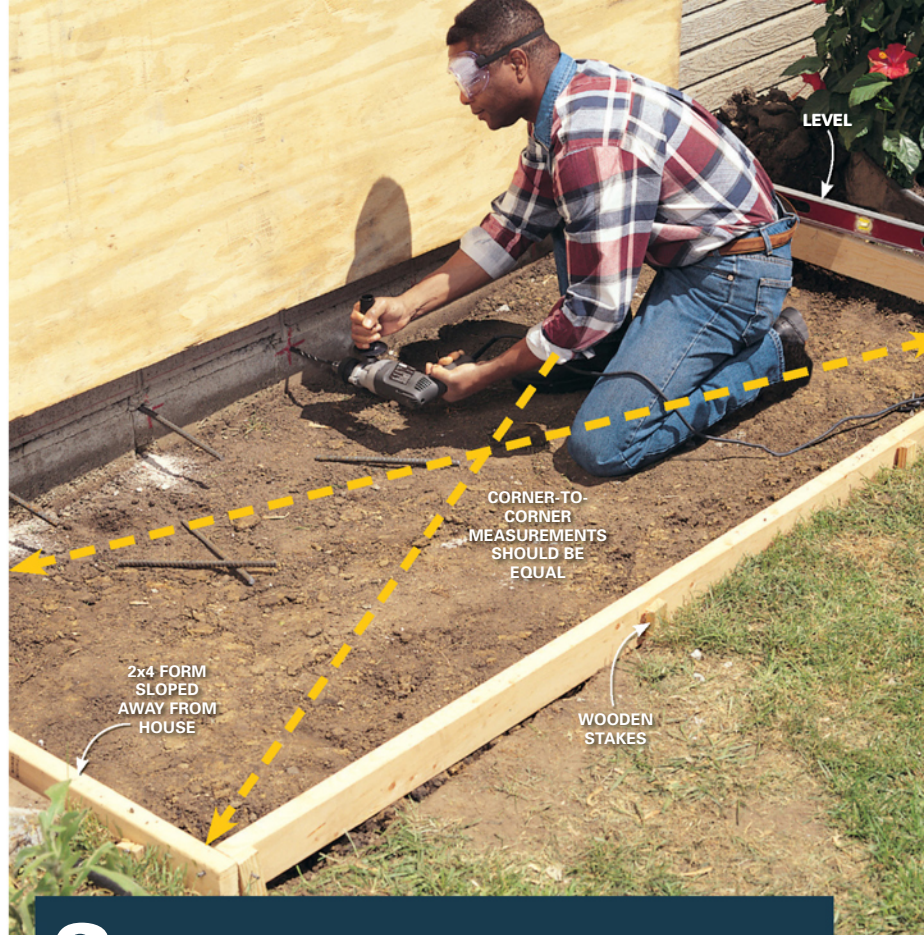
A 10-lb. sledgehammer is usually all you need to bust up that nasty old pad (and get a good workout in the process). To protect the house from flying chips, cover any nearby glass with a sheet of 1/2-in. plywood (shown at left). And be sure to wear goggles to protect your eyes.



A few swings with a sledgehammer will let you know right away if you need to call in some heavier equipment. A rental jackhammer will break up a slab much faster than a sledgehammer, with fewer blisters and less sweat. For a small slab, rent an electric model rather than a pneumatic hammer. Rental fees will be about \$80 for 24 hours.



ART DIRECTION: MARCIA ROEPKE • PHOTOGRAPHY: HSP



2 Build the form

Using straight 2x4s, lay out the form's three sides and screw them together. Take diagonal measurements to check for square (if they're equal, the form is square). Drive stakes—one every 3 ft.—along the outside of the form, being careful not to bend the 2x4s. Level the 2x4 that runs parallel to the house and drive screws through the stakes and into the 2x4 to hold it in place. Next, be sure the sides of the form slope away from the house 1/4 in. for every foot and screw through the stakes to secure them.

3 Pin the pad to the foundation

Using a hammer drill and masonry bit, drill 1/2-in. holes 4 in. deep in your home's concrete foundation and space them about a foot apart. Then, using a hammer, tap 12-in.-long pieces of 1/2-in. rebar into the holes to connect the new pad to the foundation. The rebar will ensure that your new pad maintains its slope away from the house. **Note:** Not all municipalities allow this practice, so check with your local building inspector.



4 Level the wet concrete

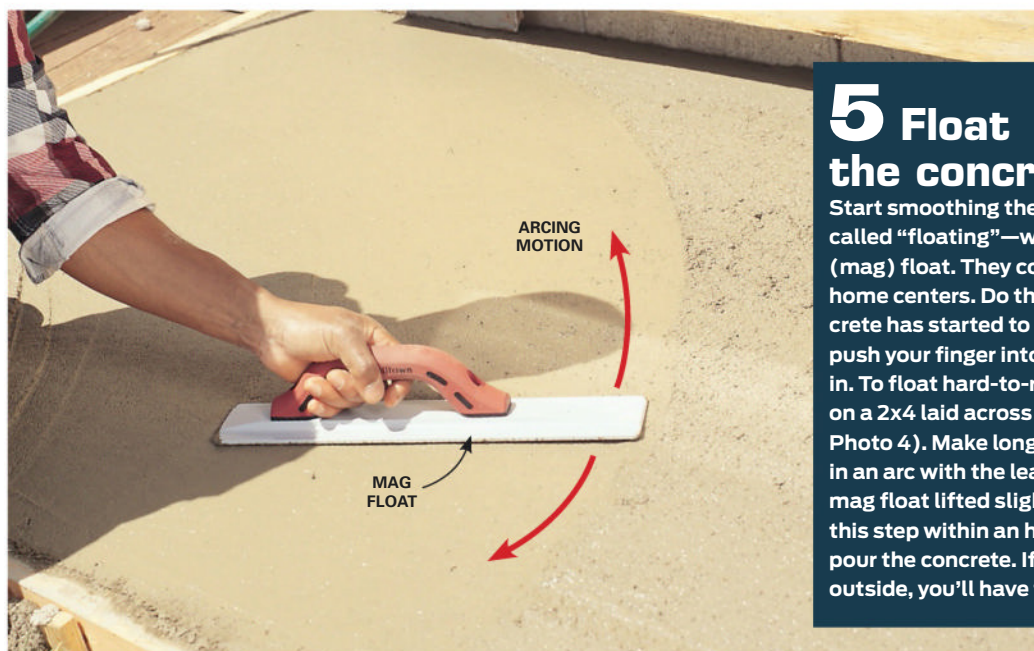
To get a nice, flat surface that's perfectly sloped, find a straight 2x4 that's a foot longer than the width of the form and set it on top of the form as you start pouring the concrete. Use it to level the wet concrete by pulling it from the house toward you while working the board side to side—a process called “screeding.”

The mix should be slightly higher than the top of the form when you start. Poke the mix with a shovel to work out any air pockets, especially near edges and corners. For a smoother finish on the pad's edges, tap the sides of the form with a hammer.



5 Float the concrete

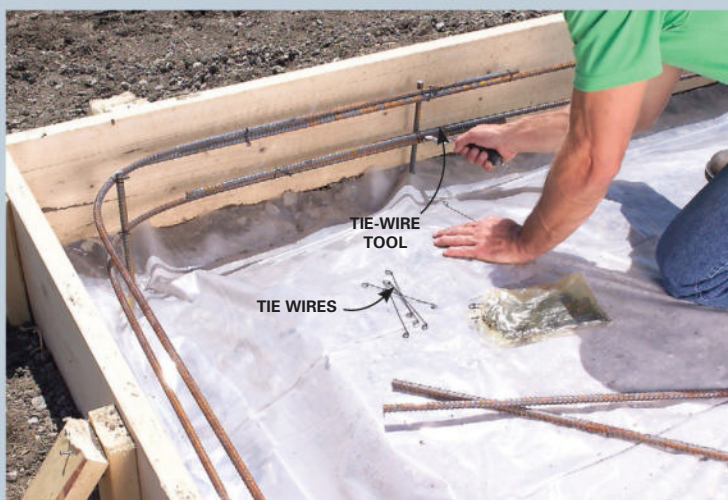
Start smoothing the concrete—also called “floating”—with a magnesium (mag) float. They cost about \$25 at home centers. Do this when the concrete has started to set up and you can push your finger into it only about 1/4 in. To float hard-to-reach areas, kneel on a 2x4 laid across the form (see Photo 4). Make long, sweeping strokes in an arc with the leading edge of the mag float lifted slightly. Try to finish this step within an hour of starting to pour the concrete. If it's hot and dry outside, you'll have to work even faster.



REINFORCEMENT ISN'T REQUIRED, BUT...

For a small concrete pad—less than 40 sq. ft.—you don't normally have to bother installing steel reinforcing bar (rebar). However, doing so adds strength and crack resistance to the pad if you lay out the rebar in a grid pattern 2 ft. on center.

You'll find 10-ft. lengths of rebar for about \$5 each at home centers, and you can cut them to size with a hacksaw or an angle grinder. You'll also need tie wires (\$2.50 for a bag of 100) and a wire-twisting tool (\$6) to connect the pieces of rebar in a grid pattern. For more information about reinforcing concrete with rebar, visit familyhandyman.com and search for “concrete slab.”



6 Round over the edges

Fifteen to 30 minutes after screeding, use a steel edging tool—about \$6 at home centers—to smooth and round over the edges of the pad. This gives a nice-looking shape to the edges and forces the aggregate away from the corner. Do this a few times during floating (see Photo 5) and after.

EDGING TOOL

7 Add texture with a broom

Use a special concrete broom (\$12 to \$100) or any stiff-bristle broom about 15 minutes after floating to add a slip-resistant texture to the top of the pad. The coarser you want the texture, the earlier you should broom. The grooves created by the broom should follow the direction of the slope so water runs off easily. Brooming also hides imperfections in float work.

CONCRETE BROOM

FOUR THINGS TO KNOW ABOUT CONCRETE

1. Too much water weakens concrete

If you mix too much water with concrete, cement crystals form farther apart, leaving concrete weak and porous. That can cause trouble later as pores and pockets fill with water, freeze and break up the concrete's surface. With the right amount of water, cement crystals grow tightly together and interweave to form strong, watertight concrete.

2. Floating too soon leads to trouble

As concrete sets, water rises to the surface. Left alone, this “bleed water” is reabsorbed into the concrete. But if you float the watery surface, you’ll force the aggregate and cement down, leaving a watery mix of sand and too little cement on top. Wait for the bleed to disappear before floating. Also, don’t overwork it. Too much floating (or troweling) will lead to a less durable surface.

3. The longer it stays damp, the better

Concrete doesn’t harden because it’s drying; it hardens because it’s wet. The longer concrete stays damp, the harder and stronger it gets. The hardening or “curing” process can continue for weeks if the concrete dries slowly. Covering it with a sheet of plastic also slows the curing process (see “Cover the Pad” on p. 46).

4. It can burn your skin

Some people get concrete on their skin and don’t have any problems, but others are more sensitive to it. Until they cure, all cement-based products have the potential to leave minor burns on your skin. Play it safe and wear a long-sleeved shirt, long pants, boots and waterproof gloves when working with concrete.



8 Cover the pad

To prevent the concrete from cracking while it's curing (hardening), cover it with a plastic sheet to slow the process. Wetting the pad with a fine spray of water every two to three hours for the first day helps too. Higher temperatures require more frequent wetting. The more time concrete has to cure, the stronger it will be.

ORDER THE RIGHT CONCRETE MIX

Bagged concrete vs. ready-mix

Most small pads require less than one yard—27 cu. ft.—of concrete. You can buy several bags (\$3 to \$5 per bag) at the home center, which you'll have to lug home, mix with water and pour yourself. It's a lot of work, but it might make more sense financially for a small pad at the bottom of your deck stairs. For bigger pads, have "ready-mix" concrete delivered. It comes mixed with water and the delivery guy will pour it right into your forms. Prices vary by region, but expect to pay about \$300 for 1 yard. Order it a few days ahead. If rain threatens, you can usually cancel up to two hours before delivery.

Order the right concrete mix

■ Plan to pour a pad at least 4 in. thick and calculate the right volume. Concrete is ordered in cubic yards. Many suppliers have calculators on



their website, but it's fairly easy to figure out how much you need. First figure out the cubic footage, then convert to yards by dividing by 27. Here's how: Multiply the length of your pad by the width by the depth (4 in. = .33 ft.) and divide the total by 27. Order a little bit more than you need. A good rule of thumb is to order an extra 5 percent rounded up to the next 1/4 yd. to handle spillage and uneven bases.

- Order from the nearest supplier. Get fresh concrete mixed near the site, not across town by some company with a lower price.
- Ask for 5 percent "air entrainment" in the mix. Suppliers add a chemical that traps microscopic air bubbles to help the concrete accommodate the expansion and shrinkage caused by climatic changes such as freezing.
- Get the right strength. Tell the dispatcher you're pouring a pad and they'll recommend the correct "bag mix" (ratio of cement to aggregate and sand). In cold climates, they'll probably suggest at least a 3,000-lb. mix. That means the concrete can support a 3,000-lb. load per square inch without failing.
- Have your checkbook ready. You'll have to pay after the concrete's unloaded.

The truck arrives with the concrete premixed with the correct water content. But the driver may send a little concrete down the chute and ask if you'd like more water added. Unless the mix is too dry to get down the chute, forget it. It should be thick—not runny. Wetter mud may be easier to place (fill the forms), but the wetter the mix, the weaker the concrete.

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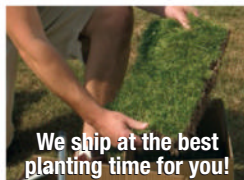
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First aid for carpets

After a carpet spill, doing the right thing—right now—can make the difference between a complete recovery and permanent damage. You can treat most food or drink spills with the steps shown here, whether it's wine, coffee or spaghetti sauce.



Use the wet/dry vacuum first

Getting as much of the liquid and solids out of the carpet as quickly as possible is the single most important part of removing a carpet stain. But blotting and scooping can actually drive the stain deep into the carpet backing and pad. Instead, reach for your wet/dry vacuum and vacuum up the spill. Convert your wet/dry vac to wet mode by removing the paper filter and installing a foam cover (if equipped) before sucking anything up (**Photo 1**).

Apply a cleaning solution

After sucking up as much of the spill as possible, resist the temptation to hit the stain with strong cleaners like vinegar and hydrogen peroxide right out of the gate. Those products can set the stain and even discolor your

carpet. They can be used in some cases to remove a stubborn stain, but only as a last resort after you've used a milder cleaning solution.

If you keep a store-bought carpet stain removal product on hand, great. Use it. If not, you can make your own by mixing 1/4 teaspoon dish soap (clear is best) to 1 cup of water. Pour the homemade solution into a spray bottle and apply a generous amount to the soiled area, but don't saturate it. Let the cleaning solution soak into the fibers for a few minutes before moving on to the next step.

Blot from the outside in

Blot the stain with a clean white cloth (dyed fabric can transfer color to the carpet), working from the outside in (**Photo 2**). Your goal is to move the carpet fibers, spread



1 SUCK UP THE MESS

Push the hose directly onto the carpet fibers and leave it in place for several seconds. Don't rub or drag the hose over the carpet. Move to an adjoining spot and repeat as many times as required to remove as much of the spill as possible.



2 BLOT GENTLY

Fold a clean white cloth into a small square and dab the carpet, starting at the outside edge. Roll the cloth toward the center and refold the cloth to a clean section as you soak up more stain.



3 RINSE THE STAINED AREA

Dab or spray clean water onto the stained area. Never pour water directly onto the carpet—it'll push the cleaning solution and stain into the backing and padding and can cause mold.

the cleaner slightly, and soak up the stain. Avoid aggressive blotting, scrubbing and stomping on the blotter. That just drives the stain deeper into the pile, backing and padding, making stain removal even more difficult. After blotting, use your wet/dry vac again to remove as much cleaning solution as possible.

Rinse, rinse, rinse

Leaving cleaning solution in the carpet is a big mistake. The leftover cleaning chemicals attract dirt, causing the spot to get soiled faster than the rest of the carpet. Even if you remove the stain, you'll eventually have a dirty area at the exact spot of the stain. Plus, the rinsing step helps remove any leftover stain liquid. So rinse the stained area multiple times with clear water (**Photo 3**). Vacuum the



4 CLEAN YOUR SHOP VACUUM THE EASY WAY

Dump some disinfecting cleaner into a bucket of warm water and drop your hose into it. Empty the tank and rinse both the hose and tank with water.

rinse water between applications and continue vacuuming until you remove as much final rinse water as possible.

Leaving food or organic matter in your shop vacuum will turn it into a stinky science experiment in no time. So clean it right away (**Photo 4**).

What to do next

Our techniques won't set the stain or damage your carpet, so if your stain is particularly stubborn, you can proceed to the next level and follow specific spot removal advice. Pet vomit, and fecal and urine stains, require additional neutralization and disinfection steps. Find advice for treating those stains by searching for "carpet pet" at familyhandyman.com.

TOILET TIP:

Make sure the new wax ring seals

Toilets can leak between the wax ring and the toilet flange. If you simply scrape off the old wax ring without actually cleaning the flange, residue can prevent the new wax ring from sealing.

You don't need chemicals to remove the old wax. Just fire up a hair dryer and melt the old wax. Wipe the flange clean with a clean rag or paper towel to get the best possible seal with the new wax ring.

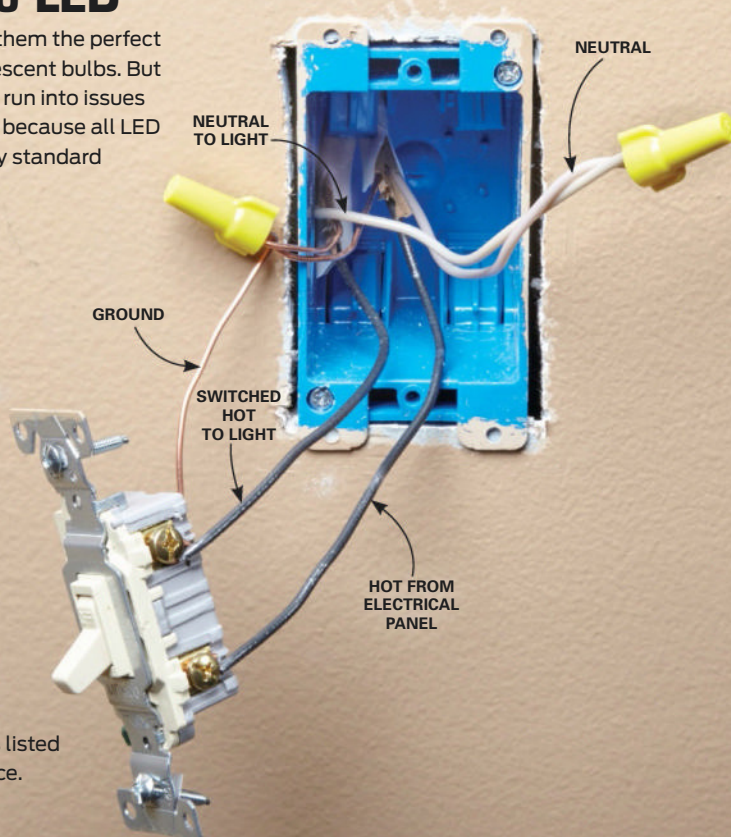


Convert dimmable incandescent bulbs to LED

The prices of LED bulbs are dropping, making them the perfect choice to replace your energy-wasting incandescent bulbs. But if your current bulbs are on a dimmer, you may run into issues even if you install dimmable LED bulbs. That's because all LED bulbs run on DC current and there's no industry standard for how bulb manufacturers build their AC-to-DC circuits. So the new bulbs may flicker, stay lit even when the dimmer is shut off or suddenly pop on to full brightness when dimmed. The industry is working on new standards, but in the meantime, you'll most likely have to buy a new dimmer and fit the fixture with bulbs that are listed as compatible by the dimmer manufacturer.

Many new dimmers work with a micro-processor that requires a neutral wire in the switch box, and the package descriptions don't always list that requirement. So check your switch box to see if it has a neutral wire. If it does, you can buy an LED compatible dimmer from the hardware store or home center. If you don't have a neutral wire, you'll have to find a "no neutral required" dimmer. Shop online at any of the three largest dimmer manufacturers' websites listed below or call the toll-free number for assistance.

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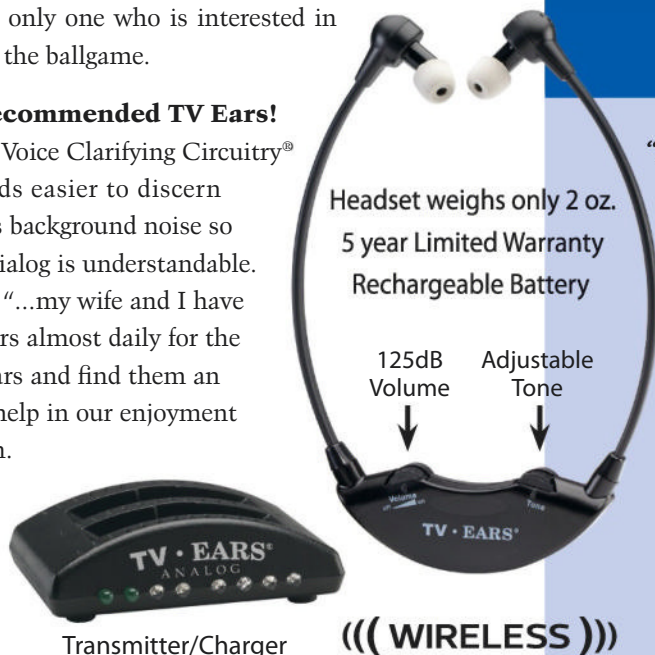
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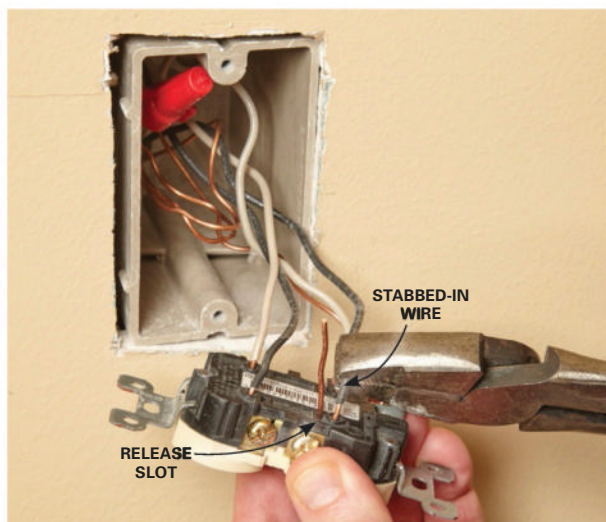
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“UNWIRING” A STAB-IN RECEPTACLE OR SWITCH

Many receptacles and switches are equipped with spring clamps that trap and hold the copper wire in place. These “stab-in” clamps are great for saving time during installation, but the connections aren’t nearly as reliable as connections made at the screw terminals.

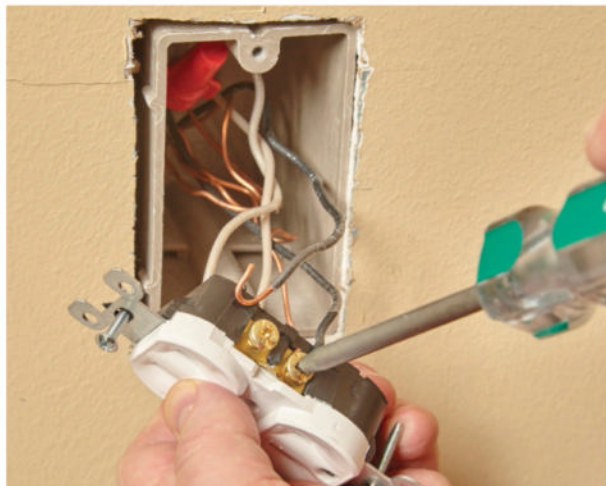
When replacing a stab-in receptacle or switch, most electricians simply cut the wire, strip and bend a loop, and connect it to the screws. But if your wires are too short to risk cutting off even more, here’s how to remove the existing wires from the spring clamps.

CAUTION: Before pulling out the receptacle to do any electrical work, turn off the power and double-check with a voltage sniffer.



1 RELEASE THE CLAMP

Jam a stripped copper wire, a finishing nail or a paper clip into the opening next to the clamped wire. Leave it in place while you pull the old wire out. Repeat for each stabbed-in wire.



2 RECONNECT TO SCREW TERMINALS

Bend a loop in the existing wires and wrap the loop clockwise around the screw terminal. Close the loop with a needle-nose pliers and tighten the screw.

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How to measure for replacement windows

You can replace a drafty old window in just a few hours, but first you have to get accurate measurements to order the new one. It's easy to measure the rough opening width and height once you remove the wood trim. But many DIYers make the mistake of not getting a precise depth measurement. If the window frame doesn't sit flush with the wall, you'll have to plane and sand the window frame or thicken the jamb depth with furring strips. That turns a relatively easy job into an all-day affair. So take your time and use a ruler to get the right depth. Next, measure the rough opening. Finish by measuring the outer dimensions of the old window frame.

Your objective is to buy a window that fits within that opening. If you don't, you'll have to make the opening smaller, or worse, enlarge the opening to fit the new window. And that also means reworking all the exterior trim, siding and interior wall surfaces. Take all of these numbers with you when you go shopping, and know that you can custom-order odd sizes if no stock sizes fit your opening.

Top Ten TIPS

BY JEFF GORTON

editors@thefamilyhandyman.com

Avoid clogged drains

Drains always seem to clog at the worst possible time, like when you have a houseful of overnight guests or a big party. And while you may not be able to stop every drain clog, there are steps you can take to prevent most clogs and nasty backups. Here are 10 tips to help you keep your drains running freely.



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1 Don't wait for a main line blockage

If you have a clogged sewer line every year or two, don't just keep getting it cleaned. Most sewer service companies will "scope" the line to see what's causing the problem. That entails sending a remote camera down the line for a visual inspection.

The recurring issue could be tree roots entering through clay tile joints, a partially collapsed pipe or even rotted-out cast iron that allows soil to fall into the line and create a blockage. It's worth paying to find out the cause and get it fixed rather than hassling with frequent sewer backups and sewer-cleaning bills.



2 Install a lint catcher on your washing machine hose

If the drain for your washing machine hasn't ever backed up, you're lucky. Lint, bits of fabric, facial tissue and even the occasional sock can sneak through your washer's drain hose and cause trouble in your drain.

To keep this stuff from plugging your drain, put a lint trap on the end of the drain hose. You can buy mesh lint traps for your washer's discharge hose at home centers and hardware stores, or you can simply use an old nylon stocking. Use a zip tie to hold the lint trap in place. Keep an eye on the trap and replace it when it's full. For extra insurance, buy a Lint Trapper by Sioux Chief (shown above). This reusable cone-shaped trap snaps into your laundry tub drain hole. It's available for about \$17 online and at some home centers and hardware stores.

3 Put bacteria to work

Whether it's hair, grease or food, some sort of organic matter causes most drain clogs. Fortunately, there's a type of bacteria that breaks down organic matter in your drains. Adding the bacteria to your drains will start to consume organic matter and prevent clogs. You can buy drain-cleaning bacteria in granular or liquid form.

Bacterial drain cleaner is noncorrosive so it won't harm pipes, and the bacteria won't interfere with the bacteria in your septic system. Follow the instructions on the package. Add the bacteria when drains won't be used, like right before everybody goes to bed, to allow it time to work. A package of drain and trap cleaner costs about \$12 at home centers and hardware stores. It should last several months, depending on how many drains you treat.



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4 Collect grease—don't dump it

One of the worst things you can pour down your drain is grease. Warm grease runs down your drain until it cools in the pipe, where it congeals to start forming a clog. Then other stuff gets stuck in it, and before you know it you've got a major clog.

The best solution is to avoid pouring any grease or oil down your drain. Just keep a jar handy to collect the grease, and throw it into the trash when it gets full. Or, if you're one who likes to cook with leftover bacon grease, you can buy a container that's designed to save the grease for reuse.



5 Don't rinse cement, grout or joint compound down the drain

Setting-type joint compound hardens by a chemical reaction and will set up even underwater, so obviously if it settles in your drain you're in for a rock-hard clog. Sand is another building product that is notoriously bad for drains. Sand is heavy and settles quickly in traps and pipes to form clogs that are difficult to remove.

To avoid these problems, never rinse setting compound, grout, mortar mix or concrete down the drain. Instead, save rinse water in a container until the solid materials settle out. Then decant the water in an out-of-the-way area in your yard, and dump the remaining sludge into your garbage can.



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6 Catch hair before it reaches the drain

Hair and soap combine in your tub or shower drain to create clogs that could end up requiring a drain snake to remove. But you can avoid that task by catching the hair before it reaches the drain.

Various sizes of mesh screens are available for this purpose. One good source for these stainless steel strainers is plumbingsupply.com. The No. 40 size (about \$4.50) fits bath and laundry tub drains.

Another option is to replace the stopper assembly with one that includes a built-in screen. One choice is the DrainEASY Bathtub Stopper shown here (\$14 at home centers or online). It's designed to replace stopper assemblies that screw into the drain.



7 Keep your pop-up stopper clean

The pop-up stopper on your bathroom sink is a magnet for hair, dental floss and other yucky stuff. And it's probably a good thing because it keeps all of that out of your drains. But allowing this waste to build up for too long can cause the sink to drain slower and slower and eventually not empty at all. And because the water flow down the drain is also slowed, clogs in the drain lines can form more easily.

When you notice that your bathroom sink is draining slowly, remove the stopper and clean it. Most pop-ups can be installed two ways. They can either be hooked into the pivot rod that lifts them, or simply rest on it. If your pop-up stopper is hooked in, you'll have to unscrew the nut on the back of the tailpiece (under the sink) and pull out the pivot rod to release the pop-up (left photo). When you reassemble it, try reinstalling the rod without running it through the hole in the pop-up stopper. Then drop the stopper into the drain hole. In most cases, it will work fine this way, and you'll be able to remove the pop-up stopper for cleaning without removing the rod.

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8 Collect your food waste

Grinding up food in a disposer and sending it down the drain is convenient, but it can clog drains. A better idea is to collect your organic waste in a container and add it to a compost pile. Many cities collect organic waste for composting, but if yours doesn't, consider building your own compost bin. Avoid putting meat or other greasy food in the compost collection because it takes too long to break down.

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9 Flush your drains

Low-flow toilets and faucets are great for saving water but not so good for keeping drains clear. The lower volume of water often doesn't carry away debris, and instead leaves it to collect in your pipes. You can counteract this problem by occasionally flushing the pipes with a large flow of water. Fill a five-gallon bucket with water and pour it into your toilet while simultaneously flushing to help keep the large main drain line clear. Also, fill your bathtub and sinks with hot water and release it down the drain.



10 Don't use the toilet as a wastebasket

It's tempting to throw all kinds of personal care products into the toilet. After all, there's a big drain hole and the stuff usually goes down OK. But just because dental floss goes down the toilet drain doesn't mean it'll make it to the main sewer. It's possible it will get snagged on something in your pipes and start a clog.

In addition to the fact that many of these products don't decompose readily, adding an unnecessary burden to the water treatment facility, they can clog drains. So avoid using the toilet as a wastebasket. It's better for the environment and better for your drains.

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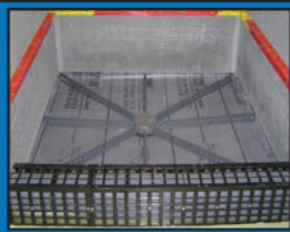


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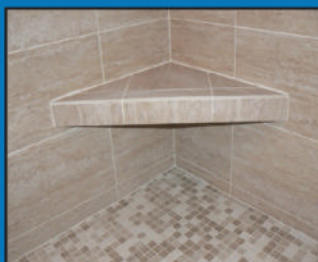
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BY RICK MUSCOPLAT

editors@thefamilyhandyman.com

ART DIRECTION VERN JOHNSON • PHOTOGRAPHY TOM FENENGA

Rebuild your chain saw

A “front-end job” makes it cut like new

Keeping your chain saw's bar, chain and drive sprocket in tip-top shape involves more than regular chain sharpening and re-tensioning. Even with meticulous care, a chain saw's drive sprocket and bar eventually wear out and must be replaced.

We asked our small-engine expert, Roger Wyatt

at Reed's Sales & Service, to walk us through a typical chain saw “front-end job.” He showed us how to keep a saw on the cutting edge. You can replace all the drive components yourself in about an hour. The parts cost about \$70, and you'll save about \$70 in shop labor.

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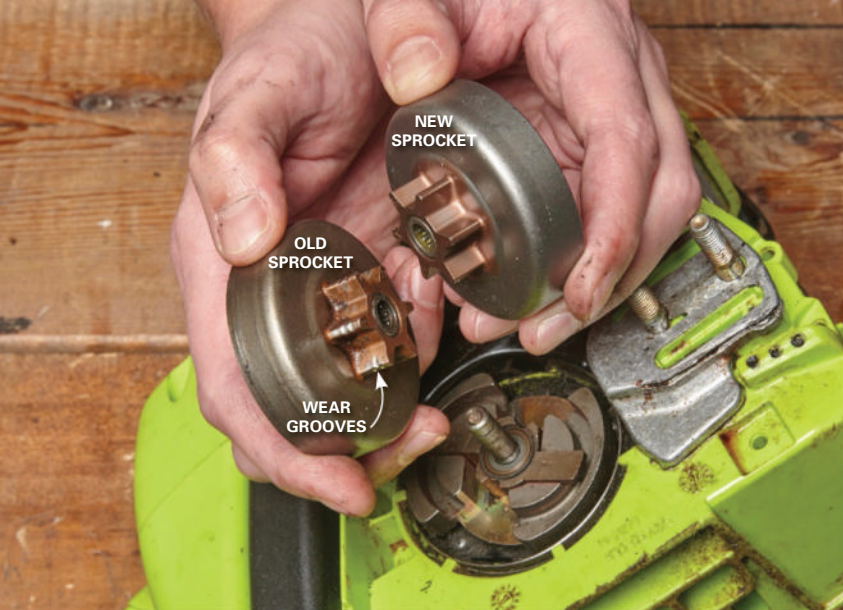


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MEET THE PRO



Roger Wyatt owns Reed's Sales & Service in St. Paul, MN. Every year Roger and his crew repair more than 1,000 lawn and garden tools.

Start with an inspection

Many DIYers make the mistake of replacing just the chain when their machine isn't cutting right. But the drive sprocket, bar and chain work together as a system, and wear on any one of these three components affects the operation of the others. In fact, placing a new chain on a worn drive sprocket can cause rapid chain wear, as well as tensioning and binding problems. Since all chain movement starts at the drive sprocket, check it first.

A drive sprocket wears where it contacts the drive links. Over time the sprocket can develop slight grooves. Deep grooves, however, can be a sign of improper lubrication, excessive chain tension or pushing a chain saw beyond its limit. Remove the chain and bar so you can fully check all the components, starting with the drive sprocket (**Photo 1**). Next, check the drive links and the tie straps for wear (**Photo 2**). If you see any wear, replace the chain.

If the drive sprocket and links are good, check the length of the remaining blades (**Photo 3**).

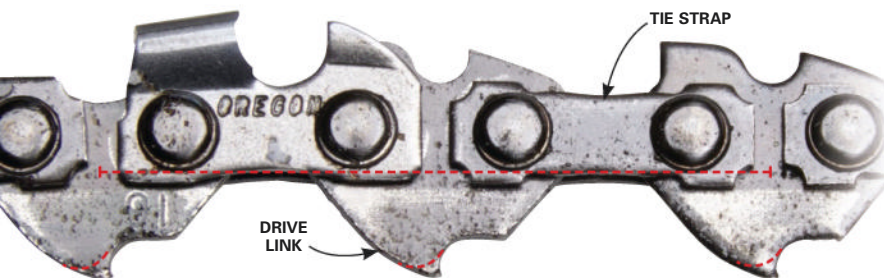
Next, examine the bar. If the bar has a nose sprocket, rotate it with your finger. It should roll easily with no noise or binding. If not, replace the bar. Finally, check for flat spot wear (**Photo 4**). A good bar has an elliptical shape. If the curve is more pronounced on one side, replace the bar.

Replace the drive sprocket and chain

Be sure the antikickback brake is released—check by moving the chain (with gloved hands). Then remove the drive sprocket cover and swap in the new sprocket (**Photo 5**). Wrap the chain around the bar with the cutting edges facing forward. Then engage the chain with the drive sprocket. Install the drive cover, lining up the adjusting screw mechanism with the notch in the bar. Snug the retaining nuts just enough to hold the bar but allow you to adjust chain tension. Then tension the chain (**Photo 6**).

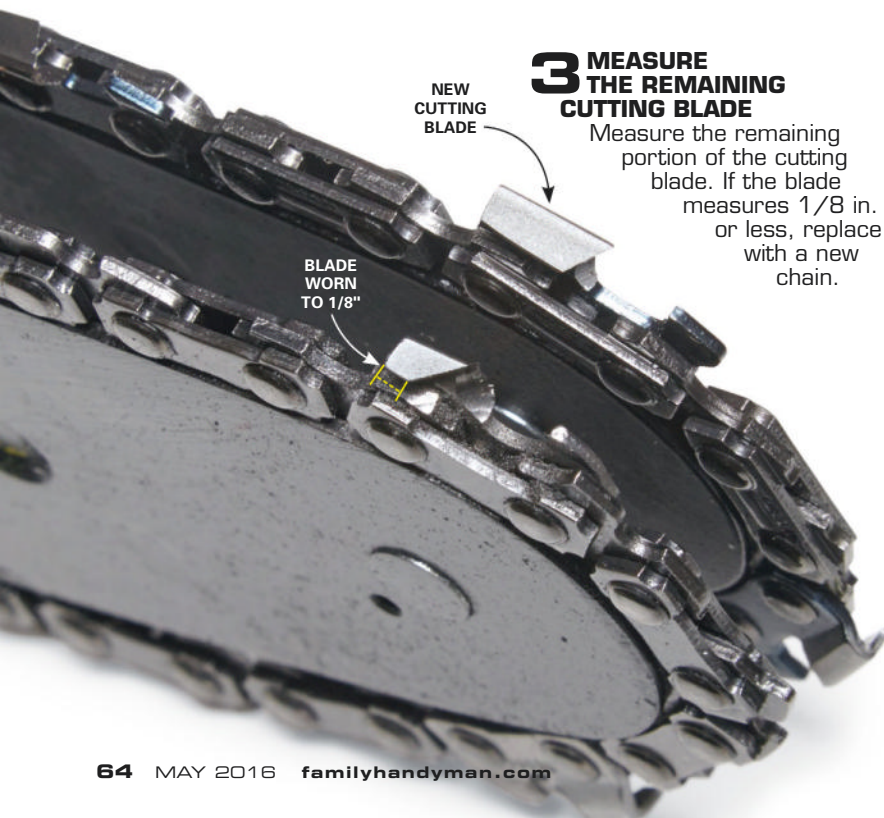
1 CHECK THE DRIVE SPROCKET FOR WEAR

Examine the drive sprocket teeth for wear grooves. A shiny spot where the drive links engage with the sprocket teeth is OK. But if you see wear grooves, replace it.



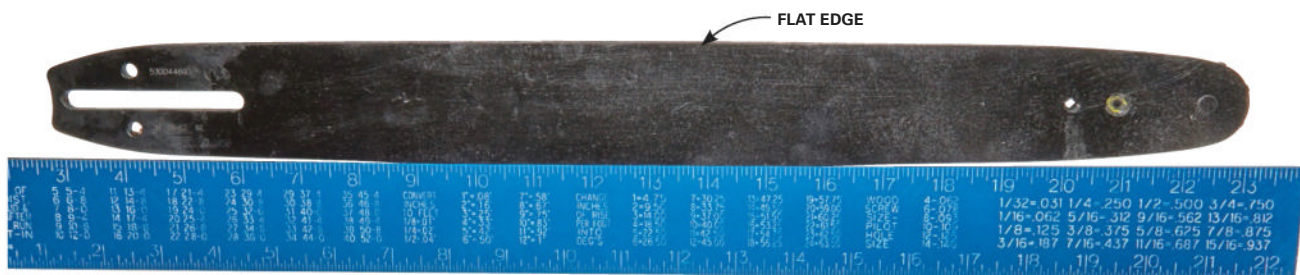
2 CHECK THE DRIVE LINKS AND TIE STRAPS FOR WEAR

Run your finger gently along the bottom edge of each drive link—they should come to a sharp point. Then check for wear on the chain's tie straps. If any are worn, as indicated by the dotted lines, replace the chain.



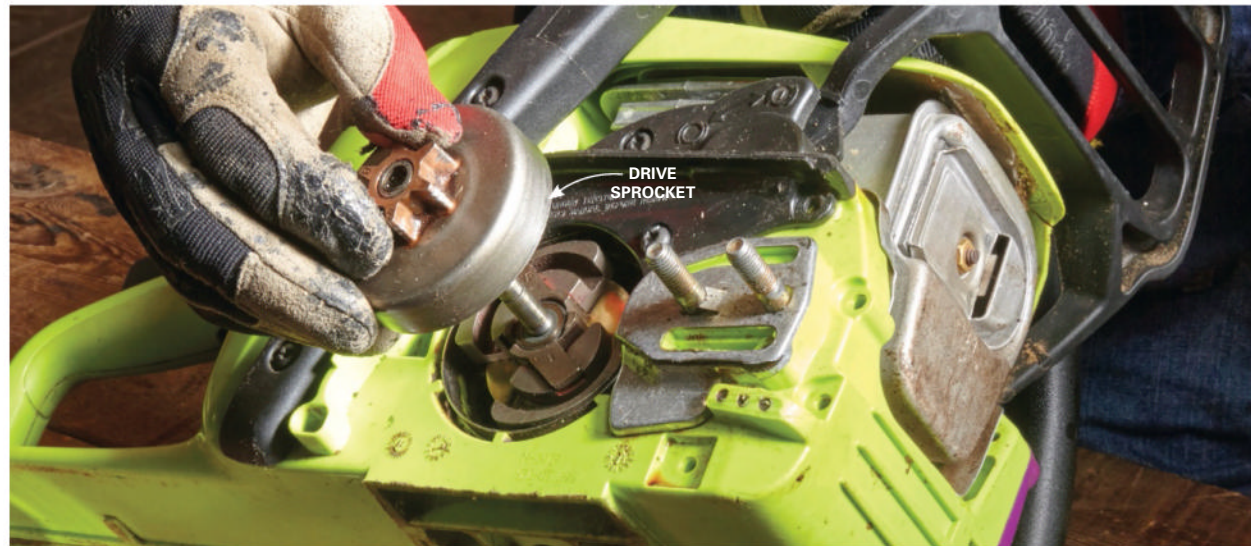
3 MEASURE THE REMAINING CUTTING BLADE

Measure the remaining portion of the cutting blade. If the blade measures $\frac{1}{8}$ in. or less, replace with a new chain.



4 CHECK FOR FLAT SPOTS

Lay a straightedge along both sides of the bar. The sides should curve outward slightly. A bar with a flat edge should be replaced.



5 REMOVE THE DRIVE SPROCKET

Use a small flat-blade screwdriver to remove the driveshaft E-clip. Then lift off the old sprocket. To install a new sprocket, slip it into place and snap on the E-clip with a needle-nose pliers.



6 TENSION THE CHAIN

Lift the top portion of the chain and turn the adjusting screw until the bottom of the drive link is even with the top of the bar. Hold the bar up while you tighten the bar nuts.

BREAKING IN A NEW CHAIN

Put the chain in a disposable pie pan, pour bar oil over it and let it soak for an hour or so to thoroughly lubricate the pivot points. Install the chain and tension it. Run the chain saw with no load at half throttle for several minutes until the bar and chain are warm. Shut off the motor, let the chain cool and then re-tension the chain.

Maintain a light load (only small limbs and branches) for the first half hour and make sure the chain has extra lube. After a half hour, let the chain cool and then re-tension it. Then you're good to go.

GET THE RIGHT CHAIN

Buying the right chain is more complicated than you might think. Don't assume any 18-in. chain will work on your 18-in. bar. This chain saw, for example, could have come from the factory with any of several 18-in. chain/bar combinations. To work properly, the new chain must have the same drive link thickness, chain pitch and number of drive links. And the chain pitch must exactly match the drive sprocket. If they're mismatched, you'll never get the proper tension.

The easiest way to get the right chain is to take your saw to a dealer. But you can figure out the correct chain specs yourself. You'll need three numbers: the number of drive links, their thickness (gauge) and the "pitch" of the chain.



Measure the drive link thickness

The chain gauge may be stamped into the drive links. If not, measure a drive link gauge with a micrometer or vernier caliper as shown above. Common sizes are .043, .050, .058 and .063 in. This one measures .050 in. Then count the number of drive links. This one has 62.



Measure the chain pitch

Measure the span of three rivets (center to center) and divide that number by two to determine the chain's pitch. This one is 3/8 in. (the most popular size for chain saws for home use).

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PRO tips

BY MARK PETERSEN

editors@thefamilyhandyman.com



Spray foam insulation kits

Closed-cell polyurethane spray foam has some pretty awesome qualities. It has a high R-value. It's resistant to water, mold and insects. It expands into hard-to-reach nooks and crannies. Heck, it can even add structural support to walls and roofs.

However, it is expensive. So we spoke with a couple manufacturers and some pro insulators about

where and when to use it, when to call in a pro with a truck-mounted unit, and when a portable kit is the best option. We also dug up some great installation tips to help you spray safely and get the most bang for your precious buck.

We used the Touch 'n Foam System 200 two-component, low-pressure kit. It has an R-value of 5.4 per inch.

MEET THE EXPERT

Bob Templin works for Citywide Insulation in Shakopee, MN. He has been in the insulation business for 27 years, starting long before spray foam insulation became mainstream.





Sealant vs. insulation

Closed-cell spray foam *sealant* looks just like foam *insulation*, but it's not the same thing. Sealant is formulated to seal cracks and voids, or the perimeter of stud spaces before you install fiberglass insulation. Sealant should not be used to fill larger cavities because it loses its fire-retardant properties when applied in thick layers.

TRUCK VS. KIT

SCENARIO	TRUCK	KIT
Large amounts needed	✓	
Cold-weather application	✓	
Intermittent spraying		✓
Hard-to-reach areas		✓
Higher R-value is important	✓	✓
Board foot costs (1 in. thick x 1 sq. ft.)	\$.85 to \$1	\$1.25 to \$1.60

Most insulating pros with truck-mounted units have a minimum charge of \$500 to \$700. So buying a spray foam kit makes sense for small jobs, and for those jobs where you need to insulate in stages over the course of a few days or weeks. Kits are also handy for insulating jobs in remote locations where the nearest spray foam company is a hundred miles away.

You can buy kits that produce foam with the same R-value as the foam sprayed from truck-mounted units (just under R-7). But if you have a large area to insulate, it makes sense to hire a pro because the cost will be considerably less than if you use a kit yourself.

You'll also want to call in a pro if the weather is cold. Truck-mounted units have built-in heaters, which can spray foam at close to freezing temperatures, but most kits require tank temps, air temps and surface temps above 65 degrees F. Keep in mind that a house will have to be vacated for up to 24 hours if a truck is called in, but many of the kit products allow you to inhabit the house immediately after spraying.

FOAM IS MEASURED IN BOARD FEET

Most two-part spray foam kits have a number assigned to them: 120, 200, 210, 600, etc. That number usually indicates how many board feet the foam will cover. So a "200" kit will cover 200 sq. ft., 1 in. thick.



Wear the proper gear

Protect your lungs with a respirator, and be sure to wear a full protective suit, chemical-resistant gloves and wrap-around goggles. Tape your gloves to your sleeves and wear your junkiest shoes. Acetone will dissolve fresh foam right away, but once this stuff cures, it has to be physically scraped off. In general, if you don't want it covered with foam spatter, keep it away from the action.

OPEN CELL VS. CLOSED CELL

There are two kinds of spray foam on the market: open and closed. Closed-cell foam costs more than open-cell, but its properties make it more popular. Closed-cell is more resistant to water and can provide an air and vapor barrier (depending on the thickness). It provides almost double the R-value per inch. The one superior property that open-cell insulation has is that it works as a great sound barrier/deadener. It's often used under stairs and between walls and floors for that reason.



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Never spray a wet surface

Never spray foam on a surface with a moisture level of more than 20 percent—the foam won't stick. If the surface you're spraying hasn't been exposed to water for a few weeks, it should be OK to spray. But if you're patching a wall that recently sustained water damage, or was just assembled with new, wet lumber, you may want to test the moisture level before you spray. You can get a moisture meter at some home centers or online for less than \$40.



Cover windows with plastic

Staple plastic to the framing around the windows (and doors). Don't worry about covering the gap between the window and the framing because you'll want to fill those with low-expanding canned foam specifically designed for windows. Cover all the switch and outlet boxes with masking tape so you don't fill them with foam. You don't need to use gasketed electrical boxes when you insulate exterior walls like you would if you were using fiberglass—the foam will air-seal around the boxes.



CONSIDER SMALLER KITS

Three "200" (board-foot) kits will definitely cost more than one "600" board-foot kit, but the "600" kit will have two large tanks that require two hands to move them around. And that's not easy to do if you're working alone.

Make a plan before you pull the trigger

Before installing the first tip/mixing nozzle, point the gun into a garbage bag or empty box, and pull the trigger until both chemicals are flowing evenly. But long before you do that, plan your work.

You'll have to install a new tip every time you stop spraying for more than 30 seconds because the foam will set inside the nozzle and clog it. Spray foam kits come with extra tips, but it's still important to (1) clear the room of everything that could get in the way, (2) decide which areas you'll spray first, (3) put ladders wherever you need them, and (4) set up a fan or two to vent the fumes outdoors.

Before you start, shake the cans to mix the contents, and then shake every few minutes after that.



Lube the gun every tip change

The end of the gun needs to be lubricated before the first tip is installed, and again before the tanks are stored after use. Many pros prefer to lube the tip of the gun every time they install a new tip. Kits will come with some lubricant (petroleum jelly). Always follow the manufacturer's instructions on operation, tip changes, storage and disposal.

DON'T LEAVE FOAM INSULATION EXPOSED IN LIVING AREAS

To comply with building codes, spray foam insulation cannot be left exposed in living areas. It needs to be protected by a thermal barrier such as drywall. Rim joist cavities are one exception. Rim joist cavities can be sprayed with foam and left exposed if the foam is less than 2 in. and has a Class A (fire resistant) fire rating.

Foam can be left exposed in nonliving areas like attics and crawl spaces that are not being used for storage, but the spray foam must either have a Class A rating (fire resistant) or be covered by an ignition barrier (such as drywall, mineral fiber insulation or specially formulated spray-on coatings). Fire and smoke specs differ among manufacturers, so always consult with your local building official to confirm which foam you can use where.



Picture-frame first

Before filling the wall cavity, spray the perimeter with a 1/2-in. layer, which will expand to a 1-in. layer. These layers are called "lifts." This will ensure that the foam penetrates any voids where the studs meet the sheathing. This also reduces the risk of bulges in the sheathing. If foam is sprayed into a large gap between the stud and the sheathing and is immediately covered by a thick layer, the pressure of the expanding foam can actually push out any sheathing that isn't securely fastened. Wait a few minutes after picture-framing the cavity before you go back and lay down the first layer in the center of the wall.

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Spray 2-in. lifts and wait

Always wait a few minutes before spraying additional lifts, and never spray a lift more than 2 in. thick. The foam needs time to cure before being covered with another lift. Uncured foam results in reduced R-values. The allowable thickness of lifts varies by manufacturer, but all have a limit. **The two most common spray foam installation mistakes are failing to wait for lifts to cure and spraying lifts that are too thick.**



Spray the rim *and* the bottom plate

There should be a foam sill sealer between the bottom plate and the concrete foundation wall. But voids in the wood or concrete, or tears in the sill sealer, can create gaps where air and insects can penetrate. While you're sealing the rim board, cover the bottom plate and top off the concrete as well. There's no need to picture-frame the joist spaces before filling them, but don't spray a lift more than 2 in. thick.



Start and stop at cables and pipes

Don't blast over pipes and cables on the first lift. Instead, shoot some foam under-neath them at the same time you're picture-framing the stud cavities. This will ensure that the foam doesn't wrap over the cable and leave an uninsulated void behind the pipe or cable.



Scrape overspray with a curry comb

Run a straightedge along the outside of the studs and scrape down any high spots with a curry comb. Remove large chunks of foam with a handsaw. Curry combs are designed to groom horses and are available online or at farm supply stores for less than \$10.

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Test the depth with a hanger

It's important to know how thick the foam is, but it's often difficult to judge, especially in rim joist spaces. You could buy a fancy pin depth gauge (not shown), or you could just wrap a piece of tape around a section of wire hanger at your desired depth and test it.

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Combine foam with fiberglass

Fiberglass insulation can be used in conjunction with spray foam. The process is called "flash and batt." Just picture-frame the wall cavities and lay down one lift, and then fill the rest of the cavity with fiberglass insulation. This is a popular way to save money but still take advantage of the outstanding air-sealing properties of foam.

For 2x4 stud walls, the fiberglass insulation will have to be split to fit. In this case, we sprayed just under 2 in. of foam (R-10.8), and split 3-1/2-in. R-13 batts in half (R-6.5) to achieve an R-17.3 insulation value. Never cram oversize batts into a wall cavity because fiberglass insulation loses R-value when it's compressed. You could save money by spraying 1 in. of foam and adding more fiberglass, but don't spray less than 1 in.—the foam will no longer serve as an air barrier. This particular foam creates its own vapor barrier if sprayed 2 in. thick.

DIY Quiz

BY TRAVIS LARSON

editors@thefamilyhandyman.com

ART DIRECTION MARCIA ROEPKE • PHOTOGRAPHY HSP

Put on your thinking cap and take this month's quiz to see just how smart you are when it comes to DIY. Here's how it works:

- There are easy, intermediate and really tough questions all mixed together.
- There may be more than one correct answer!
- Get the answers and your DIY rating on p. 82. Good luck!

1. True or False? The roller bearings on router bits eventually wear out and lock up, leaving the bit useless.

2. What are these items shown below?

- A. Circuit jumpers
- B. Auto fuses
- C. High-amperage fuses
- D. Mini circuit breakers



3. What's the significance of the "4410" stamped on this tire?

- A. It describes the dimensions: .44 meters in diameter and 10 centimeters in width.
- B. It's the "born on" date.
- C. It's the serial number of the tire.
- D. It describes the required inflation pressure in U.S. and metric scales.



4. What does the “E” stand for in “Low-E” glass?

- A. Emissivity
- B. Energy
- C. Emittance
- D. Expediience (Latin for “transparence”)

5. What are the actual dimensions of a 2x12?

- A. 1-1/2 in. x 12-1/2 in.
- B. 2 in. x 12 in.
- C. 1-1/2 in. x 11-1/2 in.
- D. 1-1/2 in. x 11-1/4 in.



6. True or False? The damaged area on this chunk of cherry is called “tear-out.”

7. Why should premium (93+-) octane gas never be used in small engines designed for 87-octane?

- A. Small engines aren’t designed to handle the extra power and can self-destruct.
- B. Premium gas ignites too early in the compression process, causing detonation, which forces the piston and rod to bang against the crankshaft.
- C. It’s a complete waste of money and does nothing to improve performance or reduce gum or varnish buildup.
- D. High-octane gas corrodes the parts in small-engine carburetors.

Find the DIY Quiz answers on p. 82.

8. Plug-in carbon monoxide alarms are superior to ceiling-mounted ones because:

- A. Carbon monoxide is heavier than air so CO readings are more accurate near the floor.
- B. It’s harder to see the readout on ceiling-mounted CO alarms.
- C. False alarms are easier to reset when the alarm is mounted near the floor.
- D. Plug-in and ceiling-mounted units are equally effective.



9. True or False? The electrical code requires a receptacle or switch to be wrapped with electrical tape to prevent the wires and screws from contacting the sides of a metal electrical box.

10. When you’re rejuvenating car paint, a clay bar is used to:

- A. Gently polish away small scratches.
- B. Smooth out and fill small chips for retouching.
- C. Pluck tiny bits of dirt and debris from the paint.
- D. All of the above.



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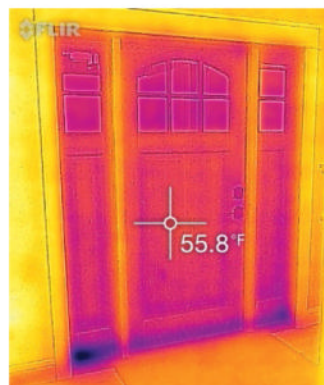
Your smartphone or tablet can help you identify birds, find a new favorite constellation, choose what's for dinner, and so much more. But did you know your mobile device could also be outfitted to make it a valuable tool for DIY projects? Here are five neat accessories that can turn it into the electronic equivalent of a Swiss Army knife.

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INTERIOR
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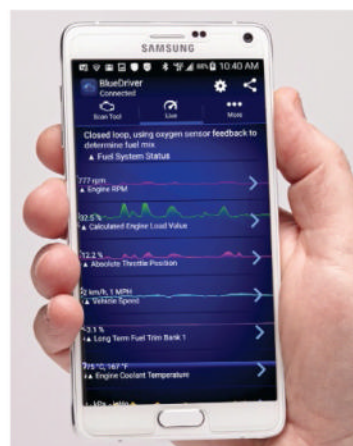
See inside your walls

Unless you have X-ray vision, it can be tough to figure out what's inside a wall. That's where a "borescope" comes in handy. It's basically a small camera on the end of a snake. You just fish it through a hole or tight space to view what's inside on a video monitor.

Several companies make borescopes, but the **General iBorescope** line is a little different in that it lets you use the display on your smartphone or tablet as a wireless video monitor. The borescope acts as a Wi-Fi hot spot, letting you connect your mobile device to it without a Wi-Fi router or Internet access. A free app lets you snap photos and record video, and the camera is waterproof so you can safely use it in areas that may be wet.

Compatibility: iOS & Android

Cost: \$110 to \$400 online, depending on the model



A mechanic in your pocket

Search online and you'll find lots of diagnostic scan tools, but most inexpensive ones don't give all the information you need to properly diagnose your car's problems. We recently tested the **BlueDriver Bluetooth Professional OBDII Scan Tool**, and it's about as close as you can get to a professional scan tool without breaking the bank.

Just download the free BlueDriver app, plug the scan tool into your car's computer (look for a connector under your dashboard like the one pictured), and pair it with your mobile device.

The scan tool not only reads and clears trouble codes but also provides repair reports listing the most common causes of each trouble code based on your make, model and engine combination. It also gives you live and freeze-frame data so you can see what was going on when a problem occurred. In addition, it lets you look at raw data accumulating in the computer that hasn't yet triggered a trouble code—a feature usually available only on professional scan tools costing hundreds more.

Compatibility: iOS & Android

Cost: \$100



One app, many tools

Ryobi Phone Works is actually a suite of devices that help you do everything from measuring the square footage of a room to finding studs inside a wall. Once you download and install the free Phone Works app, you can use it to control the different devices (each sold separately), which include a laser level, moisture meter, inspection scope, laser distance measurer, stud finder, infrared thermometer and noise-suppressing earphones. The app also lets you capture photos and video and share results and data via email and social networks.

Compatibility: iOS & Android

Cost: \$15 to \$90 depending on device

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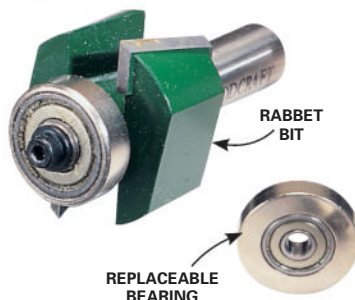
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Quiz Answers



1. False. You can clean gummed-up bearings or replace them. You can even install different sizes for different cuts. For example, if you're using a rabbit bit (shown above), the width of the rabbit depends on the bearing you choose.

2. (B) Auto fuses come in three sizes, and they're color-coded based on their amperage rating. When a fuse is bad, you can usually see that the filament is broken. But the only sure way to tell is to check it with a continuity tester.

3. (B) This particular tire was made during the 44th week of 2010. But you shouldn't be leery of buying a tire that's several years old. Manufacturers regularly make odd-size or low-sales-volume tires and store them in stable warehouse conditions.

4. (A) Low-emissivity glass has a metal coating such as tin oxide. That layer reflects infrared (think "heat") light. Much of the heat that might otherwise be transmitted through the glass is reflected and contained within the house, increasing comfort and lowering heating bills.

5. (D) All "2x" framing lumber is 1-1/2 in. thick, and 2x12s are 11-1/4 in. wide.

6. True. Planing against the grain with a jointer, surface planer or hand plane can cause "tear-out." Planing the same board from the opposite direction will often eliminate the problem. Sometimes tear-out is inevitable. Then, shallow cuts and sharp knives are the key.

7. (C) Premium gas doesn't provide any more power than lower-octane gas. It doesn't have higher levels of detergent (that's a myth). It's not ethanol free (95 percent of all gas sold in the United States, both regular and premium, contains up to 10 percent ethanol). It just costs more while providing no benefit for small engines.

8. (D) The first CO detectors were plug-in AC units, so they were mounted near the floor where outlets were usually found. People began thinking that's where they belonged because CO is heavier than air. But CO is only slightly heavier than air, and when it's generated by combustion from a stove or furnace, it's warm and rises, then quickly mixes with air and travels with normal air travel patterns. So wall- and ceiling-mounted CO detectors are both effective.



9. False. Screws and bare wires should never touch the sides of the electrical box. If they do, something is wrong and you should recheck your work. Some electricians wrap electrical tape around devices during construction to protect against accidental contact with energized parts before the finish cover plates are installed. That's not allowed by code. You must cover energized devices with approved temporary covers.

10. (C) Even after a car is thoroughly cleaned, tiny, sharp grit remains embedded in the paint. A clay bar removes the grit as you drag the bar across the paint.

WHAT'S YOUR LEVEL OF EXPERTISE?

Beginner: 0 – 3 correct
Intermediate: 4 – 7 correct
DIY Guru: 8 – 10 correct

What homeowners **MUST** know

BY GARY WENTZ

editors@thefamilyhandyman.com



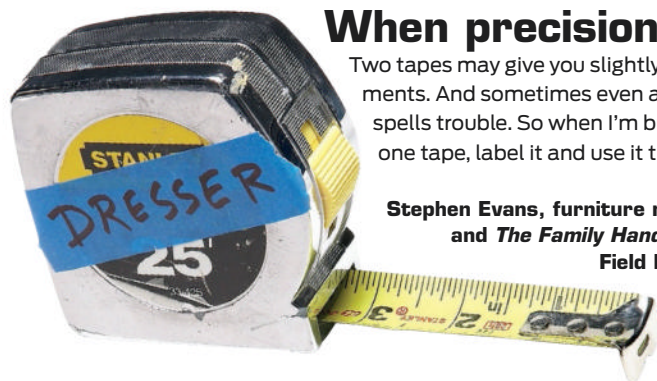
KILL CRABGRASS NOW!

The most cost-effective way to control crabgrass is to use a fertilizer with crabgrass preventer added to it. But you have to do this in the spring, before crabgrass seeds germinate. Apply it between the second and third times you mow, and do it just before it rains to work both the fertilizer and the herbicide into the soil. The fertilizer will help thicken the turf. Thicker turf helps squeeze out crabgrass plants missed by the herbicide.

When precision matters

Two tapes may give you slightly different measurements. And sometimes even a 1/16-in. variation spells trouble. So when I'm building furniture, I pick one tape, label it and use it throughout the job.

**Stephen Evans, furniture maker
and The Family Handyman
Field Editor**



ART DIRECTION MARY SCHWENDER • PHOTOGRAPHY HSP

Cut cooling costs

Washing air-blocking debris off air conditioner fins is as easy as using a garden hose. It maintains the system's efficiency and reduces energy bills. Here are a few tips for the best results:

- If the fins are caked with fuzz from dandelions or cottonwood trees, vacuum before you rinse with water.
- Rinse with moderate pressure. The fins are flimsy metal, which will bend under strong pressure.
- As you spray, peer down into the unit. You should see water streaming through the fins. If not, the fins are blocked and need more rinsing.
- Rinse off all the fins, but pay special attention to the fins just under the lid of the unit. Aim the water upward to drive out debris buildup there.

BEWARE OF GROUT CLEANERS

The toughest grout-cleaning products don't just remove stains; they actually eat away at the grout, removing a thin layer of its surface. If you use them regularly, you'll eventually destroy the grout. So check the label. If it includes a caution against frequent use, don't ignore it.

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WHAT IS LUXURY VINYL?

Luxury vinyl (LV) is the biggest flooring innovation in recent years. It's similar to sheet vinyl, but it's thicker, tougher and much easier to install. It's economical, too, with lower materials and labor costs than for most other types of flooring.



It can look like wood

Luxury vinyl planks (LVP) imitate wood and form a "floating" floor that simply snaps together without any fasteners or adhesives.



It can look like ceramic tile

If you're using a glue-down luxury vinyl tile (LVT), you can grout spaces between tiles for an authentic look. Or you can skip the grout and just set the tiles tightly together.

It's soft and pliable

Luxury vinyl feels softer and warmer underfoot than most other flooring, which makes it especially nice in bathrooms. It comes in a wide variety of patterns and styles designed to look like wood, granite, tile and other materials. Don't confuse LV products with vinyl composition tile (VCT). LV contains more solid vinyl, which makes it more durable (and more expensive).



The right mousetrap technique

Snap-type mousetraps work—if you use them right.

■ Place traps along walls in areas where you've seen the telltale brown pellets. Mice have poor vision and prefer to feel their way along walls.

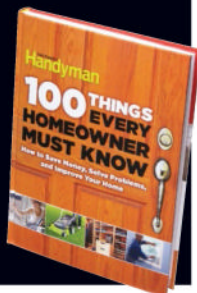
■ The best technique is to set two traps parallel to the wall with the triggers facing out. Mice sometimes jump over traps, but they can't jump two.

■ Set lots of traps. For an average-size house, two dozen mousetraps isn't too many.



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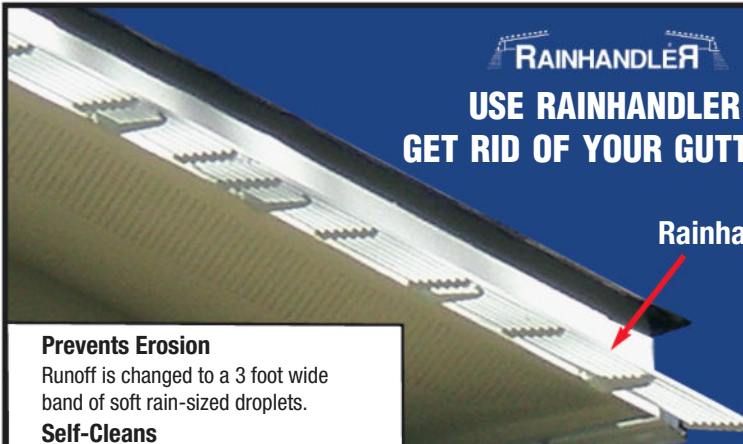


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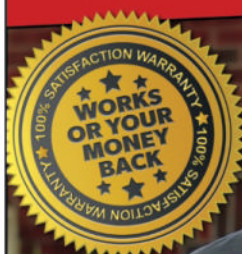
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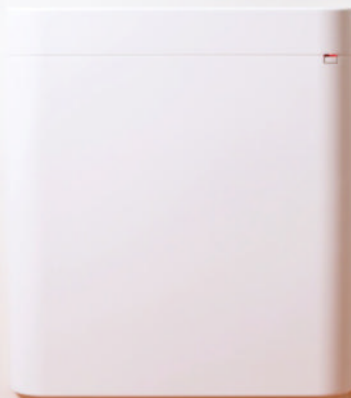
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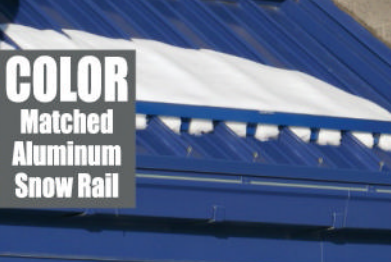
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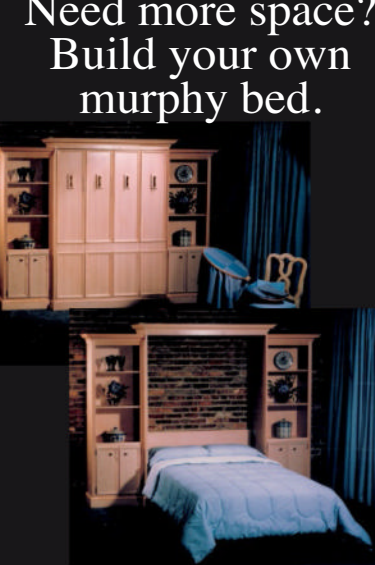




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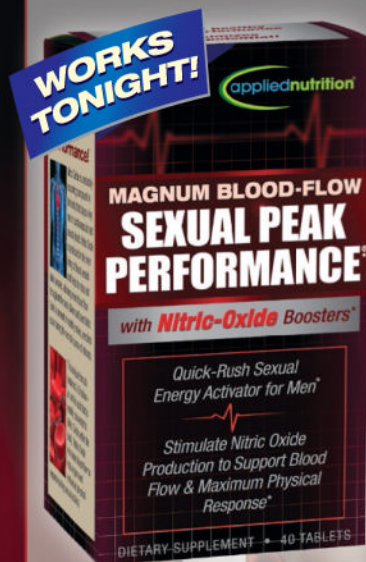
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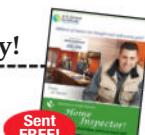
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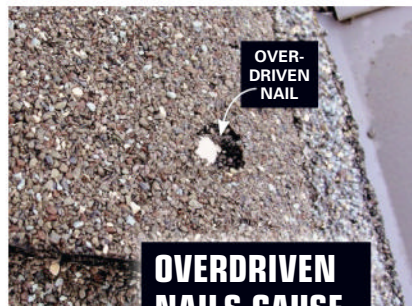
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KEEP YOUR CORD CONNECTIONS DRY

To avoid tripping GFCIs when you're working outdoors, tool cord connections should be kept out of the mud and snow. To keep your connections high and dry, drill a hole near the bottom of your sawhorse and hook a carabiner into the hole. Secure the end of your extension cord with the carabiner and you're good to go.

Mark Petersen,
Associate Editor



OVERDRIVEN NAILS CAUSE ROOFS TO FAIL

As a home inspector, I examine a lot of roofs. Overdriven nails are one of the most common mistakes I find, a problem easily fixed by adjusting the air compressor. Air pressure needs to be adjusted based on the substrate underneath. Softer material like OSB plywood requires less pressure than Douglas fir planks. The pressure may also need to be reduced a bit when the temperature rises and the shingles get soft. Overdriven nails often occur when shingles are installed over an existing layer of shingles, a practice I never recommend. Drive your nails straight and keep them flush to avoid expensive callbacks.

Reuben Staltzman,
Home Inspector

GOT SOMETHING TO SHARE?

If you've got a tip, a brag photo or a project you'd like to share with fellow pros, send it to editors@thefamilyhandyman.com. We issue a \$100 gift card for each one we publish.

OLD EYEGLASSES FOR MESSY JOBS

Construction is hard on eyeglasses. When I was working in the trades and got a new pair, I always kept the old ones in my truck. To avoid breaking my new glasses, I wore the old ones for demo jobs and slithering around in crawl spaces. I also wore them for jobs that could splatter stuff on lenses, like painting a ceiling.

Josh Risberg,
TFH Lead Carpenter



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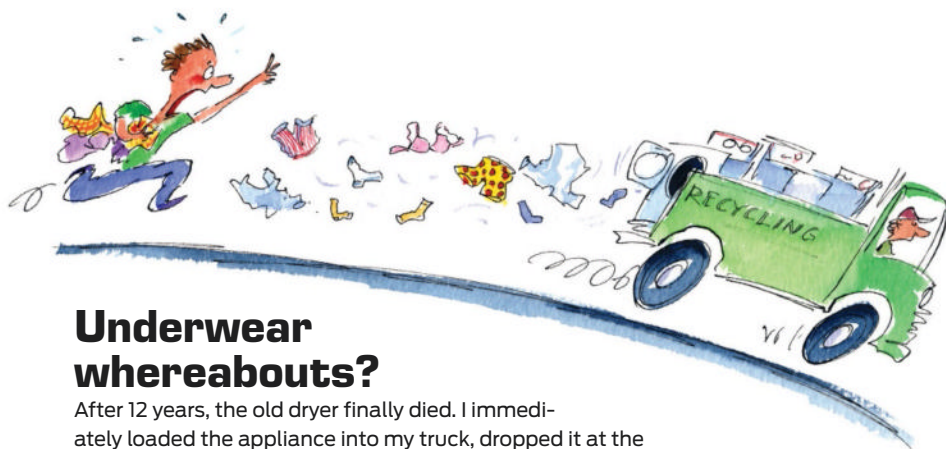
FROM OUR READERS

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LOVE ON THE ROCKS

Each spring, the weeds in my wife's stone path run rampant. She's usually down on her hands and knees pulling them all by hand. This year, however, I thought I'd help her out by using my string trimmer. Everything was going just fine until it launched a small rock through our bedroom's sliding glass door. My wife has since forgiven me, but we're back to pulling weeds by hand.

Ron Walton



Underwear whereabouts?

After 12 years, the old dryer finally died. I immediately loaded the appliance into my truck, dropped it at the recycling center, bought a new dryer and installed it. In less than two hours, our laundry room was back in business. I was sure my quick response would go into the record books, and I waited for my well-deserved praise. But my wife just wanted to know where I had put the wet clothes from the old dryer.

Then it dawned on me—the clothes were still in the old dryer! I called the recycling center and learned that the old dryer had been hauled away only moments before. Sometimes, it pays to procrastinate.

Bill O'Callaghan

Level headed

One day I was installing tie-down anchors on my pickup truck. I wanted them to look as good as possible since they were the type that mounted on the outside of the bed. I got out my small torpedo level, jumped in the bed and set about fastening them, making sure they were all perfectly level.

A couple hours later, I hopped out of the truck bed and took a few steps back to admire my work, only to find they were all crooked! How could this be? Turns out the tie-down anchors were level but the truck wasn't. I'd parked it on a slope.

Chris Register

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