

1 family 1 handyman

SMART HOME IMPROVEMENT™



SPECIAL TOOL ISSUE

SAWS & BLADES!

33 ESSENTIAL
TIPS TO
SHARPEN YOUR
SKILLS

WHY YOU NEED A
CORDLESS
CHAIN SAW

SMALL ENGINE CARE
TIPS FROM A PRO

3 TOOL PROJECTS:
■ TABLE SAW SLED
■ PLANING JIG
■ POWER CARVING

APRIL/MAY 2022

+ TOOL
BATTERIES
TIME TO CUT
THE CORD



WE DIG DIRT

IF YOU HAVE TO BE INSIDE

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START WITH THE TOOLS YOU HAVE

WHEN IT COMES TO DIY,
LEARNING COMES FIRST

I left a teaching career because I wanted to be able to point to my work at the end of a long day and say, "I made that."

After spending lots of borrowed money and five years becoming a teacher, and then only a handful more years in front of a classroom, I decided I wanted to work with my hands and learn carpentry. Working on houses was a new career for me. I had no DIY experience growing up, and my resume certainly didn't include swinging a hammer—in fact, I had to buy one before my first day. The daily gratification woke me up (early!) each morning, ready to go.

What I didn't expect in the switch to a building career was the learning and problem solving, or how much I would enjoy standing back with my arms crossed, thinking about materials and methods. My eye for tools changed as well. I swapped my way-too-heavy hammer for something easier to swing, and I bought a truck to haul my growing collection of tools.

Now, as an editor at *Family Handyman*, I get to combine my passions for teaching and building. I get to see changing techniques



from the best contractors. I'm able to get my hands on the latest and greatest tools, as well as innovative materials and gear, and then share all that information with you.

But my favorite part of this career is inspiring YOU to say, "I made that." I hope to encourage you to dive into your next project even if you don't have the finest tools, gear or skills. You'll learn along the way, I promise, and as your experience

grows, your tool collection will likely follow. If you run into something you weren't expecting or encounter a problem you don't know how to solve, come to *Family Handyman* and we'll guide you to the finish line. We've been doing this for more than 70 years. We've got your back.

MIKE BERNER
EDITOR



What are those projects you've tackled that took a little extra effort or creativity, all because you didn't have a particular skill or were short a special tool? I'd love to hear about them and what you learned by diving in. Email us at editors@thefamilyhandyman.com.

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You won't know how you lived without this easy-to-make table saw jig.

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We'll show you how to flatten big lumber with an ordinary router.

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THE YEAR OF THE SMART HOME

It's not a matter of "if" you'll buy a smart-home product in 2022 but a matter of which one. Manufacturers large and small are adding "connected" products to both real and digital retail shelves. Our eyes are on a few of these products for testing.

The M-Pwr Smart Door is a collaborative effort that combines a Masonite door, a Ring doorbell camera and a Yale smart lock. It also features motion-activated LED lighting. It's currently available for only new construction.

Kohler's PerfectFill smart bath technology will fill your tub to your preferred depth and temp. Program ideal tub settings for everyone in your home (photo above).

How about smart lightbulbs that monitor your health? Yes, please. From Sengled, these lights can monitor your sleep, heart rate, temperature and other vital signs. They can even detect if someone has fallen. No cameras—they use biometric data to detect changes.

With dual cameras, the new Eufy Video Doorbell 2K captures people and packages with clarity. And it's battery powered.



READER PROJECT

I made this ceiling in my dining room addition during the pandemic last year. It took me six months, but a project like this requires a lot of patience.

John Huggins



HOMEOWNERS & EARTH DAY

How many times have you asked, "Is this recyclable?" Then you look for the little symbol with the circular arrows. (If you've never asked that, make it your goal, on Earth Day, April 22, to recycle something.) That symbol on a plastic jug or a glass bottle means one of two things. First, the item is recyclable somewhere, just maybe not in your area. Second, the item may be made from recycled material.

The bottles, cans and papers that are recyclable vary by city nationwide, and it depends mainly on a city's capabilities for sorting and processing materials. The manufacturers of those materials show that recycling symbol on their products with no knowledge of local recycling rules. They simply know whether it is technically possible to recycle their product. Check with your city or trash hauler to learn what you can and cannot recycle.

FROM YOUR KITCHEN:

- Cardboard pizza boxes? Yes, but take out the thin paper liner and the crust you didn't eat.
- Plastic beverage containers? Yes, but give them a quick rinse (not a thorough cleaning) and put the top back on.
- To-go food containers? No, polystyrene plastic food containers and drinking cups are generally not recyclable.

FROM YOUR GARAGE:

- Old garden hose? Worn extension cord? No and no, residential recycling companies call these "tangles" because they tie up machines and can injure workers.
- Old tools? Maybe, but first ask yourself if you can fix the tool or donate it. Check with the tool manufacturer or the retailer where you purchased it; some offer recycling. And for battery-powered tools, always recycle those cells. Check www.call2recycle.org for locations.
- Oil and chemicals? Some, like motor oil, are easy to recycle. Others, like paint and pesticides, are hazardous waste. Dispose of them appropriately.

Shhhhh. No wake zone.



Protect your baby (and their toys) with coverage for fishing gear and personal property too.

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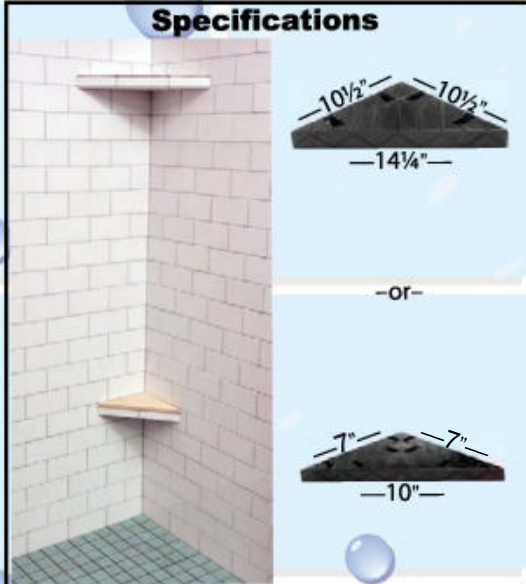
GOOF PROOF SHOWERS®



GPCS-1410 GOOF PROOF CORNER SHELF & FOOTREST

The Corner Shelf is a strong stay-in-place, molded plastic form to add a shelf into any 90° vertical corner. The 14" uncut Corner Shelf has guidelines on the top surface for cutting the shelf to the optional 10" Footrest size support. Designed to be installed on finished walls and covered with any solid surface material or tile. Built-in slope on the top surface ensures proper water run-off in showers. Additionally, the underside of the Corner Shelf may be filled with modified thin-set mortar when choosing to tile the bottom. Includes complete, easy to read installation instructions with anchors, screws and shims for out of square corners.

Specifications



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HANDS ON

fh TOOLS, GADGETS + GEAR WE RECOMMEND



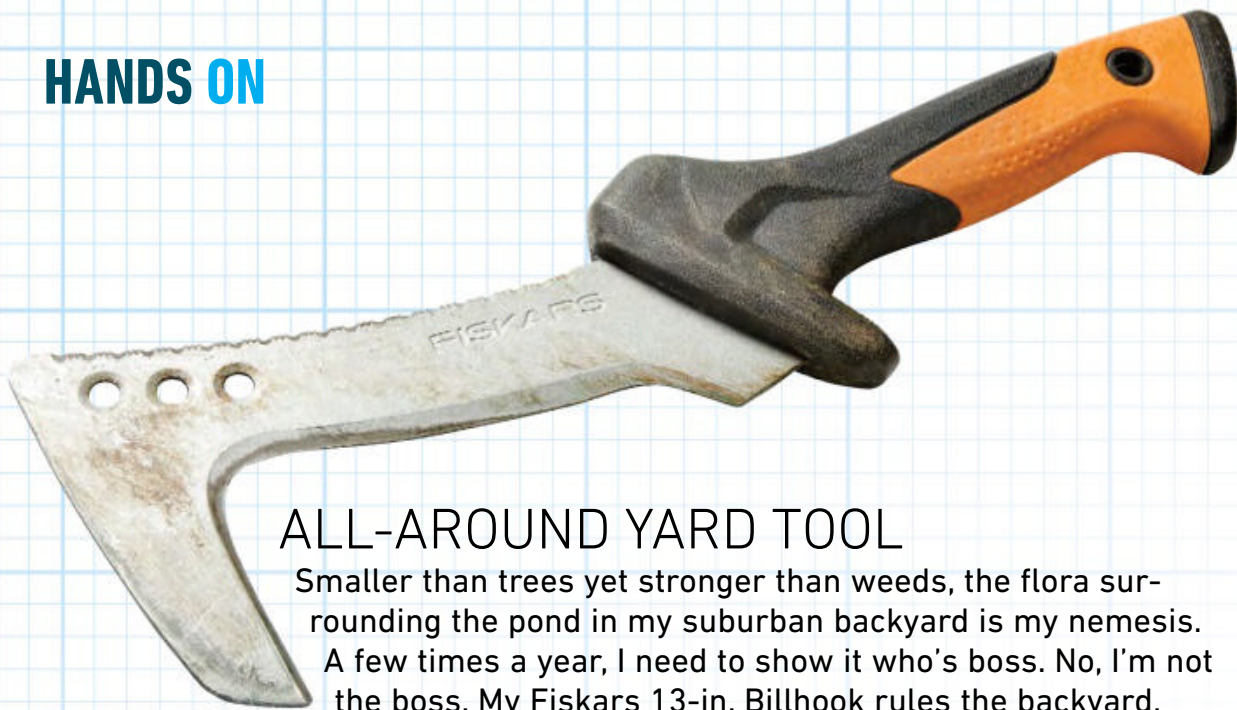
VERSATILE TORCH

It's often called a kitchen torch—think creme brulee—but that's just scratching the surface of its uses. The Bernzomatic Maker Precision Torch comes with an attachment that has a fine soldering tip. Remove the attachment's soldering tip, and it becomes a micro heat gun, which works great on heat shrink tubing for wiring repair.

Using the regular flame tip, I can solder copper pipe and make solder repairs on brass and woodwind instruments. My Precision Torch also goes camping with me—it's a handy fire starter. The torch has an adjustable flame and the butane is refillable. You'll find the Bernzomatic Maker Precision Torch Kit (about \$30) at home centers, hardware stores and online.



BRAD HOLDEN SENIOR EDITOR



ALL-AROUND YARD TOOL

Smaller than trees yet stronger than weeds, the flora surrounding the pond in my suburban backyard is my nemesis. A few times a year, I need to show it who's boss. No, I'm not the boss. My Fiskars 13-in. Billhook rules the backyard.

The Billhook's hooked blade works like an ax to slice off growth at ground level. It is also able to cut through small branches in multiples so I can neatly pile the trimmings. The serrated edge opposite the hook lets me saw through dense weeds and beefy branches. And the small tip end is handy for splitting perennials.

The tool's handle seems custom made; I have a sure grip when I'm swinging at the weeds and heavy growth. A nylon sheath wraps the tool securely when I'm finished. You can find the Fiskars Billhook for about \$35 at home centers and hardware stores. 

JOE CRUZ ASSOCIATE EDITOR



FOOLPROOF FINISH

Applying a finish goes hand-in-hand with woodworking, but it's a completely different skill. And it's not easy to get a perfect finish. Brushed- or sprayed-on finishes often end up with "dust nibs" that you need to sand out, or on vertical surfaces these finishes can easily sag or drip. I've switched to General Finishes Gel Topcoat. It's about as close to foolproof as you can get.

Just slop it on with any old brush, wipe it off with a clean, soft rag and let it dry. You'll still need to sand lightly between coats, and you'll need to apply more coats than you do with a brushed-on finish to build up a protective film. But the results are worth it. You'll end up with that high-end "in the wood" look and feel to your finish, as opposed to the look of a layer of plastic sitting on top of the wood. Find General Finishes Gel Topcoat online or at specialty woodworking retailers. A quart will set you back about \$35. 

BRAD HOLDEN SENIOR EDITOR



PORTABLE COOL

Working (or playing) outside when it's brutally hot is zero fun. But if you can't avoid it, you can at least make it a bit more comfortable with the Ryobi Bucket Top Misting Fan. It'll keep you cooler by blowing a fine mist toward you while you work. And it's battery powered, so you can take it anywhere.

Place it on top of a 5-gallon bucket filled with water or connect it to a garden hose for a continuous supply of water. The fan tilts, so you can adjust the angle to hit you just right, and the mist and fan have two settings. The fine mist will keep you damp, not soaked, and you'll feel much cooler and be able to work longer. A fully charged battery lasts three to four hours. Find the Bucket Top Misting Fan at home centers or online. A \$100 bill gets you the unit itself, a battery, a charger and a hose adapter. 

MIKE BERNER EDITOR



FULL-FEATURED CORDLESS JIGSAW

Jigsaws are essential for cutting curves, though seemingly few do the job cleanly and accurately, which leaves you with a whole lot of sanding work. I just got a Bosch GST-18V Barrel-Grip jigsaw, and now I'm saving time, energy and sandpaper. I prefer barrel-grip saws over D-handle jigsaws so I can position my hand closer to the cut. The Bosch GST-18V fits nicely in my XL-size hand, and I can engage the on-off switch and the work light easily with my thumb.

Most important, the Bosch tracks well through a variety of wood. I used it to shape curves on a recent cherry wood project, and I made test cuts in pine, ipe and some thin ash boards. One of my favorite features is the blade-change system. One flick of a lever ejects the blade, and you insert a new blade with a simple push—no tools needed.

A fan above the blade blows all the sawdust away so you can keep an eye on your cutting line. The cast aluminum footplate is long for stability and has a plastic cover to protect your material. With an 8Ah battery in place, the jigsaw weighs about 6 lbs., and with the 4Ah battery, about 5 lbs. The 8Ah battery adds length to the tool, which can limit cuts in tight work spaces, but those are rare in my jigsaw use. The Bosch GST-18V is a high-performance tool in my shop. The bare tool is \$150. 

GLENN HANSEN DEPUTY EDITOR

DEAD-CENTER DRILLING

One of the most difficult parts of attaching cabinet hardware, such as hinges, is predrilling centered holes. I'm a big fan of self-centering drill bits. They come in many sizes to suit the hardware you're mounting. The outer sleeve contacts the circumference of the hole in the hinge, holding the bit dead-center as you drill.

From time to time, I've had a drill bit break, but they're easy to replace. They're usually just held in with a setscrew, so you can pop out the broken one and put in a new one in a few seconds. You can get sets for about \$25 at hardware stores, home centers and online. 

JAY CORK ASSOCIATE EDITOR





NUBEQA is a prescription medicine for men with prostate cancer that has not spread to other parts of the body and no longer responds to hormone therapy*

*Hormone therapy includes drug treatments or surgery that lowers testosterone.

Ask your doctor about NUBEQA

NUBEQA.com

INDICATION

NUBEQA® (darolutamide) is a prescription medicine used to treat men with prostate cancer that has not spread to other parts of the body and no longer responds to a medical or surgical treatment that lowers testosterone.

It is not known if NUBEQA is safe and effective in women and children.

IMPORTANT SAFETY INFORMATION

NUBEQA can harm unborn babies and cause loss of pregnancy. Men with female partners who may become pregnant should use effective birth control (contraception) during treatment and for 1 week after the last dose of NUBEQA.

Before taking NUBEQA, tell your healthcare provider about all your medical conditions, including if you:

- Have kidney or liver problems.
- Have a partner who may become pregnant. Males who have female partners who may become pregnant should use effective birth control (contraception) during treatment and for 1 week after the last dose of NUBEQA. Talk with your healthcare provider about birth control methods.
- For women, tell your healthcare provider if you are:
 - pregnant or plan to become pregnant. NUBEQA can cause harm to your unborn baby and loss of pregnancy (miscarriage)
 - breastfeeding or plan to breastfeed. It is not known if NUBEQA passes into breast milk.

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without their prostate cancer spreading to other parts of the body when they added NUBEQA to hormone therapy (median† 3.4 years for NUBEQA + hormone therapy compared with 1.5 years for hormone therapy alone)

Adding NUBEQA also extended overall survival‡ by lowering the risk of death by 31% compared with hormone therapy alone

Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements. NUBEQA may affect the way other medicines work and other medicines may affect how NUBEQA works. You should not start or stop any medicine without talking to your healthcare provider.

Most common side effects of NUBEQA include:

• Feeling more tired than usual • Arm, leg, hand, or foot pain • Rash • Decreased white blood cells (neutropenia) • Changes in tests that determine how your liver works (liver function tests)

NUBEQA may cause fertility problems in males, which may affect the ability to father children. Talk to your healthcare provider if you have concerns about fertility.

These are not all the possible side effects of NUBEQA. Call your doctor for medical advice about side effects. You may report side effects to the FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

†Median is the middle value in a set of numbers, not the average.

‡How long a person may live after diagnosis or starting a therapy.

Please see additional Important Safety Information on adjacent page and Important Facts About NUBEQA on next page.


NUBEQA®
(darolutamide) 300 mg tablets

IMPORTANT FACTS ABOUT NUBEQA® (darolutamide) tablets (new-BEH-Kah)

What is NUBEQA?

NUBEQA is a prescription medicine used to treat men with prostate cancer that has not spread to other parts of the body and no longer responds to a medical or surgical treatment that lowers testosterone. It is not known if NUBEQA is safe and effective in women and children.

What should I tell my healthcare provider before taking NUBEQA?

Tell your healthcare provider about all your medical conditions, including if you:

- Have kidney or liver problems
- Have a partner who may become pregnant. Males who have female partners who may become pregnant should use effective birth control (contraception) during treatment and for 1 week after the last dose of NUBEQA. Talk with your healthcare provider about birth control methods
- For women: tell your healthcare provider if you:
 - are pregnant or plan to become pregnant. NUBEQA can cause harm to your unborn baby and loss of pregnancy (miscarriage)
 - are breastfeeding or plan to breastfeed. It is not known if NUBEQA passes into breast milk

Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements.

NUBEQA may affect the way other medicines work and other medicines may affect how NUBEQA works.

You should not start or stop any medicine before you talk with the healthcare provider that prescribed NUBEQA.

How should I take NUBEQA?

- Take NUBEQA exactly as your healthcare provider tells you.
- Your healthcare provider may change your dose if needed.
- Take your prescribed dose of NUBEQA 2 times a day with food.

- Swallow NUBEQA tablets whole.
- If you are receiving gonadotropin-releasing hormone (GnRH) analog therapy, you should continue with this treatment during your treatment with NUBEQA unless you have had a surgery to lower the amount of testosterone in your body (surgical castration).
- If you miss a dose of NUBEQA, take your normal dose as soon as possible before your next scheduled dose. **Do not take 2 doses together to make up for a missed dose.**
- If you take more NUBEQA than prescribed, call your healthcare provider right away.

What are the possible side effects of NUBEQA?

- Feeling more tired than usual
- Arm, leg, hand, or foot pain
- Rash
- Decreased white blood cells (neutropenia)
- Changes in tests that determine how your liver works (liver function tests)

NUBEQA may cause fertility problems in males, which may affect the ability to father children. Talk to your healthcare provider if you have concerns about fertility.

Tell your healthcare provider if you have any side effect that bothers you or that does not go away.

These are not all the possible side effects of NUBEQA. Call your doctor for medical advice about side effects.

How should I store NUBEQA?

- Store NUBEQA at room temperature between 68°F to 77°F (20°C to 25°C).
- Keep the bottle tightly closed after you first open it.

Keep NUBEQA and all medicines out of the reach of children.

The information provided here is not comprehensive.

To learn more about NUBEQA:

- Talk to your healthcare provider or pharmacist
- Visit www.nubeqa.com to obtain the FDA-approved product labeling
- Call 1-888-842-2937

You may report side effects or quality complaints of products to the FDA by visiting www.fda.gov/medwatch, or call 1-800-FDA-1088.



HANDY HINTS



CLEVER SOLUTIONS FROM OUR READERS

DRYWALL DUST SUCKER

Vacuuming drywall dust with my shop vacuum clogs the filter—fast! To make the filter stay clean longer, I take an old T-shirt and cut it off below the armholes. Then I wrap the lower section around the vacuum filter and secure it with two heavy-duty rubber bands. When the T-shirt filter gets clogged, I just pull it off, shake it out and reuse it. And I'm recycling, too.

BRIAN HAWKINS

T-SHIRT
FILTER COVER



WINDOW PAINT SCRAPER

It's hard to paint the wood around windows without getting some paint on the glass. Scraping it off with a razor blade can scratch the glass, or you might slip and cut the painted wood or yourself. I make a scraper by cutting a bevel on each end of a 3/4-in. scrap of hardwood. It takes the paint off cleanly without marring the window. When the bevels get dull, I cut new ones.

DOROTHY MENDEL



A/C WATER FOR THE GARDEN

Some time ago, it dawned on me that I was sending tons of water from my A/C condensate down the drain. I figured, why not put the water to use? I disconnected the condensate line and redirected the drain to empty into a 5-gal. bucket. I left the original drain line in place so at the end of the cooling season, or if I'm away for more than a day, I can reconnect the drain. Since I started this project, I've carried thousands of gallons of free water out of my basement for use on plants and in the garden.

GARY SOUDERS



EASY PAINT SEAL

I keep a roll of Press'n Seal with my painting supplies. It's perfect for covering roller trays, paint pails, rollers and brushes in between coats. This saves me so much time. I can keep all my painting tools covered and clean them just once, even after two or three coats. I even use it to cover coffee cans of leftover paint.

CINDY BOGGS



DRILL HOLSTER

My family goes through shoes like crazy, and I wanted a way to repurpose them. I turned some into drill holsters by screwing them, toes down, to a wall in my garage. Then I adjusted the laces so each drill fit just right in its shoe. Now my drills and drivers are easy to grab.

DAVE TROMPOWER

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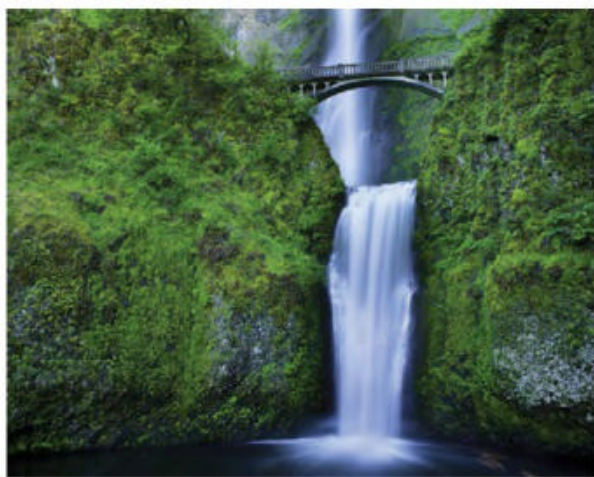


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Cruise Guide





CAULK ORGANIZER

Here's a great way to store tubes of leftover caulk. Hang a piece of coated wire closet shelving upside down so the shelf edge supports the tubes. I used shelf clips to hang mine and spaced the bottom away from the wall with a strip of wood.

RICH HAYNES



WATER SPOUT EXTENDER

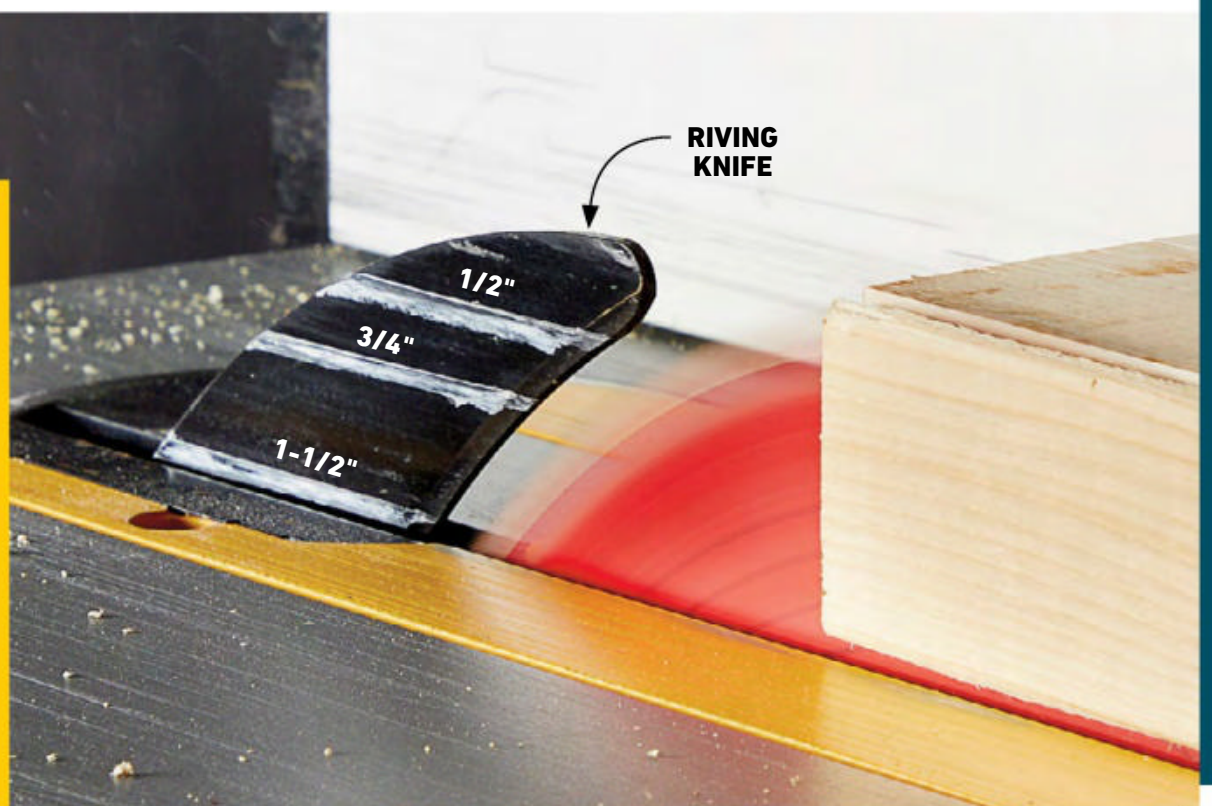
When filling a water bottle at your refrigerator's water dispenser, you practically have to get on your knees and tilt your head to see exactly where the water will come out. I cut a small section from a silicone straw (other tubing would work too) and put it on the dispenser so I can see where the water will dispense. Now I can fill my water bottles without having to do yoga.

MELISSA HAYS

TABLE SAW DEPTH GAUGE

My table saw doesn't have a good way of showing me the blade height. But my circular saw does, so that was my inspiration. I made marks right on the riving knife of my table saw for common thicknesses that I cut. Now I don't have to put a tape measure next to the blade to figure out whether it's at the correct height.

MIKE BERNER





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HOMELAB



A TESTING ZONE FOR INNOVATIONS

DIGITAL MEASURING DEVICES: WHAT ARE THEY & DO YOU NEED ONE?

BY GLENN HANSEN

A tape measure is a pretty reliable tool. You probably have several around your house and work area. They're inexpensive and easy to use. So, do you need a digital measuring device? I mean, if it ain't broke ... right? But we love new digital devices, and we found three unique tools all promising a better way to measure. It just depends on what you need to measure.

DIGITAL TAPE MEASURE

The KOISS model K519 digital tape measure looks like any other tape, aside from the buttons and small LCD screen. This tool uses a standard pull-out, retractable, locking tape that reaches 16 ft. When you pull the tape across a board, wall or table—whatever you're measuring—the LCD screen reads the length continuously.

With the push of a button, you can set it to measure from either end of the device. It will store two measurements, can instantly figure the halfway point if needed, and displays in feet, feet and inches, inches, or centimeters. And the tape itself has bold markings in both metric and standard, though it

doesn't highlight 16s or even feet. It's a sleek and simple package available in multiple colors for about \$30.



LASER DISTANCE MEASURE

The Bosch GLM 20X (shown) is a laser distance tool that reads distances up to 65 ft.,

and it's compact, just 4 by 1-1/2 in., so it can fit neatly in your pocket. The one-button tool reads clearly and accurately for gathering floor or wall measurements. With a backlit display, it works indoors or outdoors

and is rated to work in temps as low as 14 degrees F. This tool is available at home centers for about \$50.

If you need more advanced features, try the Bosch GLM165-27CG, which measures up to 165 ft. with a bright green laser display and Bluetooth connectivity (we did not test this device). This tool stores 30 measurements, adds and subtracts, and calculates area and volume. It retails for \$170.



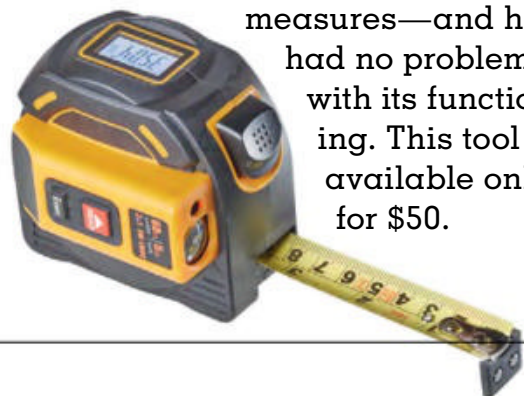
DUAL TAPE & LASER DISTANCE MEASURE

The HISS laser tape is a dual-function device with a 16-ft. pull-out tape and a side-mounted laser that measures up to 60 meters (nearly 200 ft.). The tape measure is auto-locking with a grippy, rubber-coated, magnetized hook end. The nylon-coated tape is highlighted for feet and at 16s, has metric markings, and is two-sided, with the bottom side showing convenient fractional notations.

The laser measuring feature is simple to use and calculates distance from the front or the rear of the unit. Just place the device, aim its red laser light and press the "Read" button. The laser gave accurate readings across the several lengths I tested. The "Unit" button lets you toggle between standard and metric readouts.

The tool runs on two AAA batteries, has a convenient strap handle and is enveloped in a durable plastic. I dropped the device several times—as I do with tape

measures—and have had no problems with its functioning. This tool is available online for \$50.



BUY BATTERIES ONCE

I had to ask myself, “If most of my tools, both shop tools and lawn tools, run on rechargeable lithium-ion batteries, why am I still buying single-use AA and AAA alkaline batteries?” The honest answer is purchase ease. One little AA power pack costs about a buck, maybe less, and packs of these are often located near the checkout so I never forget to grab a quantity when I’m out shopping.

I heard about a company called Pale Blue that sells rechargeable lithium-ion batteries, and I purchased a four-pack of AA batteries online for \$30. That price hits with a jolt—these batteries cost roughly seven times more than regular alkaline AAs. And when I think of all the items in my house running on AA or AAA batteries, I would need to spend several hundred dollars to go fully rechargeable. Yet, I started with the four-pack and inserted them into my computer keyboard and mouse—not big power drainers, but they both get heavy use.

Rechargeable AA batteries are not new, and I’ve tried them before. All those were nickel-metal hydride (NiMH) batteries that you recharge using a plug-in cradle. Tool manufacturers moved away from NiMH batteries a few years ago for several reasons, but most AA/AAA rechargeables still use NiMH cells. The main weakness of NiMH batteries is they self-drain when not in use. Keep them in a drawer and they’ll discharge over time. Plus, I would often misplace that charging cradle.

The Pale Blue AAs I bought eliminate both those problems. Lithium-ion batteries hold a charge when not in use. And these are charged using each battery’s micro-USB port and a 4-into-1 USB cable. I’ve already used and recharged these batteries twice, reducing that initial cost. The manufacturer claims they will take up to 1,000 recharges. That would seem to be a longer life than a regular alkaline battery. Maybe I will replace all my batteries!



NOTE:

You can safely dispose of most alkaline batteries in your trash (though not button batteries and not any alkalines in California), but it’s better to recycle them. Visit [Call2Recycle.org](https://www.Call2Recycle.org) for recycling locations.

HATE WINDOW SCREENS? HIDE 'EM

More than 85 percent of Pella Windows customers choose windows with screens, but according to the manufacturer, many of those buyers don’t like the look of screens. Plus, they think it’s a hassle to remove, store, clean and reinstall them. For those reasons, the company created its new Hidden Screen design for select windows in its 250-series product line of double-hung, single-hung and sliding windows.

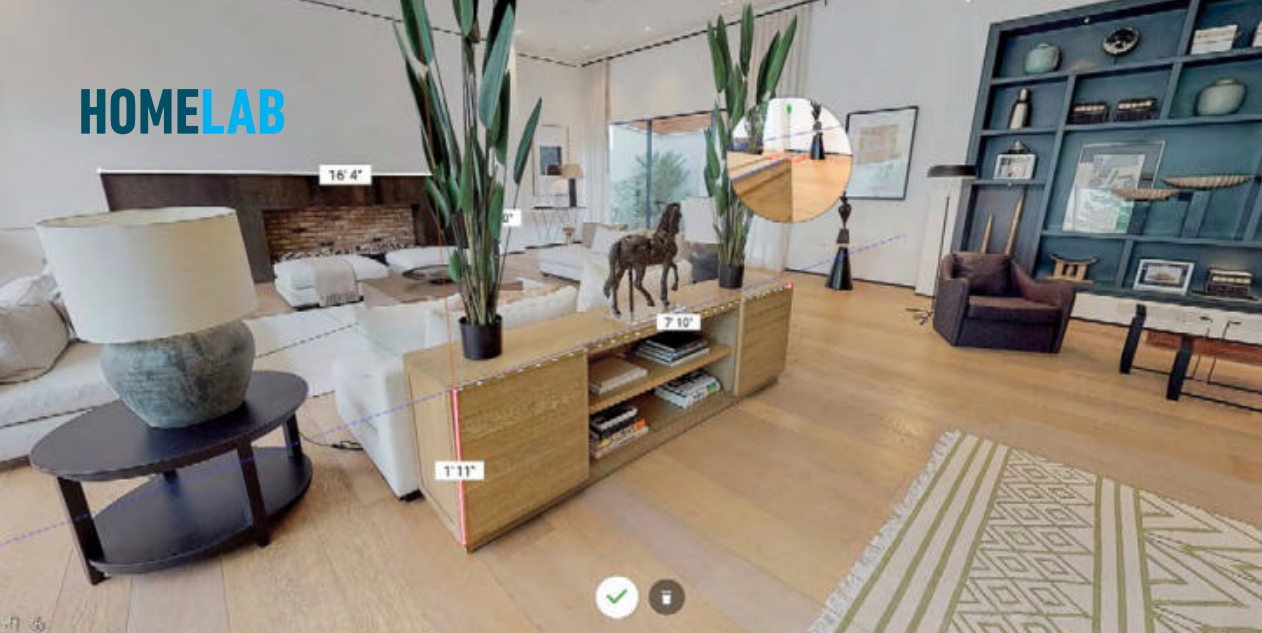
The Hidden Screen is a pleated screen cloth of extruded aluminum that folds open when the window is opened, and folds away when it’s closed, eliminating the task of removing



and storing screens for the winter. Pella engineers claim the screens have endured durability testing of some 9,400 open-close

cycles, which equals one cycle a day for 25 years. The company also tested the screens for their ability to keep bugs out.

Current customers can retrofit their 250-series windows to accept the new Hidden Screen. Installation requires a Pella-approved installer.



A 3D TOUR CAN HELP YOU SELL, RENT OR REDESIGN YOUR HOME

High demand and a comparatively low supply of existing homes helped make 2021 a big year for home sales. Homes moved fast in high-priced markets. The activity could slow in 2022, and if you're considering selling a home, you need to be aware of all the new tools available in the real estate market.

"As a home seller, you want as many eyeballs on your property as possible," says Mike Velez of BLDG Realty in Chino Hills, California. "Realtors used to send postcards to show homes locally, but today's audience is the whole world, especially during COVID with remote work letting people live nearly anywhere. I sold a home in Southern California to a couple from South Carolina, and they didn't set foot on the property until they owned it. I'm not the only one doing that."

One of Velez's favorite tools is a 3D tour. Using the Matterport 360-degree camera and 3D-tour technology (matterport.com), agents and home sellers can show a home's features beyond just wall colors and floor coverings. A 3D tour lets shoppers see a home's

interior from every angle, giving room measurements, window sizes and specifics of kitchen countertop materials, appliance features and much more.

"Good photography is the foundation of every home sale," says Velez. "Every buyer wants information about room sizes, materials and feature details." Realtors like Velez pay the cost of Matterport's 3D-tour service, and the video can be captured using one or more cameras. For owners of vacation rentals or Airbnb properties, the same 3D-tour features can help promote property rentals.

Matterport might also be a worthwhile tool, literally, in a home-remodeling project. When paired with a software such as RoomSketcher, Matterport can help you visualize new flooring, select and place different furniture, or even move walls and resize rooms. Along with the 3D visualization features, you can create two-dimensional floor plans with room-size specifications, which can be helpful for estimating prices of carpet or hardwood flooring.

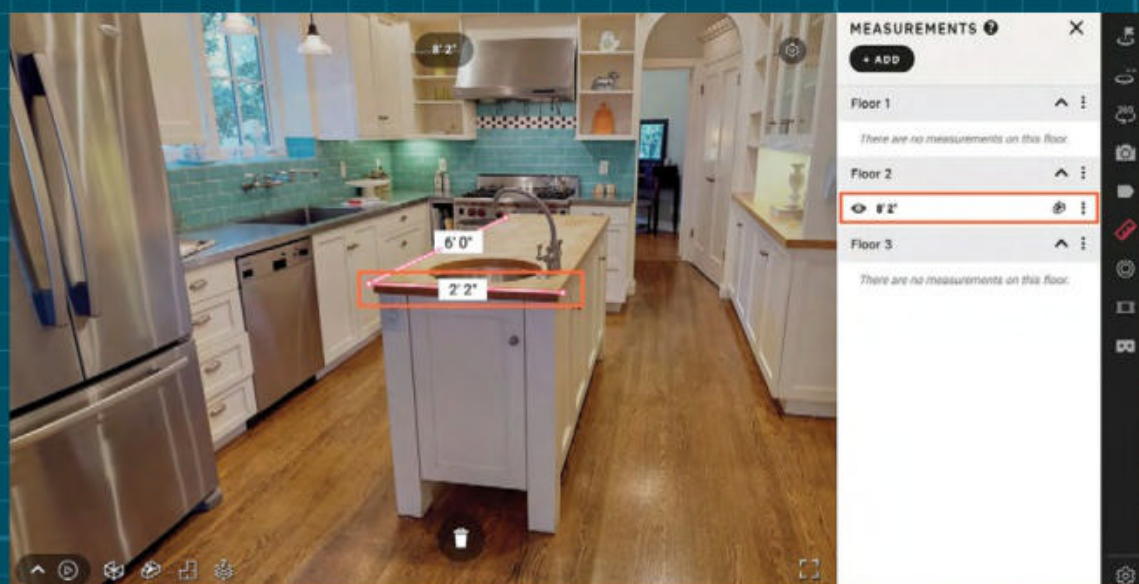


SPRAY CAN O' CEMENT

Everyone loves spray paint. Also, everyone has too many boring clear-glass flower vases. This is a Reese's Peanut Butter Cups mash-up moment.

On a recent trip to the hardware store, I noticed a can of cement spray paint. It's not for cement; it looks like cement. In the Rust-Oleum Specialty paint line, this faux finish adds interesting detail to otherwise boring household objects.

I bought a can (\$8) and took it into my workshop along with a clear glass vase. To prep the vase, I taped off the half I didn't want painted, then scuffed the glass to better accept the paint. Even more than most spray paints, this one will run and drip if you're not careful. I sprayed four coats, lightly sanding down a few drips in between. I then warned my wife—look for more cement-covered vases in the house!



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WORKSHOP WORKHORSE

MASTER YOUR CIRCULAR SAW
WITH THESE TIPS

BY MIKE BERNER

One of the most reached-for tools in my garage, the circular saw is an essential tool for DIYers of all skill levels. The “circ” saw is uber-versatile; if you need a straight cut of any kind, a circular saw can do it. Follow along to learn circular saw skills and to find out what type of saw you should reach for in your shop.

SAFETY FIRST

Always wear hearing and eye protection when you use any power saw, and keep loose-fitting sleeves, long hair and hoodie drawstrings tucked away. When making a cut, keep hands in front of and away from the saw, never behind it.



ADJUST BLADE DEPTH

When a lot of the saw blade extends beneath your material, you increase the possibility of cutting something you don't intend to cut. As a rule of thumb, set your blade depth so that just a bit more than the teeth protrude through the material.



DON'T BIND THE BLADE

When a circular saw blade gets pinched or twisted while making a cut, the blade can kick back toward you with force. This is almost completely avoidable. Don't rush, keep your saw cuts straight and position the cutoff side of your workpiece to fall away from the blade. Never cut between supported ends, such as in the middle of two sawhorses, where the cut will fall into the saw blade.

CUTS OF ALL KINDS

Whether you're cutting 2x4s to length, breaking down plywood sheets into a manageable size, creating joinery, or making angled and beveled cuts, reach for a do-it-all circ saw.



RIP CUT: Sawing with the grain of solid lumber

CROSSCUT: Sawing across the grain of solid lumber

BEVEL: Changing the angle of the blade relative to the saw's shoe

COMPOUND: Sawing at an angle with the blade set at a bevel

Your circular saw can cut far more than just 2x4s and plywood, and specialty blades are available to help you cut other materials.

MASONRY: Repair a driveway crack or cut landscape blocks and pavers with a diamond blade in your circular saw. These blades are common for tile saws or angle grinders but also come in sizes to fit your circular saw.

METAL: Install a steel-cutting blade to cut cleanly through tough metal. Check that your circular saw does not exceed the blade's rpm rating. The Cermet blade by Diablo is a heat-tolerant blade that cuts up to 3/8-in.-thick steel, without heating up the material or leaving sharp burrs.

PLASTIC: I learned to cut material such as vinyl siding by flipping the blade to spin backward. This is a bad idea. Instead, use a blade for cutting composite material. They are configured to cut—not melt—plastic and other composite materials, as well as aluminum. For more on saw blades, see p. 34.



TYPES OF SAWS



**SCAN THIS CODE
TO SEE THESE
SAWS IN ACTION
AND TIPS FOR
USING THEM.**

A specific circular saw exists for the work you do most often. If you only cut 2x4s, you don't need a bigger saw. If you need to cut flooring easily, there is a saw that does that better. Getting the right saw for the job makes your work easier. Here are the types of saws and what they're best at cutting.

TRADITIONAL/ SIDEWINDER

This is the circular saw that everybody knows. The motor is mounted on the left and spins a 7-1/4-in. blade on the right. Tried and true, this saw can handle most of the jobs a DIYer has on his or her weekend projects list. It is also available in a left-handed version with the motor on the right and the blade on the left.

COMPACT/ FLOORING SAW

Equipped with a much smaller 4-1/2-in. blade, this saw still has the ability to cut 2-by material, but it excels at cutting flooring and sheet goods. The barrel handle design on these saws gives them a unique operating feel, and they demand different use habits for safety.

WORM DRIVE

Most circular saws are direct drive, meaning the saw blade is connected directly to the motor's spindle. A worm-drive saw has the blade in front of the motor. Gears perpendicular to the motor spin the blade. Some framing carpenters favor gear-driven saws. They're narrower and heavier than traditional circular saws but are more powerful and track straight when you're making long cuts. Two versions of this saw, worm drive and hypoid drive, use slightly different style gears; both need gear oil for maintenance.

TRIM SAW

A smaller version of a traditional circular saw, a trim saw has a 6-1/2-in. blade and typically comes in a blade-left orientation, although some use a blade-right setup. This saw's smaller blade results in less cutting-depth capacity, but its light weight and easy handling make trim saws shine for out-of-shop tasks.



BEAM CUTTER

When you need to cut large timbers for landscaping or a thick slab for a project, check out a beam cutter, such as this one by Prazi (\$170 at praziusa.com). This attachment fits a variety of 7-1/4-in. sidewinder saws. Bolt one on and you'll be able to cut lumber up to 12 in. thick.

SO SIMPLE— A SPINNING BLADE, RIGHT?

Circular saws might all look similar, but they vary in significant ways. Cutting capacity, for example, is mostly a factor of blade size, but can differ slightly among saws. When choosing the best saw, look for these features, which improve safety, make the saw more versatile or stand up better to the rigors of the job site:

■ **ELECTRIC BRAKE:**

An electric brake stops the blade as soon as you release the saw's trigger.

■ **MAGNESIUM SHOE:**

Magnesium is lighter and stronger than steel.

■ **NO-CATCH BLADE GUARD:**

Some blade guards catch on the edge of your material, which is annoying and also unsafe. A blade guard shaped to avoid snagging the edge of a board means you don't have to lift it to make your cut. Keeping safety features in place is always a good thing.

■ **POSITIVE BEVEL STOPS:**

This feature makes it easy to change the bevel angle from 90 degrees to 45, or other common angles, with speed and consistency.



PREVENT SCRATCHES AND CHIP-OUT

Apply tape to the material you're cutting. This accomplishes three things: It prevents the saw's shoe from scuffing your wood, allows you to make an accurate and visible (dark) mark you won't have to sand away, and helps prevent chip-out.

TIPS



**NO-CATCH BLADE
GUARDS CAN STILL
CATCH ON ANGLE CUTS**

CUT ANGLES EASIER

Cutting angles can be tricky because the blade guard often catches on the material as the saw begins to cut, even with a no-catch blade guard. Before starting the cut, lift the blade guard lever with your opposite hand until the blade guard can rest on the material.

CUT PLYWOOD ON A FOAM BACKER

Cut full-size sheets of plywood on top of a sheet of 1-in. rigid foam. The foam won't dull the blade, and the cut-off parts won't crash to the floor.



RIGID FOAM BACKER



MAKE A NOTCH

Mark the width and depth of your notch, then set the saw's depth and make several cuts between your marks. Knock away what's left with a screwdriver or chisel.

If the notch is less than 1-1/2 in. wide, use your circular saw to smooth out the bottom by slowly dragging the saw blade over the notch sideways. If the saw's shoe can't be supported on both sides of the blade, smooth out the bottom with a chisel.



PRO TIP

If you're notching a narrow piece of lumber, clamp scrap lumber on both sides of the piece to give the saw's shoe more solid footing.



USE A SPEED SQUARE GUIDE

To quickly make square cuts, use a Speed square as a saw guide. You'll get a perfect cut, fast. Be sure to place your square and the bulk of the saw on the keeper side of the board and line up the blade so it cuts on the scrap side of the board. If necessary, adjust the saw's blade depth to prevent the motor from hitting the square.



SECURE MATERIAL

Whether you're ripping or cross-cutting, if your material shifts, you risk a potentially dangerous kickback. Secure the material to a workbench or sawhorse with nails, screws or clamps.



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Would you believe a lawn could look perfect when watered just once? In Iowa, the state's biggest Men's Garden club picked a Zoysia lawn as "top lawn – nearly perfect." Yet, this lawn had been watered only once all summer to August!

In PA, Mrs. M.R. Mitter wrote, "I've never watered it, only when I put the plugs in...Last summer we had it mowed 2 times...When everybody's lawns here are brown from drought, ours stays as green as ever." *That's how Amazoy Zoysia lawns cut water bills and mowing! Now read on!*

2 NO NEED TO DIG UP OLD GRASS

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No weeding means no costly chemicals. Since Amazoy Zoysia lawns naturally resist insects, you'll save money, while helping to protect the environment. You'll never have to expose your family and pets to the risk of weed killers and pesticide poisons.

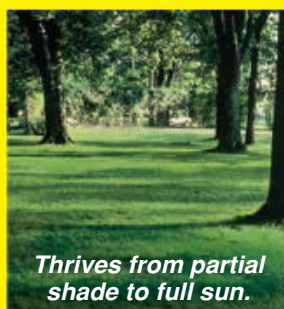
4 FOR SLOPES, PLAY AREAS, BARE SPOTS AND PARTIAL SHADE

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Thrives from partial shade to full sun.



Plant it from plugs.

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500	+100	4	\$52.50	\$20.00	25%
750	+150	6	\$70.00	\$25.00	36%
1100	+400	10	\$99.00	\$36.00	44%
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Super Plugs Precut plugs 3 inches by 3 inches READY TO PLANT Packed in trays of 15 Super Plugs. Plant minimum 1 plug per 4 sq. ft.

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SCORE FOR A CLEAN CUT

A saw blade tends to lift the surface wood fibers as it cuts, giving you a fuzzy or splintered edge. Score your cutting line with a razor blade to cut the fibers on top and give you a clean edge.



PROP THE BOARD

When making cuts on a pile of lumber or on a flat work surface, prop up the piece you're cutting with a small scrap about 2 in. long. It prevents you from cutting into the work surface and will allow the cutoff piece to fall away from the blade. Make your cut on the high side of the prop.



MAKE STRAIGHT CUTS

A veteran carpenter once suggested I unwrap my thumb from the saw's handle and align my wrist and thumb with the direction I'm pushing the saw. When I changed my grip, I was able to make much straighter cuts without the aid of a saw guide.

PRO TIP

For straighter cuts, watch the blade cut along your line, instead of focusing on the saw's guide.



MAKE STEEP BEVEL CUTS

Most circular saws will make bevel cuts up to 55 degrees. What if you need a steeper bevel? Subtract the bevel you're after from 90 and set your saw at that bevel. Next, clamp or screw a block even with the end of the board to support the saw base while you cut. If the blade doesn't complete the cut, finish it with a handsaw or reciprocating saw. This trick works for compound cuts as well. Cut the angle first with the saw's bevel at 90 degrees, and then use the off-cut to support the saw while you cut the steep bevel.



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CUT AND ROLL THROUGH POSTS

Even though the cutting capacity for traditional 7-1/4-in. circular saws is only about 2-1/2 in., you can easily cut through thicker posts. Mark the cut and make the first full-depth cut on one side, then roll the material backward and use the saw kerf to line up the next cut. A third roll and cut will saw through a 4x4 post. If you're working with larger lumber such as 6x6 posts, you'll have to cut on all four sides and finish it off with a handsaw or reciprocating saw.

CHECK FOR 90 DEGREES

If the blade on your circular saw isn't 90 degrees against its shoe, any bevel you adjust to will be inaccurate. Check the blade with a machinist's square. If it's not square, flip the saw upside down and adjust the setscrew on the bottom until it is square. Once the saw is dialed in at 90 degrees, adjust it to 45 degrees and check the angle with a Speed or combination square. Unplug the saw or remove its battery when making such adjustments.



UPGRADE WITH A DIY TRACK GUIDE

A simple and inexpensive track guide will let you cut straight, accurate lines with any circular saw. The track consists of a straight board fastened with glue and nails to a piece of 1/4-in. hardboard. Use the board as a fence and run the saw along the track, cutting the hardboard to match your saw blade exactly. Then to make a cut, just line up the edge of the guide with your marks. Making one long and one short version of this guide will give you a rip guide and a crosscut guide.

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HAS YET TO FIND ANY TAKERS
FOR SAW BLADE FRISBEE
AROUND THE OFFICE.

THE BEST CUTS

SAW BLADE SAVVY
TO GIVE YOU AN EDGE

BY JAY CORK

Saw blades seldom get the attention they deserve. We might purchase based on price, or just grab what's on the shelf in the correct size. And we think it'll be OK. It probably will be—just OK. The right saw blade—a better saw blade—will produce cleaner and more accurate cuts, and will do so safely. That means better DIY results the first time. Here's what you need to know about blades for table saws, miter saws and circular saws.

ALL BLADES ARE THE SAME, RIGHT?

A saw blade is more than its teeth. I prefer laser-cut blades with vibration-dampening slots cut into the blade body. Here's why: Blades with these slots cut cleaner and quieter. Blades without vibration-dampening slots are loud. This vibration makes your saw ring like a bell.

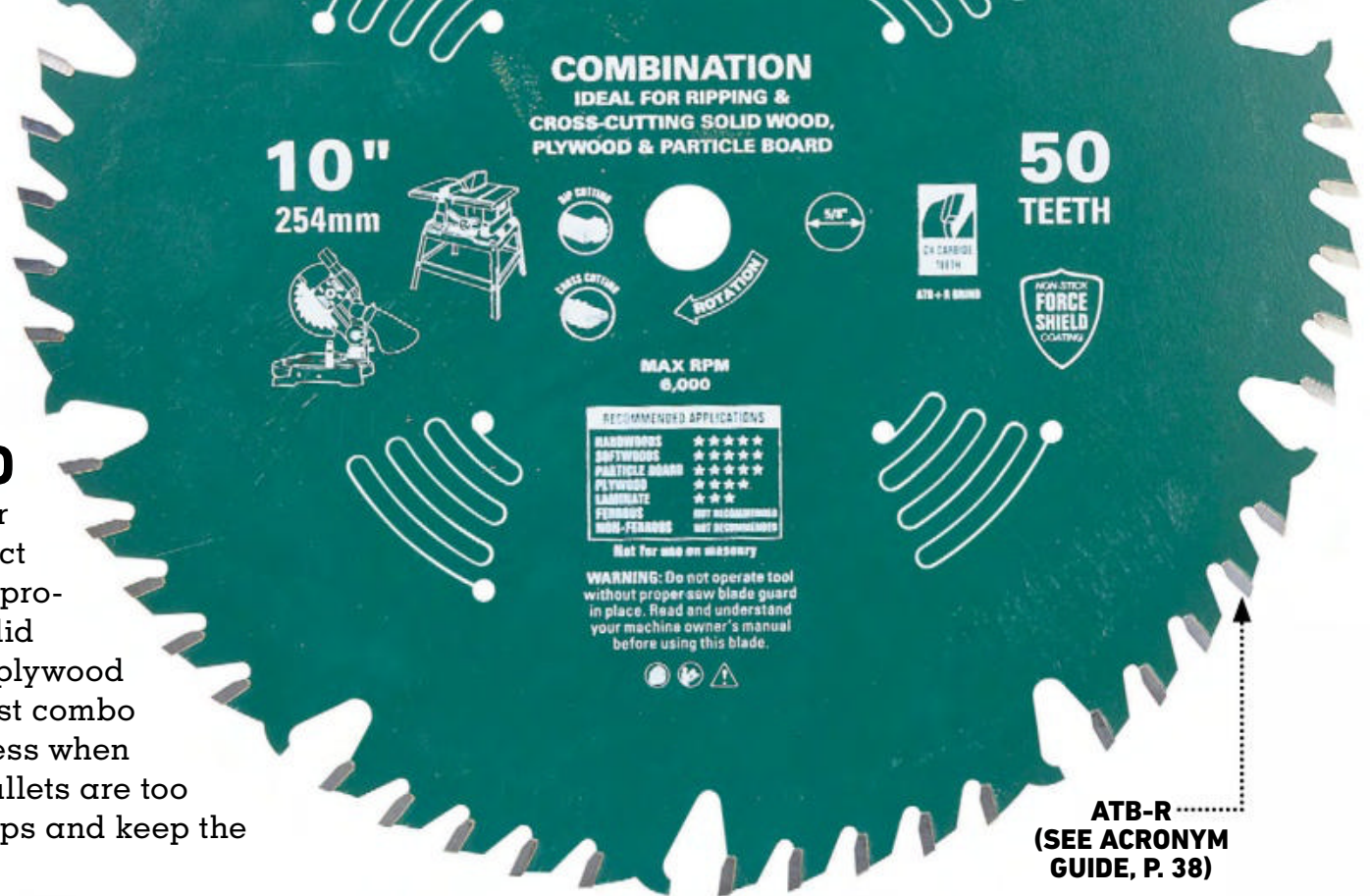
SHOPPING FOR SAW BLADES

Home centers stock many mid-level construction blades. If you're looking for a high-end woodworking blade, find your way to a specialty woodworking store like Rockler or Woodcraft. The experts at these stores will help you find what you're looking for.

TABLE SAW BLADES

THIS IS THE BLADE YOU NEED

A combination blade for the table saw is perfect for the casual user. It produces clean crosscuts in solid wood or plywood, and rips plywood with acceptable results. Most combo blades expose their weakness when ripping thick lumber; the gullets are too small to effectively eject chips and keep the blade cool.



THIN KERF VS. STANDARD KERF

Which type should you buy? The correct answer is determined by the power of your saw. My rule of thumb is to use a thin-kerf blade for any table saw under 3 hp, which includes all portable job-site saws. A thin-kerf blade is 25% thinner than standard kerf, therefore it has 25% less cutting resistance. With a thin-kerf blade installed, your job-site saw will feel like a powerhouse.

THESE ARE THE BLADES YOU WANT

1. PLYWOOD/MELAMINE BLADE

With a less aggressive rake angle and a steeper top bevel, these blades are designed to minimize chip-out in manufactured sheet material.

2. RIPPING BLADE

A proper ripping blade can do more than produce glue-ready straight cuts along the grain. A ripping blade with flat teeth will produce a true flat-bottom kerf, which makes the blade perfect for joinery cuts such as dados, rabbets and tenons.

3. CROSSCUT BLADE

With teeth designed to cleanly sever wood fibers, this blade will give you glass-smooth cuts across the grain.

1 HATB

2 FTG

3 ATB



BLADES FOR STATIONARY CROSSCUT MACHINES

USE FULL-KERF BLADES

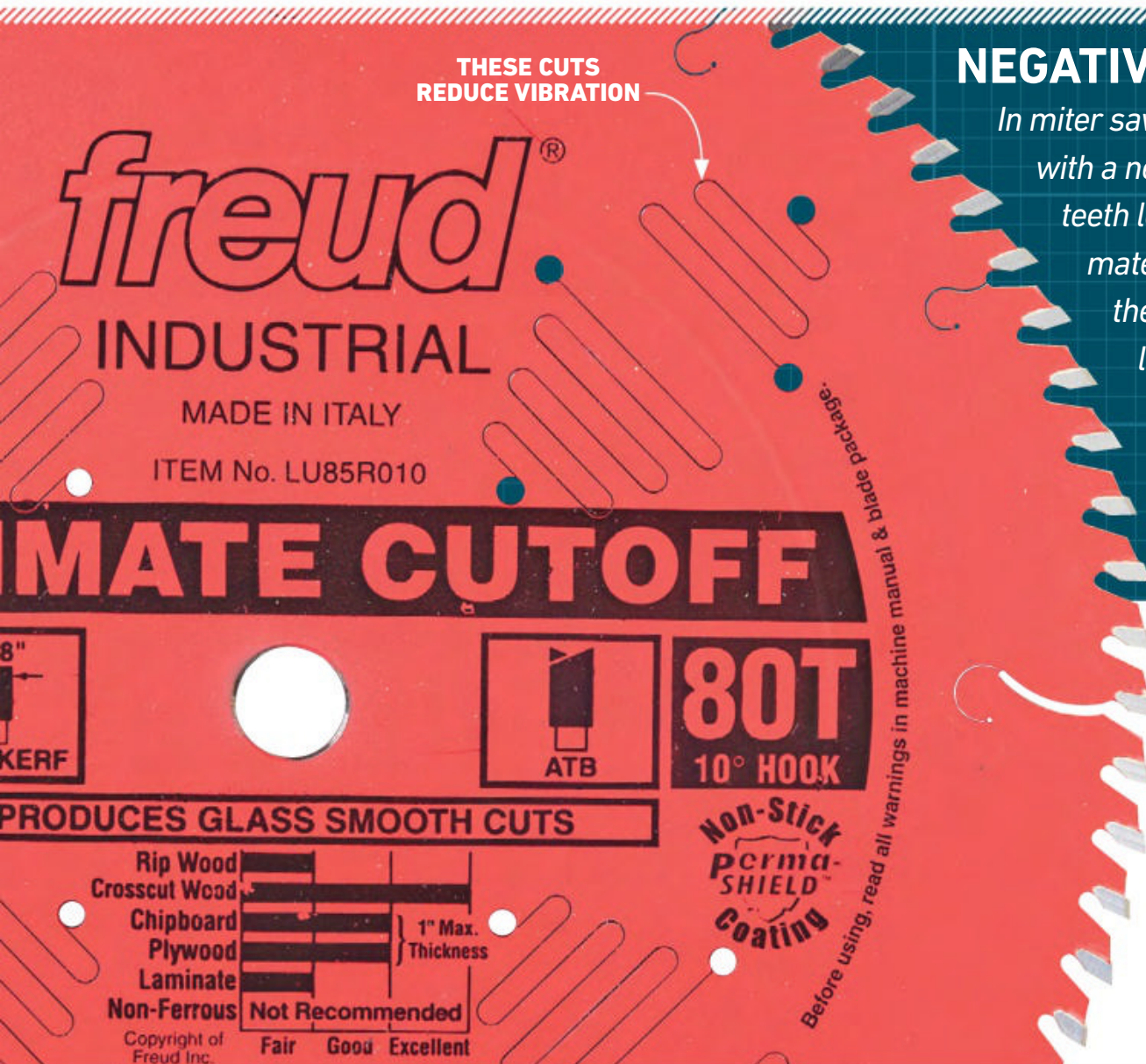
Miter saws, especially sliding miter saws, may subject the blade to higher torsional stress. That's why I always use a full-kerf blade on my sliding miter saw. With a stiffer body and larger teeth, this blade will resist flexing and give you a clean, accurate cut.

NEGATIVE HOOK ANGLE

In miter saws, especially sliders, use a blade with a negative hook angle. The tips of the teeth lean backward in relation to the material. This design greatly reduces the risk of kickback and produces less chip-out as the blade exits the wood. In contrast, a positive hook angle can grab and lift the workpiece, and give you fuzzy cuts—not safe, not good!

TOOTH COUNT MATTERS

A 10-inch finish saw blade has 60 to 80 teeth. That tooth count helps produce beautiful cuts, but my rule of thumb has always been to use a high-tooth-count blade in stock that's 1/4 in. or thinner, and use a lower-tooth-count blade for thicker stock.



CIRCULAR SAW BLADES

SMALL SAW, BIG CHOICES

You can improve your circular saw game by owning a range of job-specific saw blades. For less than \$100, you can expand the usefulness of this saw with dedicated blades for demolition, solid lumber, plywood, even cement composites. You'll make better cuts and your saw will last longer.

THESE AREN'T YOUR DAD'S BLADES

When I first used my father's circular saw, the cheap stamped steel blade smoked and burned, and also disappointed. Blades like this are still made—for some reason. You can spot them easily, but there is no reason to ever use them. A high-quality carbide-tipped circular saw blade costs only about \$15; it will cut cleaner and won't burn your wood.



GENERAL-PURPOSE CONSTRUCTION



FIBER CEMENT COMPOSITE



DEMOLITION—WOOD AND NAILS



RIPPING SOLID WOOD



FINISH CUTS IN PLYWOOD

BLADES FOR CUTTING METAL

Don't cut metal with that nice crosscut blade! Sure, it might cut, but metal will damage the teeth. Blades for cutting nonferrous metals are designed for that work. With a negative hook angle, the teeth don't flare out to the sides. Before cutting metal, invest in a blade made for that purpose and save your wood blade for wood.

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& OTHER NON-FERROUS METALS

ITEM: LU89M012

MADE IN ITALY

12" 72T
Dents / Dientes

TCG FULL KERF
7/64" 0.11" ~2.8mm
-5° Hook

NEGATIVE HOOK ANGLE, TCG



USE PLASTIC BRISTLE BRUSHES



YOUR BLADE ISN'T DULL

It's dirty. And if you keep cutting with a dirty blade, it's going to get dull—fast! Cleaning the teeth regularly will keep the blade sharper longer. Make a habit of cleaning your blades immediately after use. You can easily remove any pitch buildup, and the next time you reach for that blade, it will be ready to go.

HOOK ANGLE EXPLAINED

POSITIVE RAKE ANGLE FOR TABLE SAWS

Positive rake angle on the table saw not only produces a better cut, but is safer, too.

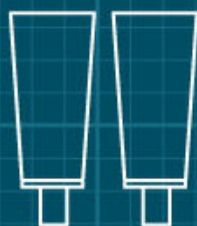
POSITIVE OR NEUTRAL FOR MITER SAWS

Stationary miter saws can safely accept any hook angle; the blade is not moving in relationship to the work, so the material being cut can dictate the rake angle.

NEGATIVE HOOK ANGLE FOR SLIDING SAWS

Taking the crosscut blade off your table saw and putting it on the sliding miter saw could have dangerous consequences. Have you ever had a piece of wood jump out of your hands on a sliding miter saw? It might be because you're using the wrong blade. Sliding miter saws and radial arm saws require a blade with negative hook angle. As the blade spins, the teeth will push the part down and into the fence rather than catching it and pulling it up.

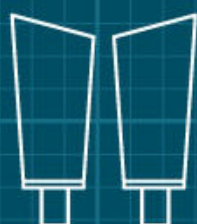
AFTMCTG (ACRONYMS FOR THE MOST COMMON TOOTH GRINDS)



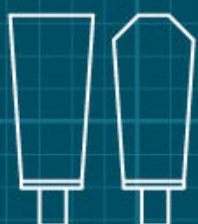
FTG: Flat Top Grind — Most often found on ripping blades.



HATB: High Alternate Top Bevel — Plywood and melamine blades use this tooth geometry to minimize fuzzy edges.



ATB: Alternate Top Bevel — Most common on crosscut blades.



TCG: Triple Chip Grind — This configuration is found on metal-cutting blades and some ripping blades.



ATB-R: Alternate Top Bevel with Raker — Found on combination blades for the table saw.



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CORDLESS CHAIN SAWS

////////////////////////////////////
**AN IDEAL CHOICE
FOR HOMEOWNERS**

BY BRAD HOLDEN

Thinking about buying a chain saw? Consider a battery-powered one.

While these saws can't go toe-to-toe with gas-powered chain saws when it comes to run-time and power, they'll do the job for most homeowners. And for many people, their advantages—no hard-to-start two-cycle engine, no mixing gas and oil, and no fouled spark plugs—make up for any shortcomings. We put a few models through their paces to find out what you can expect from a battery-powered chain saw. Here's what we found out.



**SCAN THIS CODE
FOR A VIDEO
OF ALL SIX
OF THESE SAWS
IN ACTION.**

CHAIN SAW SAFETY GEAR

You must take chain saw safety seriously. In a split second, a slip or errant cut can cause severe injury. Here are a few safety measures you should take.

- Protect your hands with gloves containing fibers that stop chains.
- Protect your feet with steel- or composite-toe boots.
- Battery-powered chain saws are quieter than their gas-powered counterparts, but they're still noisy. Wear hearing protection.
- Protect your eyes and face from flying wood chips with a minimum of safety glasses. A full face shield is better.
- Protect your legs with chaps woven with fibers that will stop a chain.
- If you're cutting branches or limbs overhead, wear a hard hat. Hard hat/face shield/earmuff combos are readily available.

WHAT WE LOOKED FOR



RUN-TIME

We tested run-time two ways. First, by cutting through a 16-in.-diameter log. That's a tough slog; so many teeth carving at the same time draws a lot of battery power. Second, by cutting through 8-in. logs—work that's more typical for the average homeowner.



CHARGING TIME

As you'll see, most battery chargers won't keep up with a saw's run-time. For any battery-powered saw, you'll want an extra battery (or two) if your work requires more than just trimming a few branches. Extra batteries are essential for chain saw work that's away from home and your plugged-in charger.



SPECS & FEATURES

Criteria included bar length; weight; whether they feature a hand-guard/chain brake, bucking spikes and tool-free chain adjustment; and the ease of locating replacement chains.



(DISCONTINUED: NEW 56V MODEL NOT AVAILABLE FOR OUR TEST)

ECHO 58V

\$240 TOOL ONLY
+ \$216 FOR ONE BATTERY

- **BATTERY VOLTAGE** – 58V 4Ah. Extra battery: \$216
- **ELAPSED TIME** for a single cut through a 16-in.-dia. log – 1:25
- **RUN-TIME** cutting a 16-in.-dia. log – 6:47
- **RUN-TIME** cutting 8-in.-dia. logs – 9:05
- **CHARGING TIME** – 52 minutes
- **BAR LENGTH** – 16 in.
- **CHAIN BRAKE** – Yes
- **BUCKING SPIKES** – Yes, plastic
- **HIGHER Ah BATTERY** – No
- **TOOL-FREE CHAIN ADJUSTMENT** – No
- **WEIGHT** – 15 lbs.
- **REPLACEMENT CHAIN** – Commonly at home centers



GREENWORKS ULTRAPOWER 60V

\$350 INCLUDING BATTERY

- **BATTERY VOLTAGE** – 60V 4Ah. Extra battery: \$250
- **ELAPSED TIME** for a single cut through a 16-in.-dia. log – 1:37
- **RUN-TIME** cutting a 16-in.-dia. log – 5:37
- **RUN-TIME** cutting 8-in.-dia. logs – 8:30
- **CHARGING TIME** – 23 minutes
- **BAR LENGTH** – 18 in.
- **CHAIN BRAKE** – Yes
- **BUCKING SPIKES** – Yes
- **HIGHER Ah BATTERY** – 8Ah battery available for \$350
- **TOOL-FREE CHAIN ADJUSTMENT** – No
- **WEIGHT** – 15 lbs.
- **REPLACEMENT CHAIN** – Commonly at home centers



RYOBI 40V

\$280 INCLUDING ONE 4Ah
BATTERY

- **BATTERY VOLTAGE** – 40V 4Ah.
Extra battery: \$160
- **ELAPSED TIME** for a single cut through a 16-in.-dia. log – 3:22
- **RUN-TIME** cutting a 16-in.-dia. log – 4:38
- **RUN-TIME** cutting 8-in.-dia. logs – 3:40
- **CHARGING TIME** – 36 minutes
- **BAR LENGTH** – 16 in.
- **CHAIN BRAKE** – Yes
- **BUCKING SPIKES** – No
- **HIGHER Ah BATTERY** – 6Ah available for \$200
- **TOOL-FREE CHAIN ADJUSTMENT** – No
- **WEIGHT** – 14 lbs.
- **REPLACEMENT CHAIN** – Usually need to order

EGO 56V

\$370 INCLUDING BATTERY

- **BATTERY VOLTAGE** – 56V 5Ah. Extra battery: \$250
- **ELAPSED TIME** for a single cut through a 16-in.-dia. log – :50
- **RUN-TIME** cutting a 16-in.-dia. log – 7:21
- **RUN-TIME** cutting 8-in.-dia. logs – 8:57
- **CHARGING TIME** – 64 minutes
- **BAR LENGTH** – 18 in.
- **CHAIN BRAKE** – Yes
- **BUCKING SPIKES** – Yes
- **HIGHER Ah BATTERY** – 7.5 and 10Ah batteries are available starting at \$150
- **TOOL-FREE CHAIN ADJUSTMENT** – Yes
- **WEIGHT** – 14.5 lbs.
- **REPLACEMENT CHAIN** – Commonly at home centers



MAKITA XCU04

\$329 INCLUDING TWO BATTERIES
(TWO REQUIRED TO RUN)

- **BATTERY VOLTAGE** – 36V 5Ah.
Extra battery set: \$170
- **ELAPSED TIME** for a single cut through a 16-in.-dia. log – 1:14
- **RUN-TIME** cutting a 16-in.-dia. log – 7:53
- **RUN-TIME** cutting 8-in.-dia. logs – 8:08
- **CHARGING TIME** – 50 minutes
- **BAR LENGTH** – 16 in.
- **CHAIN BRAKE** – Yes
- **BUCKING SPIKES** – Yes
- **HIGHER Ah BATTERY** – No
- **TOOL-FREE CHAIN ADJUSTMENT** – Yes
- **WEIGHT** – 11.5 lbs.
- **REPLACEMENT CHAIN** – Commonly at home centers



WORX-NITRO

\$300 INCLUDING TWO BATTERIES
(TWO REQUIRED TO RUN)

- **BATTERY VOLTAGE** – 40V 4Ah. Extra battery set: \$120
- **ELAPSED TIME** for a single cut through a 16-in.-dia. log – 1:21
- **RUN-TIME** cutting a 16-in.-dia. log – 6:25
- **RUN-TIME** cutting 8-in.-dia. logs – 8:15
- **CHARGING TIME** – 60 minutes
- **BAR LENGTH** – 16 in.
- **CHAIN BRAKE** – Yes
- **BUCKING SPIKES** – Yes, plastic
- **HIGHER Ah BATTERY** – 4, 5 and 6Ah batteries are available for \$100 to \$130
- **TOOL-FREE CHAIN ADJUSTMENT** – Yes
- **WEIGHT** – 11 lbs.
- **REPLACEMENT CHAIN** – Commonly at home centers



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1.5 GPM



1.2 GPM



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BRAD'S BEST PICK



The battery run-time for these saws surprised me—I had expected it to be longer. But for our test, we cut continuously, with the trigger held down the whole time. A more typical scenario for a homeowner might be limbing a downed tree, for example. In that case, nine (or even four) minutes of actual cutting time takes off a lot of limbs in brief cuts. An extra battery doubles your cutting time. For some avid users, the run-time might be a deal breaker.

Also, when we cut the 16-in. logs, the air temperature was 32 degrees F, which I thought might affect battery life. So, to cut the 8-in. logs, I brought them into a heated shop to take temperature out of the equation. The differences were marginal.

For the amount of chain sawing I do, I'd still opt for battery over gas.

But which saw is best? For me, the Makita stood out as having a comparatively long running time and light weight, and the saw cut quickly and aggressively. It has a balanced feel and metal bucking spikes that protrude well beyond its housing. Bucking spikes poke slightly into the bark during the cut, giving you a solid fulcrum to tip the bar into the cut. This eases the work and makes it safer as well.

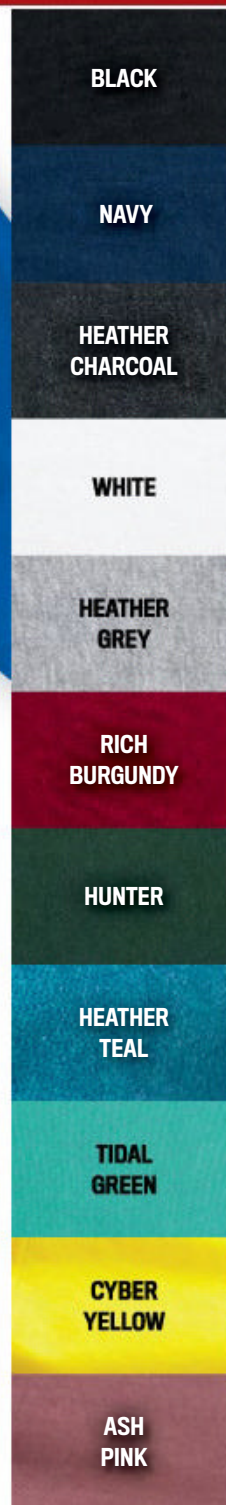
Makita's tool-free chain tension adjustment—a feature three of the saws have—is really nice as well. The Worx and Greenworks were excellent performers with nice price tags. All said and done, the six saws work well, so weigh the factors that are important to you.



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POWER PLAY

BATTERY EVOLUTION
PUTS POWER CORDS
ON THE ROPES

“We’re to
the point
where we
can launch

a battery-powered tool
that actually delivers
better performance than
corded solutions. That’s
just come around in the
last couple of years of
lithium-ion technology
advancements,” says
Bryson Stewart, VP of
product management
for Ridgid.



BY GLENN HANSEN

MEET THE EXPERT



GLENN HANSEN,
DEPUTY EDITOR, IS
ALSO COMPLETELY
RECHARGEABLE AND
POSSIBLY RECYCLABLE.

Evolution favors reliable tool technology that helps us do better work. Juicing tools with electricity—whether cordless or tethered—has never been the main goal. It's about helping users get work done more easily. Today's progression is mostly about cordless tools and battery power. "We can simplify workplaces by moving to batteries and away from power cords, air hoses and gas," says Gabriel Sandoval, director of product management for Ryobi Tools.

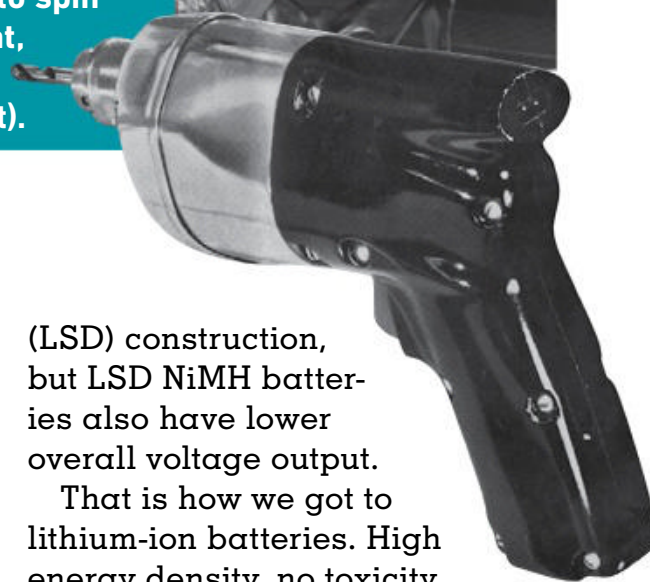
That was the goal of NASA when it contracted with Black & Decker in the early '60s to make battery-powered tools—hammer drills and wrenches—that astronauts could use in outer space. The power wrench needed to spin bolts in zero gravity but not spin the astronaut holding the tool. The goal was simplicity and usability, not power.

THE ROAD TO LITHIUM-ION

That cordless space wrench used a nickel cadmium (NiCad) battery pack. Developed by a Swedish scientist in 1899, NiCad batteries had several advantages over lead-acid batteries—durability, long life and high energy density—and we continue to buy them as rechargeable AA, AAA and other cell sizes. However, these batteries suffer from



In 1963, a cordless tool was used to spin space bolts (above), but before that, in 1961, Black & Decker made a cordless drill for earthlings (right).

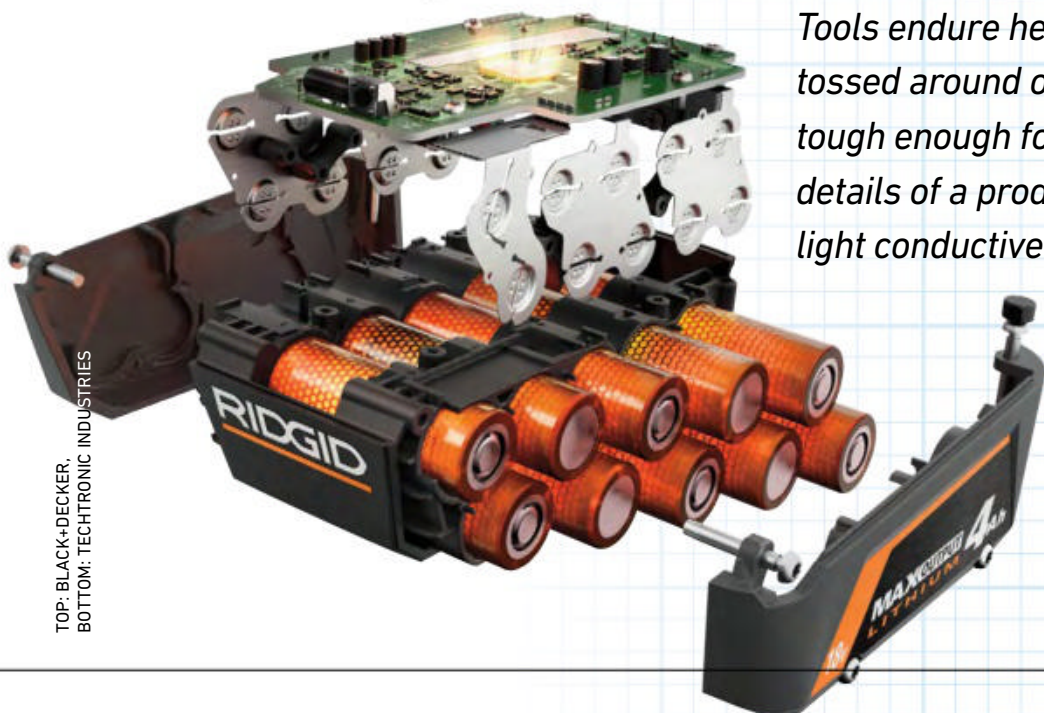


memory effect, where the cells will remember a lower energy capacity if you recharge them from a partial discharge state. In addition, cadmium is a toxin and environmental hazard.

Nickel metal hydride (NiMH), in use since the mid-1980s, delivered an even higher energy density than NiCad batteries and used no toxic cadmium or lead. The problem with NiMH was, and still is, their self-discharge rate. Leave a charged NiMH battery in a drawer or tool bag and it's likely to lose its charge; how's that for usability? Some newer NiMH battery cells are manufactured with low self discharge

(LSD) construction, but LSD NiMH batteries also have lower overall voltage output.

That is how we got to lithium-ion batteries. High energy density, no toxicity, no memory effect, a low self-discharge rate and an overall higher usability. Yes, Li-ion battery cells are more expensive than NiCad and NiMH, but the benefits outweigh the cost difference. Li-ion cells are preferred by nearly every tool manufacturer, as well as by some auto makers.



TOP: BLACK+DECKER.
BOTTOM: TECHTRONIC INDUSTRIES

BUILT FOR (SOME) ABUSE

Tools endure heat and cold, they vibrate and spin, and they're tossed around on job sites and in your shop. Is your battery pack tough enough for how you work? Some manufacturers share details of a product's construction. In the battery pack, thin and light conductive materials connect cells to an intricate circuit

board and the terminals that touch the tool. The tool itself has terminals and wires that lead to a motor enabling your sanding, drilling, sawing and more. Consider all that next time you drop a tool, throw one into your pickup bed or use a drill battery as a hammer (you know you've done that).

A BATTERY IS A COLLECTION OF CELLS

The battery packs on cordless tools look alike for a reason: Most of them hold rows of similar cylindrical cells. The new DeWalt Power Stack battery uses Li-ion pouches (see below), not cylinders. But most toolmakers choose cylinder-shaped cells because they're the most cost effective.

Li-ion cylinders are manufactured in different sizes, and toolmakers generally use the "18650" size, though some are choosing the newer "21700" size. The first two numbers tell the diameter of the cylinder in millimeters. The next two numbers tell the length (or height); the final

"0" denotes the cylinder shape. Tesla, with its Gigafactory partner Panasonic, developed the "21700" cell in 2018. Its advantage? Higher energy density. But it comes at a cost in size and weight, which can make your tools heavier. Tesla recently developed a "4680" cell (much fatter, a little taller), claiming that it has greater storage capacity and costs less to build.

In the 18V battery pack on your cordless circular saw, five Li-ion cylinders, whether "18650" or "21700," lie neatly next to each other. Some 40V or 60V batteries



"18650" lithium-ion cells from a Ryobi battery pack

for your lawn mower and the smaller 12V battery on your compact drill/driver have cells in groups of three or four. The 24V battery packs use groups of six cells. And the 2019 Tesla Model 3 electric car uses 4,400 Li-ion ("21700") battery cells, more or less, to drive itself right past the gas station.

DESIGN

As battery packs evolve, we see slight but important design updates. When Bosch built its Core 18V packs with the "21700" cells, for example, it arranged them in a wave design of sorts, not a flat layer of five cells. This enabled a slightly shorter but thicker pack design and gave more space for cool air to flow around the cells. Bosch claims this "cools the battery 17% faster and provides 135% longer life" when compared

with Bosch batteries without "CoolPack 2.0 technology."

DeWalt can take a different design direction with its new Power Stack battery technology. The use of lithium-ion pouch cells instead of cylindrical cells "represents the next step forward for our industry," says Sean Fitzgibbons, DeWalt's group product manager. Does he think cylinder cells will go away? "I think it will happen gradually in time. Not since we changed from NiCad to lithium-ion have we seen such a change in

results/performance."

He points, for one, to the large, laser-welded connective tabs on the pouch cells that improve the electrical connection and, therefore, performance.

Toolmakers know that design is about performance, and they listen to tool owners. Ridgid dropped its Octane line of batteries last year following user feedback. "Octane was big and heavy," said Ridgid's Stewart, "and we want to move away from that, based on end-user feedback. Users told us they want smaller with the same performance."

While the future of battery design will bring big changes sooner rather than later, what's most important in the design realm is to "keep the compatibility and keep it affordable," says Ryobi's Sandoval.

Several Bosch tools can use the Core 18V with the "21700" cells and cooling fins. DeWalt similarly boasts broad application for its new 20V Power Stack battery. Design must be functional first or it won't do much good in your toolbox.



DeWalt claims its new pouch cells make a battery pack lighter, smaller and more powerful.



BOTTOM PHOTOS: TECHTRONIC INDUSTRIES

BATTERIES & TOOLS IN USE

We disassembled a Ryobi 18V 2Ah battery and found five “18650” cells. Wired in series, those 3.6V cells combine energy to reach the nominal 18V rating. Had they been wired in parallel, the battery pack would be rated at 3.6V and 10Ah, not usable in shop tools.

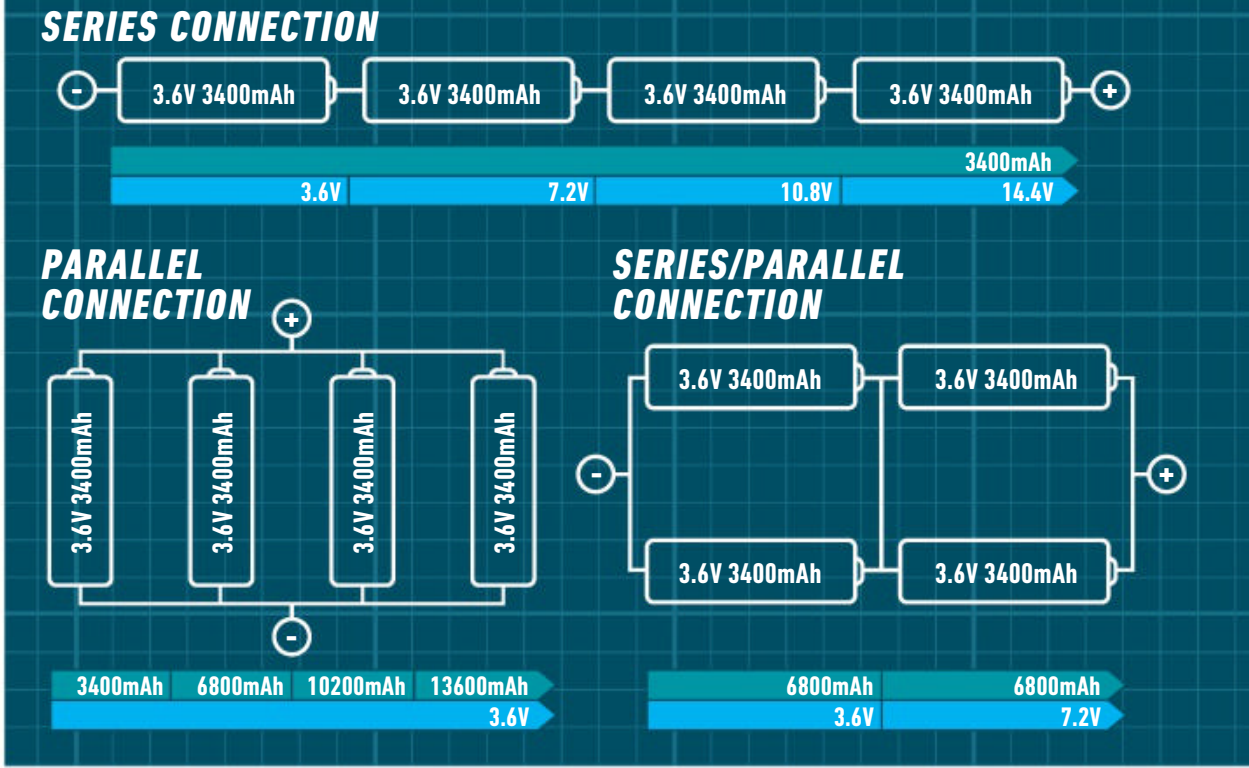
Actual battery pack construction uses series wiring, or a combination of series and parallel cell connections. For example, to achieve an 18V 4Ah battery pack, a toolmaker adds a second layer of five “18650” (3.6V, 2Ah) cells, with each of the two five-cell groups wired in series and then wired in parallel. Ryobi’s 18V 6Ah is noticeably taller, with three layers of five-cell groups inside.

Bosch is one of a few tool manufacturers using the higher-Ah “21700” cells in its battery packs. Its Core 18V 4Ah battery uses a single layer of five “21700” cells in a pack that is noticeably smaller than competitors’ 4Ah battery packs using two layers of “18650” cells (see the weight chart below). While Bosch announces “21700 cell technology” on its website, Milwaukee marketing materials don’t, even though many of its M18 batteries use “21700” cells.

So how do you know which battery cells are inside each battery pack? Amp hours. Milwaukee’s M18 line includes an 18V 3Ah battery pack stamped with Milwaukee’s “High Output” badging; it’s powered by “21700” cells. There is also an M18 pack with the same 18V 3Ah rating, but its much larger size tells the inside story of two layers of “18650” battery cells. With twice as many cells, that non-High Output battery pack weighs nearly 1 lb.

WEIGHT CHART

BRAND	V	Ah	BATTERY	TOOL & BATTERY	CELL SIZE
Bosch	18	4	18.8 oz.	(jigsaw) 48.2 oz.	21700
Bosch	18	8	34.4 oz.	(jigsaw) 63.8 oz.	21700
Ryobi	18	2	15.5 oz.	(jigsaw) 66.2 oz.	18650
DeWalt	12	2	7.8 oz.	(drill) 40.3 oz.	18650
DeWalt	12	5	14.4 oz.	(drill) 46.9 oz.	18650
DeWalt	20	1.5	12.2 oz.	(drill) 51.2 oz.	18650
DeWalt	20	5	22.1 oz.	(drill) 64 oz.	18650
Ridgid	18	4	24.4 oz.	(drill) 47.5 oz.	18650
Ridgid	18	5	27.9 oz.	(drill) 51 oz.	18650



more than the High Output battery. Less weight and equal power mean the advantage goes to the battery pack using “21700” cells.

But even though the cells and their numbers are important, they’re not the whole story.

DEFINITIONS & A LITTLE MATH

Voltage is the maximum potential energy of a battery cell or group of cells. It’s the amount of energy provided to the electric circuit that spins your drill. Each of the “18650” and the “21700” cells inside a tool’s battery pack has a nominal voltage of 3.6 (some might say 3.7, but 3.6 is the norm).

When you connect five 3.6V cells (wired in series), you get an 18V battery (5 x 3.6 = 18). Tool manufacturers that stamp a tool with “20V Max” are referring to the battery’s maximum *initial* voltage. A cell reaches maximum voltage when fully charged, but then it quickly settles to its *nominal* voltage for the remainder of its

charged cycle. That’s the difference between nominal voltage of a cell (3.6V) and maximum voltage (4V).

Most makers that go with the “maximum” voltage place an asterisk after 12V or 20V on their tools and in literature. DeWalt, for example, says, “*Maximum initial battery voltage (measured without a workload) is 20 volts. Nominal voltage is 18.” A 12V battery uses three 3.6V cells for a total nominal voltage of 10.8 and max of 12. Manufacturers in European countries are required to use the nominal voltage in labeling.



Weight matters! And 12V power can be enough.



CHOOSE A COMPANY, THEN CHOOSE YOUR TOOL

Finding the right cordless power tool for you—one that spins the bolts without spinning the astronaut—starts by considering the second and third tools you will need, not just the first.

“It is all about the platform,” says Ridgid’s Stewart—and he means for both the user and the manufacturer. Tool users who own a half-dozen of a single brand of tools might need just three batteries and one charger. That saves money and shop space.

Manufacturers that build a complete line of tools to all work with the same battery are more likely to build brand loyalty. Makita claims it makes more than 270 tools that work with its 18V battery (though some tools need two batteries). Ryobi’s One+ tool lineup now includes more than 260 tools.

Choosing one tool brand does place your future purchases into one voltage category, but you won’t be limited

to one amp-hour option. That means you can use an 8Ah battery in your circular saw if you’re cutting stacks of framing lumber or ripping heavy sheet goods. Or you can use the 2Ah battery when you want a lighter-weight tool and you have access to a charger and a backup battery.

“Your tool platform choice is dependent on many factors,” says Christopher Gregory, Bosch product marketing manager, “including tool usage, power needs, run-time and application.”

Most of the brands know you want to keep your tools for years. The DeWalt drill/driver with

20V 2Ah battery I purchased nearly four years ago still works well, so I was thrilled to learn that a brand new 20V 5Ah battery will also work with that same old drill. And my old battery works with new tools! As battery and tool tech evolve, I hope old and new continue to work together.

WHAT’S AN AMP-HOUR?

Amp (short for “ampere”) is a measure of current flow, and amp-hour is that flow over time. A battery’s amp-hour (Ah) rating tells the amount of energy charge that allows one amp of current to flow for one hour. For example, an 18V 4Ah battery will supply one amp at 18V for four hours, or two amps for two hours, or the current needed for as long as it can.

Battery cells have individual Ah ratings as well as V ratings. And this is where the “21700” cells step away from the smaller “18650” cells. While most tool manufacturers don’t announce if their battery packs use “18650” or “21700” cells, the battery’s Ah rating can tell the story. The

“18650” cells are generally rated from 1.5Ah to 2.5Ah. The larger “21700” cells have a higher cell capacity and increased energy density, which leads to high Ah ratings, from 3.0 to nearly 5.0. And that means longer run-time for your tools.





COST

Yes, it's enticing to buy the most powerful bat-

tery pack available, but that's not what most DIYers need. Start by purchasing a kit that includes a tool, like a drill/driver, with an included battery and charger. From there, buy bare tools and batteries separately, always making sure there is a lifetime service agreement available.

Shop for batteries by first considering your power needs, and then the price. If your cordless work is mostly in remote locations where you can't easily access freshly charged batteries, then go for the packs with the high amp-hour ratings. But if you're working near home with the convenience of battery chargers, then choose low-Ah batteries. They're smaller, lighter and cost less.

HOW CAN I MAKE THE MOST OF BATTERY/TOOL LIFE?

- Avoid temperature extremes, like over 100 or below zero degrees F.
- Avoid vibration and jarring. Don't use your battery as a hammer, and don't toss one into a tool bag or truck bed.
- Moisture is bad; keep your batteries dry as much as possible.
- Read the owner's manual and follow charging recommendations.
- Leave batteries on the charger when they're not in use.
- If a lifetime service agreement is available, use it!
- Do not run batteries down completely; it's better to charge them at the first sign of power loss.
- Let batteries return to room temp before charging.
- Use only original-equipment batteries designed for your tool, not aftermarket batteries.

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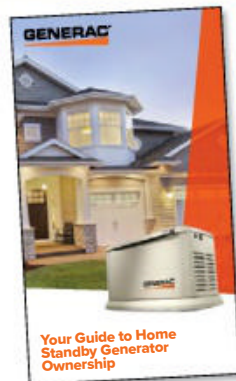
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*Price does not include installation.

ONE OF A GRIND

BY MIKE BERNER

RELIEF CARVING—
WITH POWER!

An angle grinder is a simple, affordable and endlessly versatile tool. With the right attachment, you can grind, cut or polish metal, masonry and stone. You can also quickly sand wood, cut tile and clean away rust from metal.

I recently discovered a new attachment for my grinder: power-carving wheels. With these new wheels, I can shape wood and create reliefs and contours with ease. I had a rough slab of cherry that seemed unusable and was headed for a campfire. It was perfect for a power-carving test run. After a dusty day of carving, I ended up with a unique piece of art.

TAKE SAFETY SERIOUSLY

The angle grinder is a handheld tool that spins at 10,000 rpm or more. When a spinning carving wheel hits the wood, the dust and wood chips will fly everywhere. A face shield is a must, and I prefer to add safety goggles and a long-sleeved shirt. Because my hands are so close to the wheel, I always wear gloves and keep the side handle in place. Clamp down your workpiece and make sure the chips are flying away from anything they can harm.





1 DRAW THE CONTOURS

To make my design (see Photo 6), I began by drawing lines to indicate the highest contour—the peaks. I followed the grain but also deviated from it to create interesting crossing patterns. Sketch your lines with a pencil, and then once you like the shapes, go over them with a white china pencil.

2 DEFINE THE DEPTH

To establish a consistent depth for the valleys, I drilled holes every few inches between my lines. I marked the depth with a tape flag on a 1/4-in. drill bit before drilling. You can skip this step if a consistent depth isn't important.



3 SHAPE THE CONTOURS

Using a coarse-grit carving wheel, I removed material between the lines, carving until the 1/4-in. holes disappeared. I started in the middle of the valleys and carved slopes toward the peak lines. Once I removed most of the material, I switched to a medium grit, and then finished with a fine-grit carving wheel.



WHAT IT TAKES

TIME	COST	SKILL LEVEL
1 day	\$100	Beginner

TOOLS

4-1/2-in. angle grinder, longneck 2-in. angle grinder, rotary tool, 4-in. and 2-in. donut carving wheels from saburrtooth.com, assortment of 1/8-in.-shank burrs, orbital sander

2-IN. WHEEL FOR PRECISION

To carve with more precision and reach areas the 4-in. wheels couldn't, I used 2-in. carving wheels with this special longneck 2-in. angle grinder by Proxxon.

2" MEDIUM-GRIT CARVING WHEEL

4" COARSE-GRIT CARVING WHEEL



4 REFINE THE SHAPE WITH BURRS

Available in similar grits and many shapes, these 1/8-in.-shank burrs allow you to shape details in smaller crevices. The burrs fit into many rotary tools and are especially easy to use in rotary tools that have a flexible shaft.



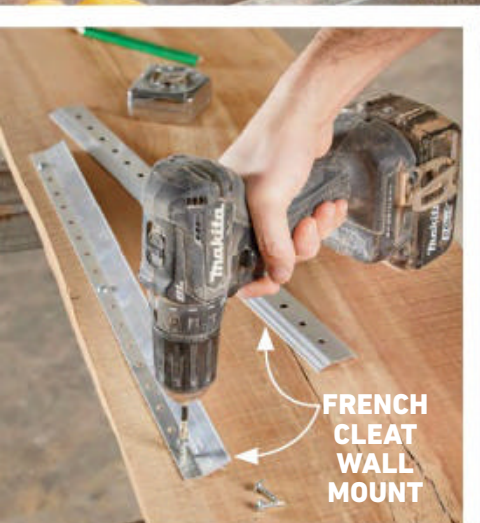
5 SAND IT SMOOTH

I sanded this piece with 80-grit through 180-grit sandpaper, using an orbital sander where it would fit and then switching to sanding sponges to follow the contours. Depending on the look you're after, sanding could be the slowest, most labor-intensive part of the project.



6 FASTEN THE CLEATS AND HANG THE PIECE

Brush off the dust and wipe the surface with a damp microfiber cloth. When the wood is dry, apply your favorite finish. To hang it, I marked a level line on the wall, located the studs and secured the wall cleat. Then I fastened the mating cleat on the back of the slab and displayed my new artwork.



MEET THE ARTIST



MIKE BERNER, AN EDITOR AT FAMILY HANDYMAN, IS ALSO THE RESIDENT WOOD SCULPTOR.

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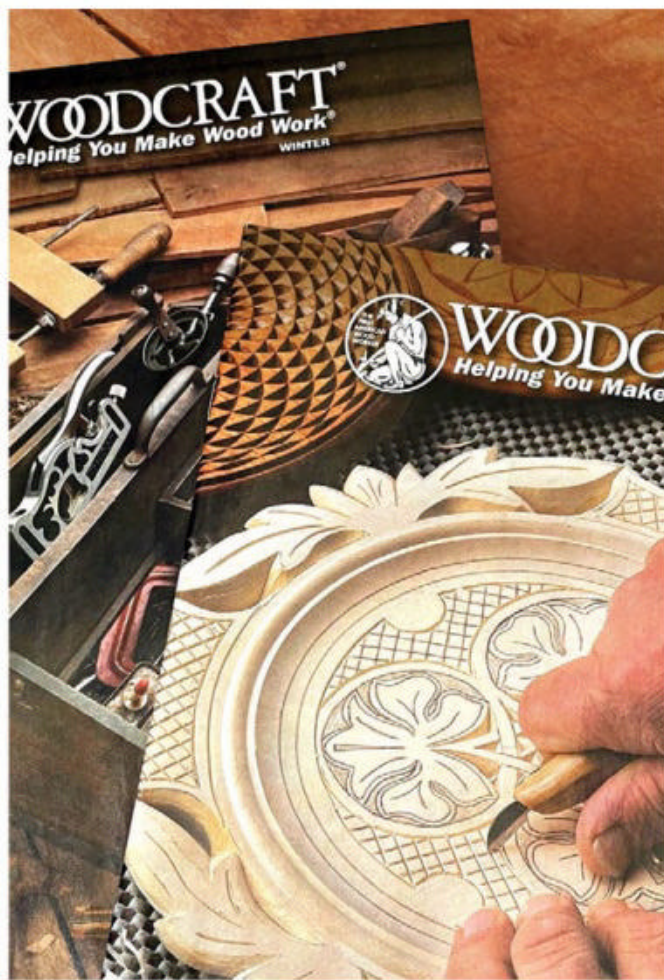
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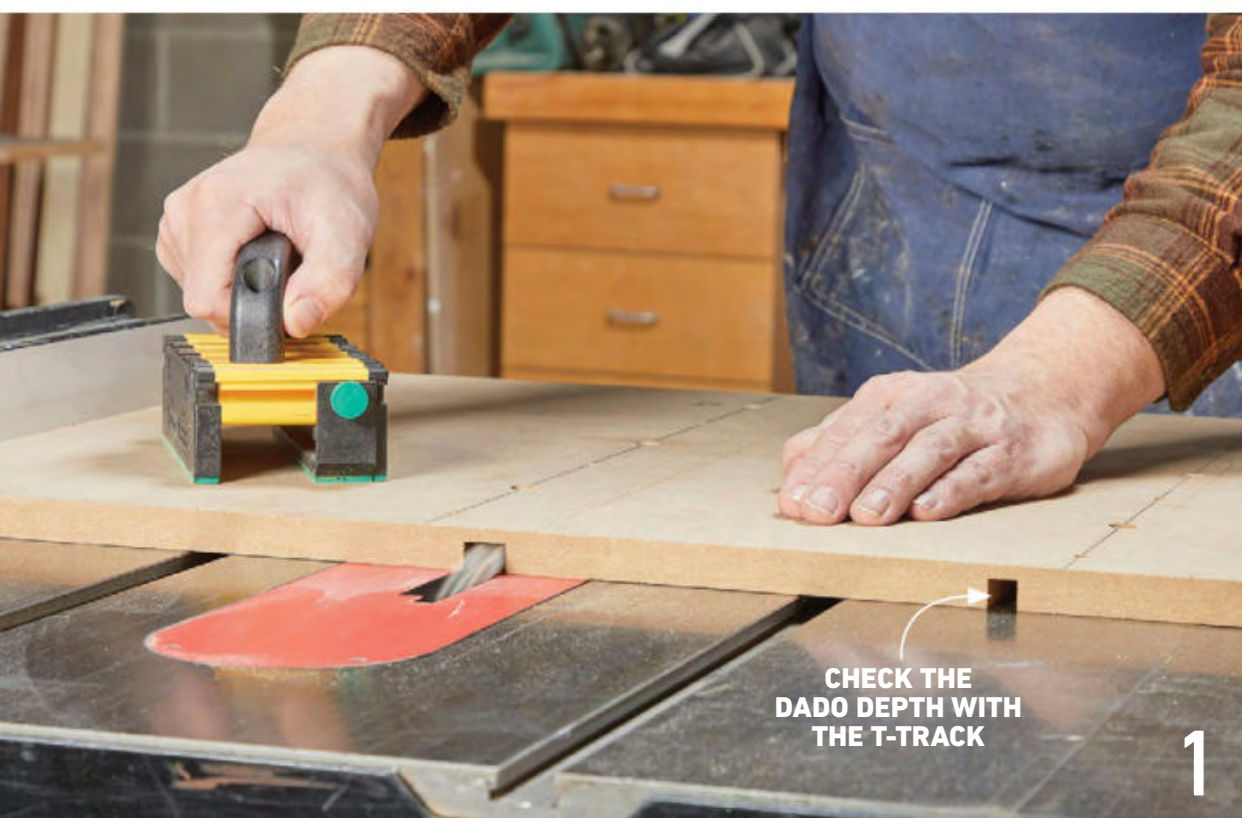
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DIY CROSSCUT SLED

SAFE, REPEATABLE
CUTS MADE EASY

BY JAY CORK

A crosscut sled adds functionality to any table saw, and it makes delicate cuts safer. This simple design is easy to build and will serve you for years to come.



1 INSTALL T-TRACKS

Cut 3/4-in. dados in the MDF base 13 in. from both edges. Secure the T-tracks in the channels with 5/16-in. screws.

PRO TIP

If any of the screws in the T-track poke out the bottom, clean them up with a hand file.

WHAT IT TAKES

TIME	COST	SKILL LEVEL
1/2 day	<\$200	Beginner

TOOLS: Table saw, dado blade, drill driver, try square



MEET THE BUILDER



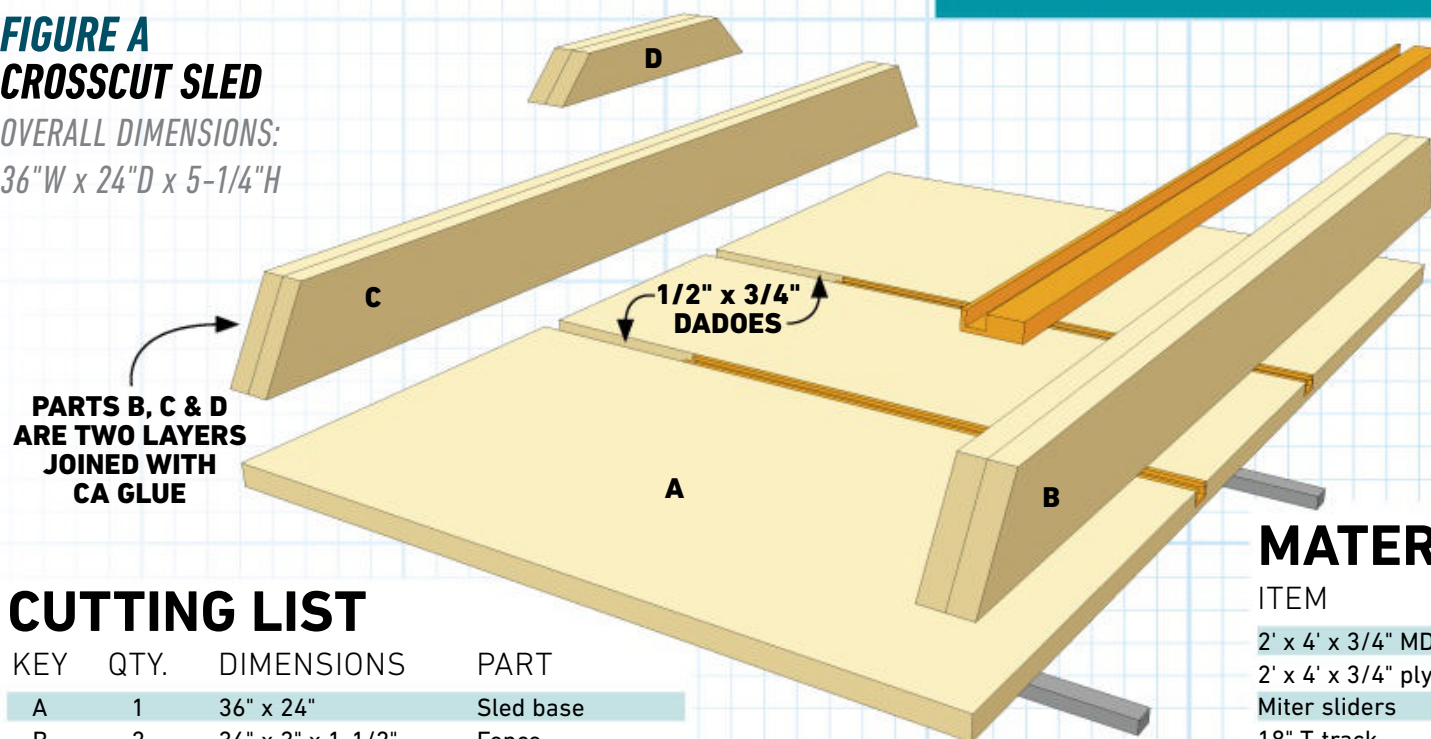
ASSOCIATE EDITOR **JAY CORK** IS REALLY GOOD AT BUILDING JIGS. DANCING JIGS IS ANOTHER STORY.

SHOPPING FOR MATERIALS

You can find most of the materials for this project at any home center. However, the miter sliders and T-track are easier to source online.

FIGURE A CROSSCUT SLED

OVERALL DIMENSIONS:
36"W x 24"D x 5-1/4"H



PARTS B, C & D
ARE TWO LAYERS
JOINED WITH
CA GLUE

CUTTING LIST

KEY	QTY.	DIMENSIONS	PART
A	1	36" x 24"	Sled base
B	2	36" x 3" x 1-1/2"	Fence
C	2	36" x 3" x 1-1/2"	Bridge
D	2	8" x 1-1/2" x 1-1/2"	Bridge cap

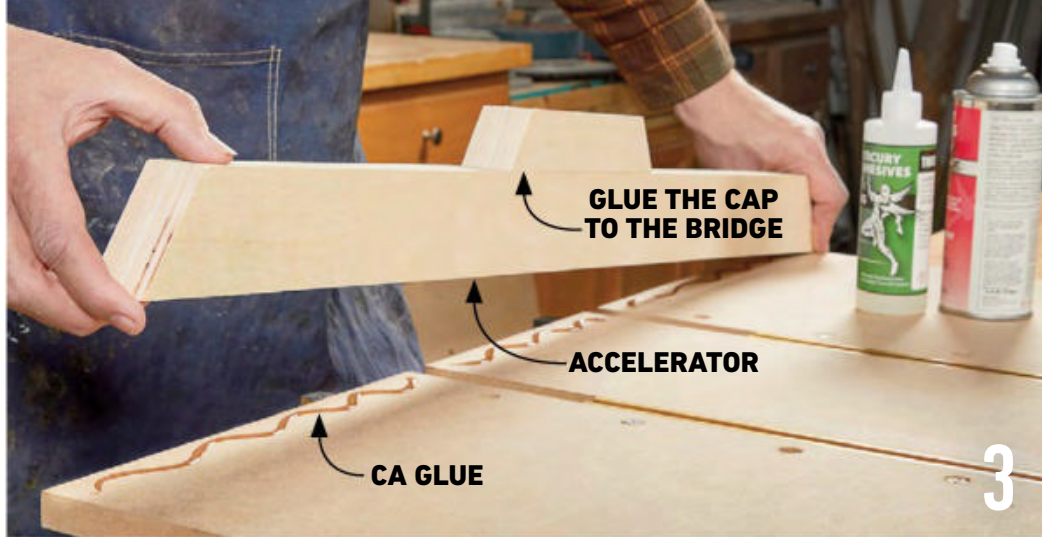
MATERIALS LIST

ITEM	QTY.
2' x 4' x 3/4" MDF board	1
2' x 4' x 3/4" plywood	1
Miter sliders	2
18" T-track	2
36" Deluxe T-track	1
CA glue and accelerator	



**SAFETY TAB
PREVENTS
TIPPING**

2

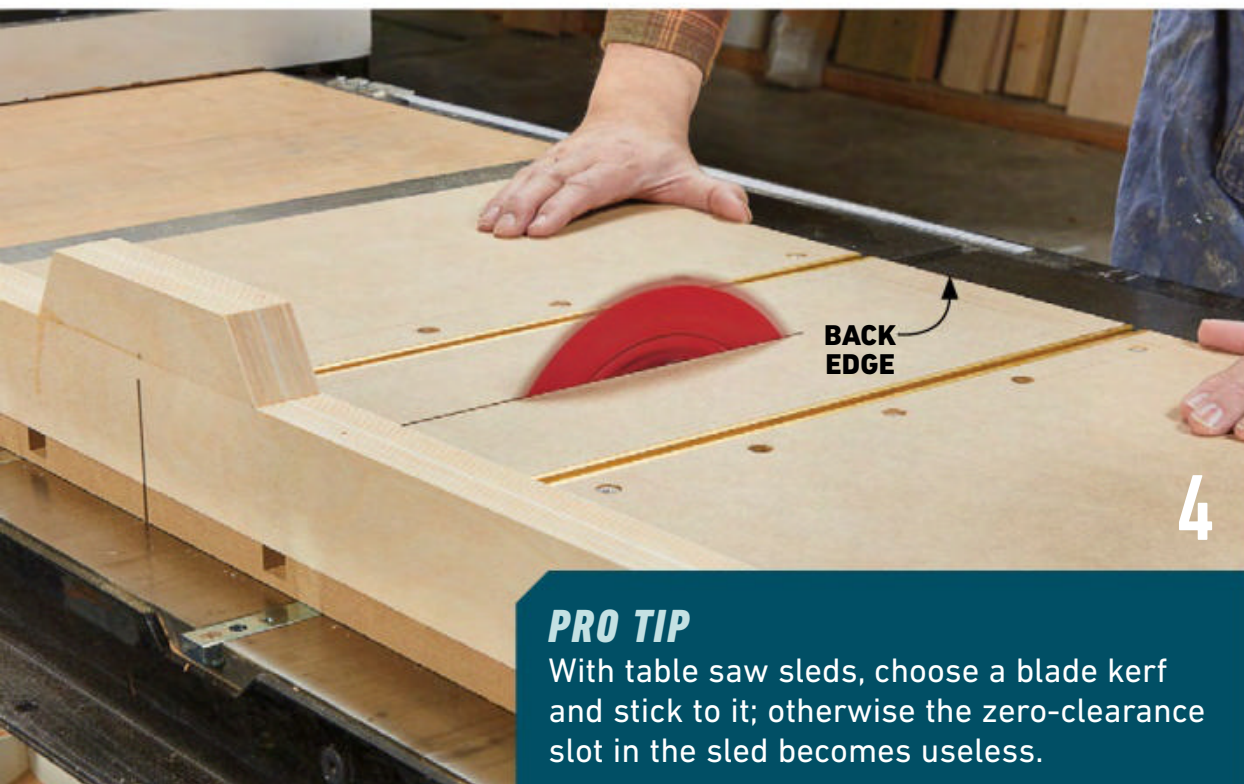


**GLUE THE CAP
TO THE BRIDGE**

ACCELERATOR

CA GLUE

3



**BACK
EDGE**

4

PRO TIP

With table saw sleds, choose a blade kerf and stick to it; otherwise the zero-clearance slot in the sled becomes useless.

2 ATTACH MITER SLIDERS TO THE SLED

Miter sliders are available in a range of styles—even homemade strips of solid wood cut to fit the miter slot. I used solid steel miter sliders made by Incra (\$28 each). They won't bend, and a tab on their leading edge keeps the sled from tipping out of the miter slots.

3 GLUE THE BRIDGE TO THE SLED BASE

Use thick CA glue with accelerator to attach the bridge to the sled base. It doesn't have to be perfectly straight or square; it's there simply to keep the two halves of the sled together.

4 MAKE THE KERF

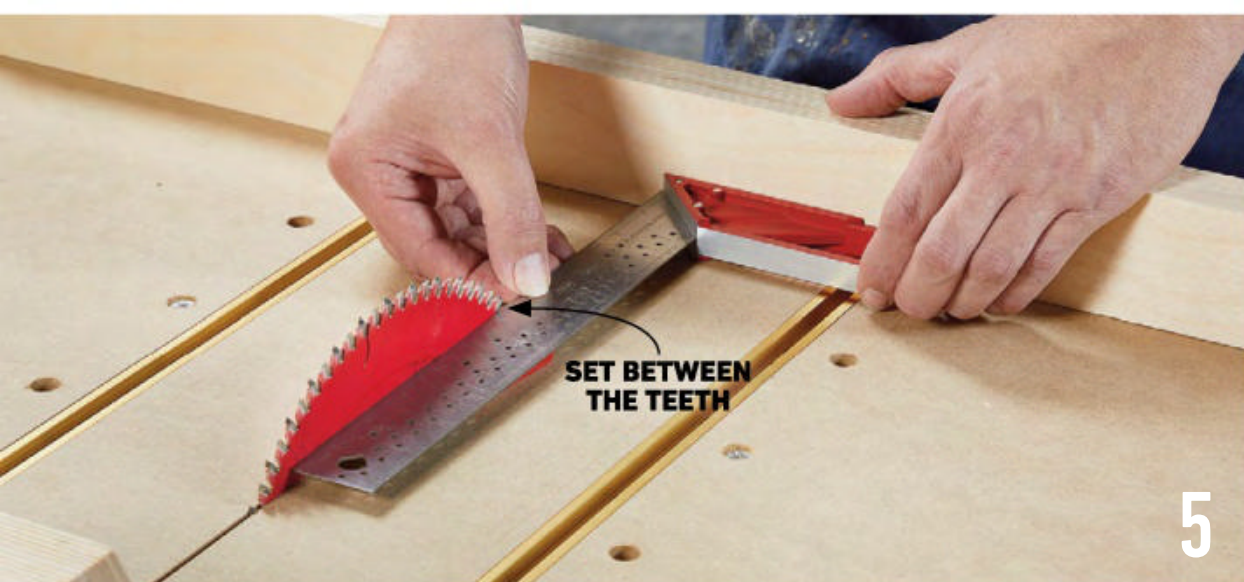
With the blade completely elevated, run the sled through the saw until the blade is 2 in. away from the back edge.

5 ALIGN THE FENCE TO THE BLADE

With the sled still on the saw, place the try square against the blade to align the fence to the saw, then glue the fence to the base. I used slow CA glue to give me time to make minor adjustments. When the glue is dry, secure the bridge and fence with countersunk 1-1/4-in. screws driven from the bottom.

6 ATTACH THE T-TRACK TO THE FENCE

Cut the T-track to length and align it to the face of the fence. Attach the track with 1-in. No. 6 wood screws.



**SET BETWEEN
THE TEETH**

5



1" SCREWS

6

SEAL EVERYTHING WITH SHELLAC

To stabilize and protect the wood, use your favorite topcoat to seal the entire sled. I used shellac because it dries fast and looks great.

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2022 Australia Wedge Tailed Eagle: Introduced in 2014, the Wedge-Tailed Eagle is the first-ever collaboration between U.S. Mint designer John Mercanti and a foreign mint. With a new design for 2022, it's struck in 99.9% fine silver at the Perth Mint.

2022 Canada Maple Leaf: Since 1988, the Silver Maple Leaf's elegant design has made it a highly sought-after bullion coin. The 2022 coin features anti-counterfeit security technology—radial lines and a microengraved maple leaf with the number "22". Struck in 99.99% fine silver at the Royal Canadian Mint.

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PLANING LARGE BOARDS

FLATTEN BIG
LUMBER WITHOUT
BIG MACHINERY



You don't need industrial-sized machinery to plane large pieces of wood. A full-size router with a 1/2-in. collet, a large-diameter bit and a simple jig will do the trick. The process will take a little longer than it would with a big machine, but the results will be just as good.

WHAT IT TAKES

TIME	COST	SKILL LEVEL
2-4 hours	\$60	Beginner

TOOLS & MATERIALS

Full-size router with 1/2-in. collet, 2-in.-diameter bottoming bit, 4 x 8-ft. sheet of 3/4-in. MDF

BIT FOR PLANING

You'll need a large-diameter router bit to speed the process along. If you have a router and a collection of bits, you might already have what you need. The bit doesn't need to be purpose-made for planing. It just needs to cut a flat surface. I used the bit shown at left that came with a door-making kit.



BY BRAD HOLDEN

FIGURE A PLATFORM

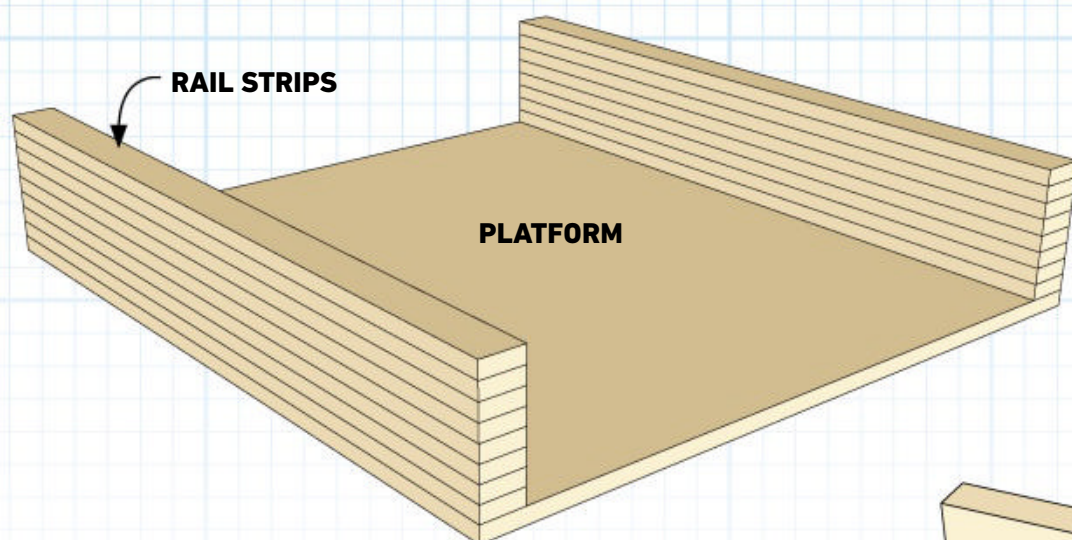
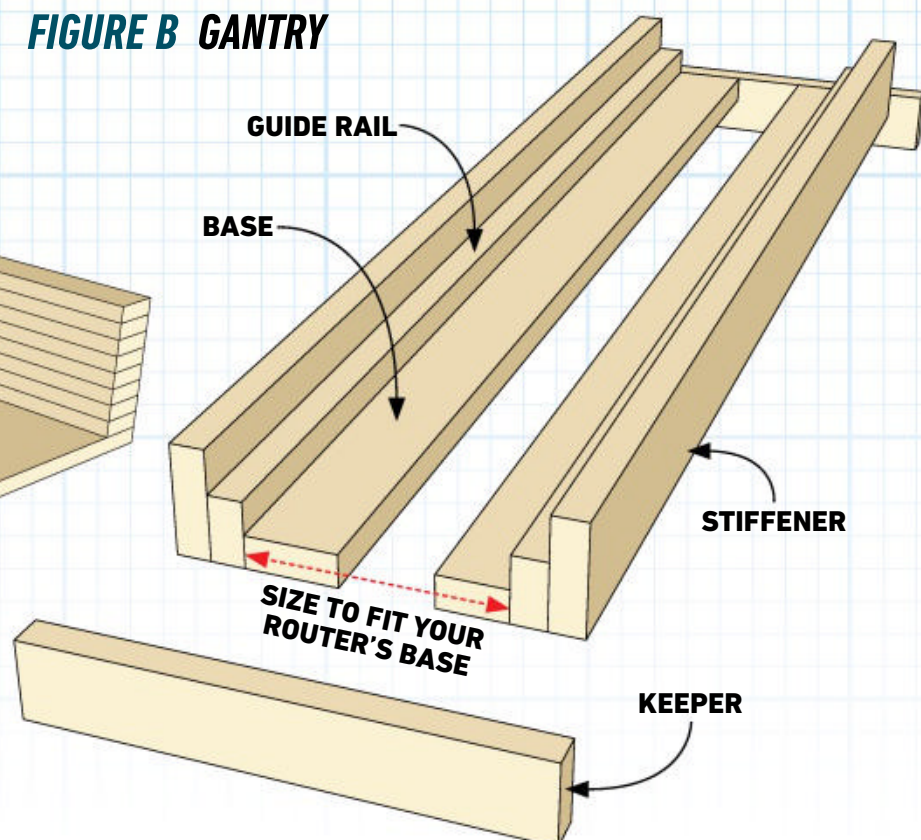


FIGURE B GANTRY



BUILD THE PLATFORM

Start with a piece of 3/4-in. MDF that's about 6 in. larger than your workpiece, in both length and width. Build up two rails to support the gantry using 2-in.-wide strips of 3/4-in. MDF. Just stack these, tacking them in place with screws or brad nails. That allows to easily remove them as you decrease the thickness of your workpiece.

BUILD THE GANTRY

Construct the gantry as shown, using 3/4-in. MDF. Its length depends on the distance between the rails of your platform. The gantry should be just long enough to allow the overhanging keepers to slide freely along the rails.

1 SECURE THE WORKPIECE

Wedge shims underneath your stock to keep it from teetering while you're routing. Use 3/4-in. MDF blocking screwed to the platform to keep the stock from sliding.

2 FLATTEN THE WORKPIECE

Set your router's depth to remove 1/8 to 1/4 in. of material. Slide the router through the gantry, then move the gantry over a distance slightly less than the diameter of your bit and slide the router through the gantry again. This first pass may only remove a few high spots.

After cutting everything to that depth, lower the bit another 1/8 in. to 1/4 in. and proceed as above until the whole side is flattened. Then flip the workpiece over and repeat on the other side. I couldn't get enough depth for cutting with my router's dust port attached, so I had to go without. This is very dusty work, so wear a mask!

3 FINISH YOUR PROJECT

After flattening, sand your project and apply the finish. I attached hairpin legs to turn this crosscut into a coffee table.



**SCAN THIS CODE
TO SEE THE
GANTRY IN
ACTION AND THE
MAKING OF THE
COFFEE TABLE.**

BEST PRO TIPS



EXPERT ADVICE FROM THE JOB SITE

SMALL ENGINES, BIG INVESTMENT

HERE'S HOW TO MAXIMIZE
SMALL ENGINE PERFORMANCE

Battery-powered yard tools are taking over, but it's not quite the end for gasoline and small engines. You can keep yours running smoothly for years with regular maintenance and some inside knowledge.

I talked with Dave Cheney of DC Carb and learned gallons of tips on small engine maintenance. Plus, he showed us how to rebuild a carburetor, which is not as scary at it sounds.

MEET THE EXPERT



SPECIALIZING IN CARBURETOR REBUILDS, **DAVE CHENEY** HAS BEEN WRENCHING ON SMALL ENGINES FOR MORE THAN 30 YEARS.

BY JAY CORK

KEEP YOUR SMALL ENGINES HEALTHY



CHECK FOR SPARK

A spark plug checker can provide critical information. First, it will tell you if electricity is getting to the spark plug. Second, if there is no spark, it gives you the ability to determine the cause of failure.

INSPECT THE SPARK PLUG DIODE

1. CLEAN AND REUSE

If the spark plug looks slightly brown—not too dark—simply clean it with a soft wire brush, check the gap and reinstall.

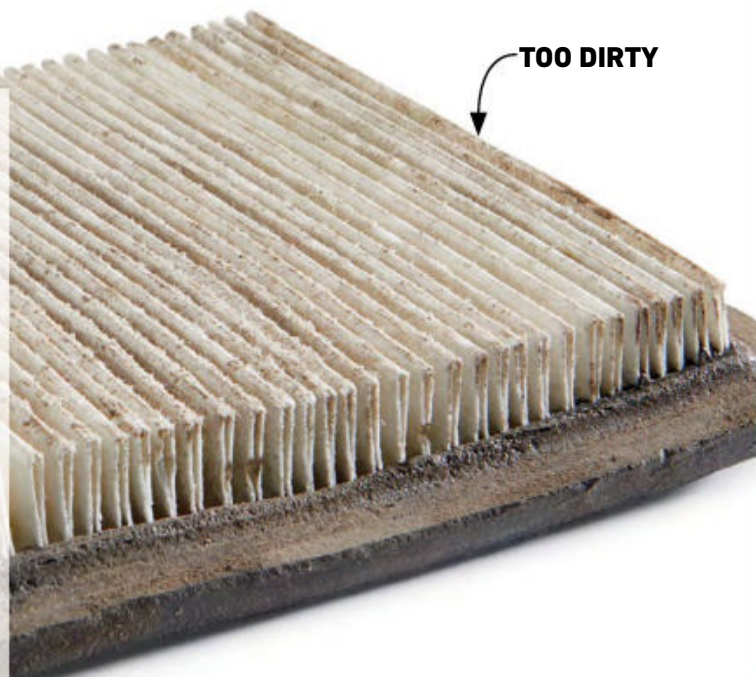
2. REPLACE

Once your spark plug gets to this point—with an oil-fouled and deteriorated electrode—it needs to be replaced. A new spark plug costs less than \$10 and will create the right spark to best ignite the fuel/air mix in the combustion chamber.



FEED YOUR MACHINE FRESH AIR

Small engines need clean air. A clean air filter allows maximum airflow and the optimum fuel/air mixture. You can and should clean the air filter. If the air filter is too far gone or if it's made of paper and it's clogged, it needs to be replaced.



ALWAYS USE NEW GAS

Small engines love fresh fuel. If you have a can of gas that has been sitting around for more than four months, recycle that old gas. Ethanol blends have an even shorter life. Through oxidation and evaporation, gasoline becomes less combustible, leading to poor performance, rough idling and varnish deposits.

AVOID ETHANOL BLENDS

Small engines prefer ethanol-free gas. Ethanol attracts moisture from the air, separates from the gas and sinks to the bottom of the tank. This can cause ignition problems. But that's not the worst of it—ethanol is also corrosive and burns very hot, which can cause overheating and severe engine damage.

SOMETHING I LEARNED WAS...

Never add fuel stabilizer to old gas—stabilizer won't bring gas back to life. Add stabilizer only to fresh gas to extend its use.

CARBURETOR TOO FAR GONE? BUY NEW!

If your carburetor has reached the point of no return, finding a new replacement online is easy. Dave says Amazon and eBay are great places to start looking.

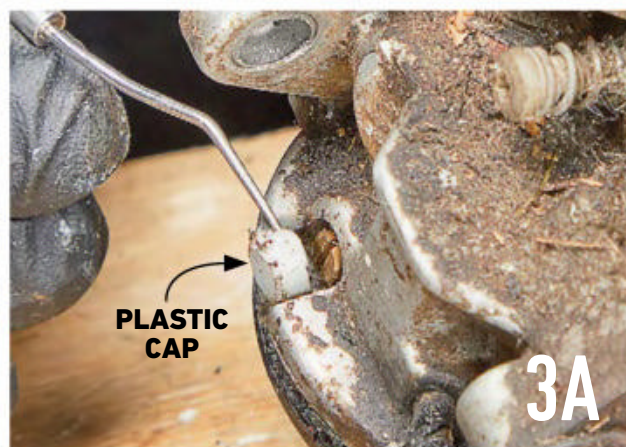


CLEAN/REBUILD THE CARB

We've all done it—delayed fall maintenance until spring. The engine might fire up, but it won't stay running for long. It's time to disassemble and clean the carburetor.

1 REMOVE THE CARBURETOR

Disconnect the fuel line, and if there is still fuel in the tank, crimp the line to avoid leaks. Most of the time, you'll find two bolts holding the carburetor to the engine. Remove these bolts and the carburetor.



PLASTIC CAP

3A

2 DISASSEMBLE

After removing the main jet and the float bowl, Dave pokes out the float hinge pin with a nail set. Take the float off with care; the inlet needle and spring clip are under the float and are easy to lose.

3 REMOVE THE IDLE JET

A dirty idle jet is the reason small engines pulse and surge instead of idling smoothly. It's also easy to overlook. On this carburetor, the idle jet is behind a small plastic cap. Dave uses an old dental pick to pop out the cap and then removes the idle jet with a small flat-head screwdriver.



IDLE JET

3B

4 SOAK IN CARB CLEANER

Soak the parts in Berryman Chem-Dip cleaner (\$30 per gallon) for 15 minutes. This takes care of most surface grime. After soaking, use a brush to clean off any remaining debris.



4





5

5 DEEP CLEANING

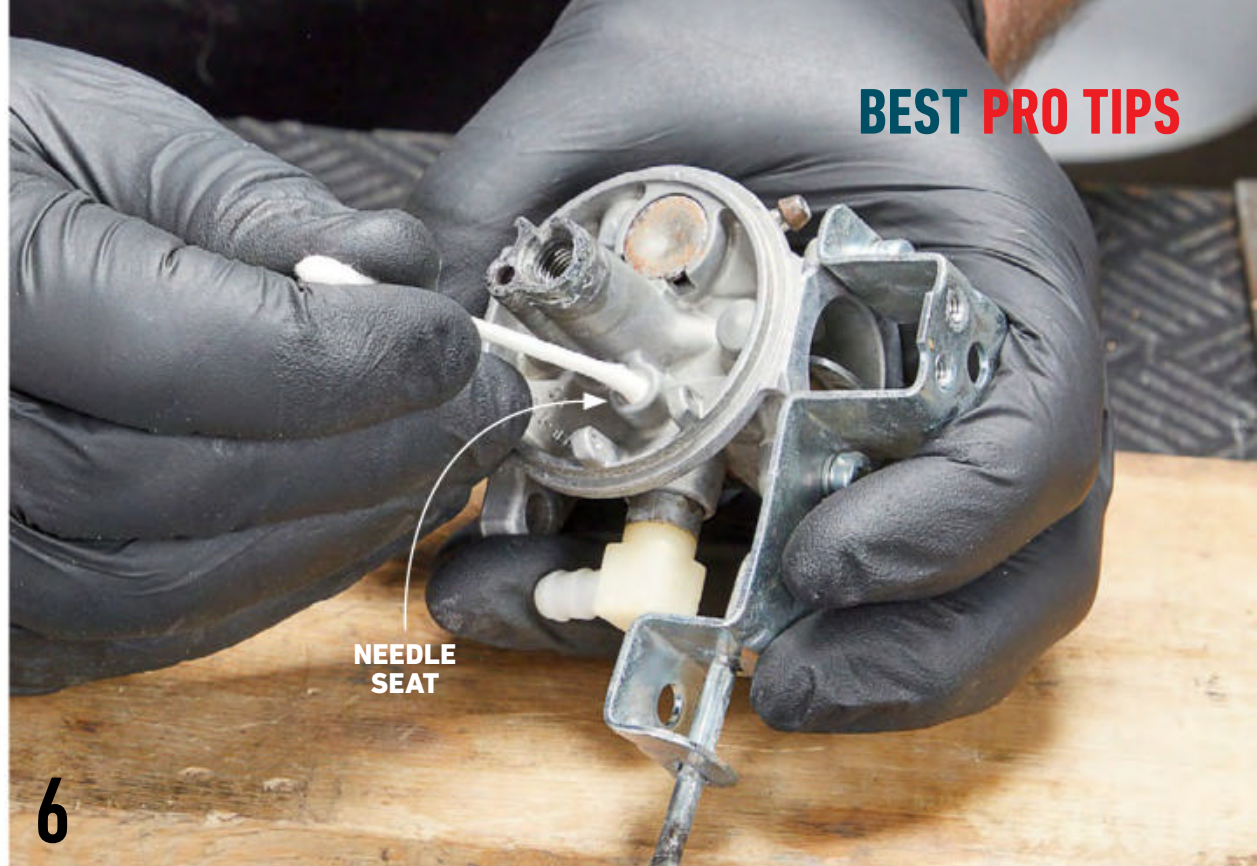
A deep clean removes debris not reachable by soaking. Dave uses an ultrasonic cleaner, but you can place parts in a pot of boiling water for 15 minutes.

6 CLEAN THE NEEDLE SEAT

To make sure the needle seats cleanly, use a cotton swab to clear debris out of the needle seat.

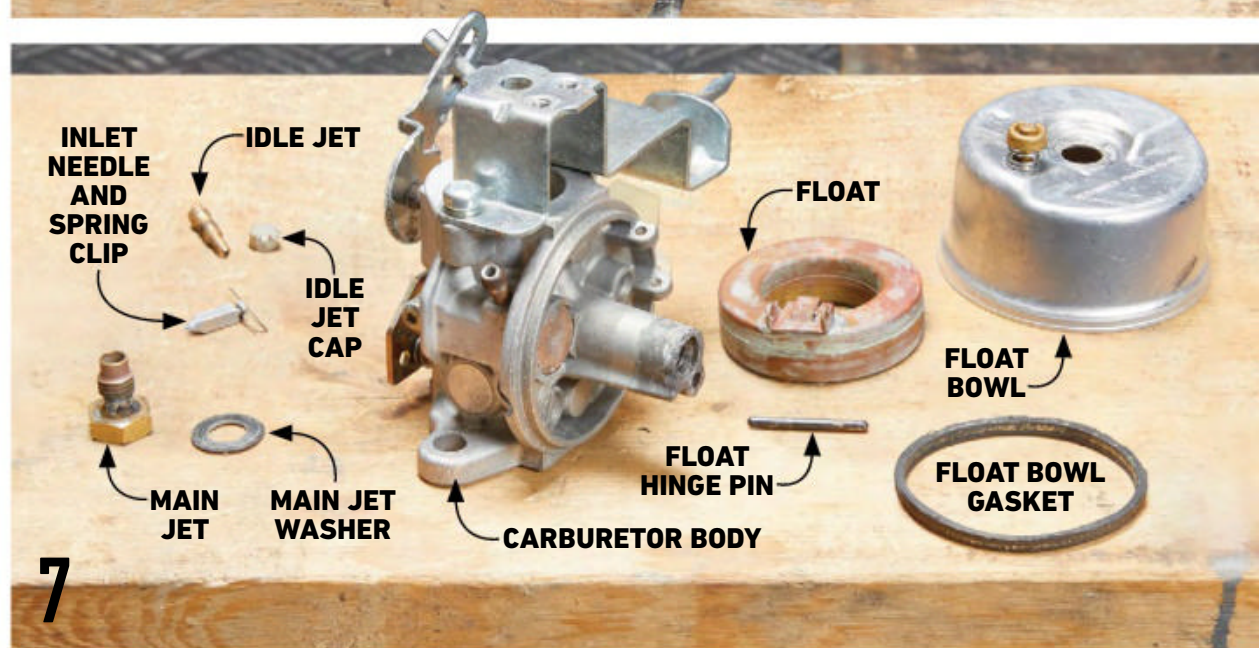
7 REASSEMBLE AND INSTALL

Lay the clean parts out on your bench and do one final inspection. Reassemble the carburetor, bolt it to your machine and don't forget to prime it!



NEEDLE SEAT

6



7

RULES FOR SEASONAL STORAGE

DRAIN THE CARBURETOR

You need to take one more important step after running your small engine out of fuel for the season. Some gas will remain in the carburetor's float bowl, and you need to drain it completely. Many carburetors have a small drain plug on the bottom of the float bowl for this purpose. If left to sit, the gas will varnish and you'll need to remove the carburetor to clean it.

DON'T WINTERIZE—EXERCISE

Perhaps the easiest way to avoid the downside of seasonal maintenance tasks is to "exercise" your engine. Instead of draining the engine of all gas, keep the fuel tank full in the off-season and run the engine once a month for about 10 minutes. Dave has used this technique for years; it saves him time and provides peace of mind. He knows his small engines always have good gas and the internal workings are always coated in fresh oil. Seems like a no-brainer.

CHANGE THE OIL

Change the oil in your small engine every season. Fresh, clean oil keeps sludge from building up and helps maintain good compression.



PLASTIC BAG

OIL FILL TUBE

PRO TIP:

Some lawn mowers don't have an oil drain plug; the oil is drained out of the fill tube at the top of the engine. Before you tip over your lawn mower to drain the oil, unscrew the gas cap and stretch plastic over the gas tank opening, then screw the cap back on. The plastic will prevent gas from leaking out the cap vent.



DAVE'S BENCH KIT

Dave depends on these tools the most in his shop.

FLEXIBLE PRY BAR

This strong, non-marring poly/nylon pry bar won't damage brass or aluminum. \$10 for a set at Harbor Freight.

RATCHET DRIVER

This 1/4-in.-drive ratchet with an extension gets the socket into tight places.

WRENCH

Dave has a set of combination wrenches in both imperial and metric.

HOSE CLAMP PLIERS

Removal of flat-type or ring-type hose clamps is much easier with these. \$14 online.

WIRE BRUSH

It's a must-have for cleaning small parts.

NEEDLE-NOSE PLIERS

You will always need a pair when working on carburetors.

JET CLEANING BRUSHES

These micro-wire brushes remove debris from jets.

CARB CLEANER

Gumout carb cleaner is available at all auto parts stores.

HOSE PINCH

These locking pliers will clamp on a hose without causing damage. \$25 online.

WIRE CUTTERS

Dave uses these for snipping linkages.

SPARK PLUG CHECKER

This adjustable-gap inline spark tester is made by Echo. \$75 online.

SCREWDRIVERS

Basic? Yes. Indispensable? Yes, also that.

DENTAL PICK

An old dental pick can poke, pull and clean where other tools simply can't.

SLIP JOINT PLIERS

These adjustable pliers can play many roles.

NITRILE GLOVES

Dave prefers these tough, black nitrile gloves.

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FIRST AID FOR DIYers

BY DONNA BIERBACH

DIY work is full of ways to hurt yourself—and we'd like to help you avoid every single one of those injuries. A smart habit to develop is to ask yourself this question before you begin any repair or project: "What's the worst thing that can happen?" And then prepare to avoid it. Here are a few basic rules to keep you safe:

- Put on eye protection before you start up any power tools and when you're working with caustic chemicals.
- Keep your table saw blade guard in place.
- Make sure your thumb is out of the way of your utility knife when you cut that sheet of drywall (left). And when working with metal, wear cut-resistant gloves.
- Use a push stick, not your hand, to direct your workpiece through the table saw blade.
- Set up your ladder properly and double-check its stability before you climb it.
- To prevent damage to your hearing over the long term, always use ear protection when you operate power tools.
- Use a voltage tester to make sure there's no power to the outlet you're working on.
- Wear a good pair of work boots on sites where you're at risk for stepping on nails or dropping heavy items.
- Get power cords out of your path to prevent tripping.

Keep your hand out of the cutting path, cut away from your body, and proceed slowly and deliberately. Remember that a sharp blade is safer than a dull one.

TREATING COMMON INJURIES

In spite of all your precautions, you may still injure yourself. Assess the situation, evaluate the injury and call 911 if necessary. Here's how to treat a few common DIY injuries:

SPLINTERS

Clean the area with soap and warm water, and use tweezers to pull the splinter out at the same angle it went in. According to the American College of Emergency Physicians, if it's deeply embedded, over a joint or difficult to remove, leave it in place and get medical help.

SMALL LACERATIONS

Here's how to handle small saw or knife cuts. If the wound is dirty, gently rinse it under running water or use antiseptic wipes. To control bleeding from small cuts, raise and support the injured part and apply pressure. Dry it and apply a sterile bandage. Be sure your tetanus vaccination is up to date.

NAIL PUNCTURE WOUNDS

Stepping on a nail is undeniably painful, and it poses a high risk of infection because dirt and germs can be driven deep into your foot. Wash your hands and apply gentle pressure to stop any bleeding. Rinse the injury for 5 to 10 minutes, apply an antibiotic and bandage the wound. Seek medical attention if the wound was dirty or the puncture is deep—you may require a tetanus booster. If the wound is healing slowly or you notice any signs of infection—including pain, pus, swelling or fever—see a doctor promptly.

A KIT BUILT FOR BUILDERS

Every household needs a well-stocked first aid kit, and it's especially critical for DIYers. We recently checked out the Construction Medic Mini first aid kit (\$100 at mymedic.com). It contains more than 45 vital first aid supplies, several of which treat acute injuries that power tool users are more prone to. There's a chest seal to treat penetrating injuries to the chest, an easy-to-use tourniquet and even a finger tourniquet to stop the bleeding if you sever a digit. The compact kit is small enough to keep in your toolbox, and a full-size Construction Medic Pro (\$375) is also available.



No matter which first aid kit you choose for your household, be sure to keep it current. You don't want to injure yourself and discover that your bandages are brittle, the medications have expired and the antiseptic wipes have long since dried up. Stay safe—we really do care about you.



Bushes and trees that touch house siding can cause water damage to the siding and walls. Trim the branches regularly.

HOMEOWNER'S INSURANCE: AS GOOD AS YOU MAKE IT

Many of us choose a DIY lifestyle because it saves us money. Doing home maintenance ourselves instead of hiring it out means cash in the pocket. Keeping up with it can also save in the long run and ensure your homeowner's insurance policy supports you as it's designed to. Most homeowner policies do not cover damage to your home that's caused by your neglect. And this can apply to both property and liability coverage.

Mold can be a big problem in homes across the country. If the cause of the mold can be attributed to a lack of maintenance, any damage that arises will generally not be covered by a homeowner's policy. If a clogged rain gutter caused water intrusion and the resulting mold, you're out of luck. If, however, the mold grew because of water from a leaking AC unit, you probably are covered.

And remember that large remodeling projects—kitchen updates, basement work—can increase the value of your home and require policy updates.

GLENN HANSEN DEPUTY EDITOR

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TACKLING A TOUGH JOB? IT TAKES BLACK GORILLA TAPE.

This double-thick adhesive grips smooth, rough and uneven surfaces. Nice and hefty, it has reinforced backing and a tight weave—but you can still tear it by hand. Count on it to withstand moisture, UV rays and temperature changes, thanks to its rugged, weather-resistant shell.

MAINTENANCE ITEMS TO CHECK THIS SPRING:

- **TREES:** Remove dead branches and obvious danger signs.
- **CLIMBING PLANTS AND SHRUBS:** Don't let them damage siding or foundations.
- **SUMP PUMP:** Check it before rainy weather.
- **SMOKE ALARMS AND CO TESTERS:** Fresh batteries are a small investment.
- **SIDEWALK AND DRIVEWAY:** Are they safe to walk or drive on, and adequately lit?

FIX THAT TABLE LEG

With one of its legs broken, this old side table teetered and shook. The break was mostly clean, but the previous repair work was poorly done, so it was time to fix the leg properly. Jay Cork shows how he did it.



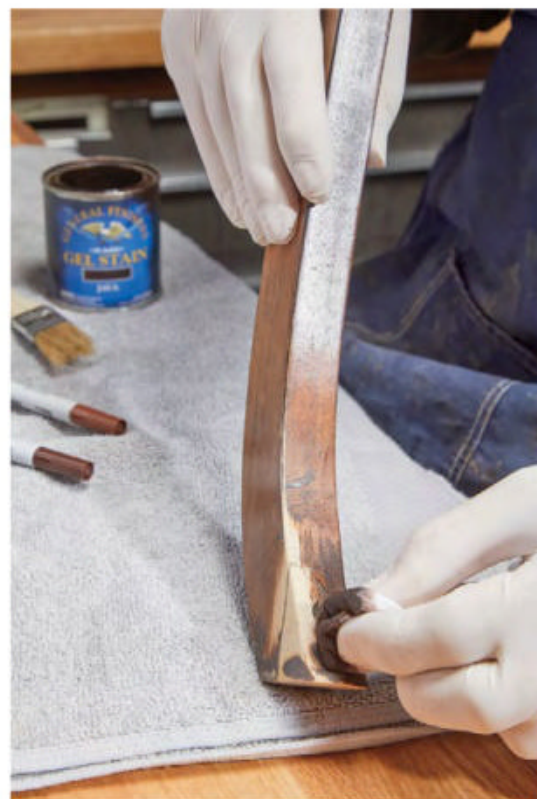
1 REMOVE THE OLD GLUE

A previous repair—done poorly—left glue that needed to be removed. Gently remove the broken wood from the table base and carefully clean off the old glue residue with a chisel.



2 APPLY GLUE, AND HOLD

Apply a small amount of 15-minute epoxy to both sides of the repair, working it into the grain. I couldn't clamp this, so I held the two parts together until the epoxy set up.



3 MATCH THE FINISH

Rub on gel stain and feather the color; it will hide the repair. Go slow and let it fully dry between coats. Once the color is blended, apply a coat of satin urethane to even out the sheen.

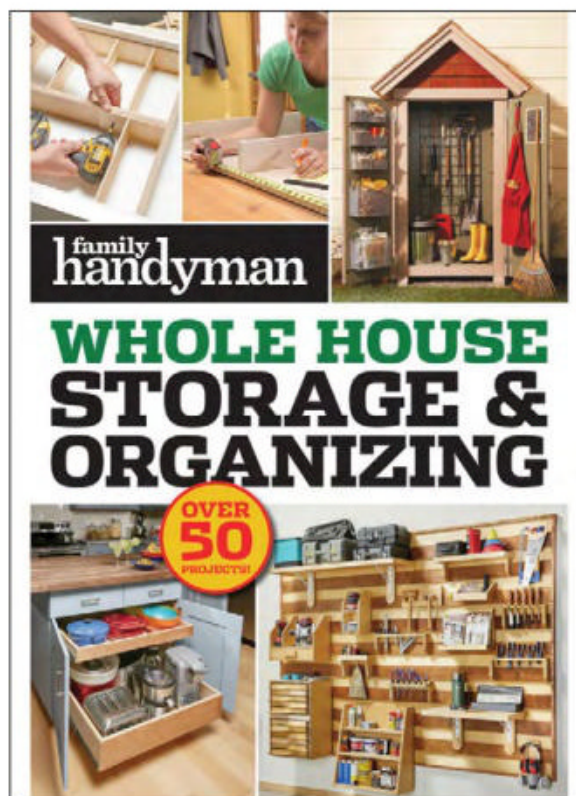
DIY DOGGIE CARE

A rotary tool like a Dremel is uniquely useful for wood carving, tool sharpening, metal polishing and more. The high rpm operation that makes it so useful can also make it noisy and possibly damaging if not used with care. When we saw the Dremel PawControl tool and considered taking a rotary tool to the claws of a precious pet, we laughed in disbelief. And then we ordered one.

The PawControl tool (\$55) is smaller and quieter than your standard Dremel tool and has a slower maximum speed. The reduced noise is what makes it pet friendly. At its slowest of four speed settings, this doggy Dremel is ultra quiet. The tool features a clear plastic “paw guide” that covers the grinding tool and enables proper placement of your pet's claws. You can choose from a few different attachments.

Does it work? The success of this tool is up to your pet. We tried it on one pup who tolerated it. Other doggie parents in our pet-friendly office said, “No thanks, my dog would hate that.” Well, they might not like the visit to the groomer either; you're just not there to watch.

GLENN HANSEN DEPUTY EDITOR



IS IT TIME TO DECLUTTER?

You've come to the right place! Here's what you need to organize every room in your home, from the bathroom to the garage. In this book, you'll find more than 200 clever storage tips, project plans and detailed photos. It's \$10 and shipping is free. familyhandyman.com/4STR

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Once in a lifetime, a product comes along that truly moves people. Introducing the future of battery-powered personal transportation . . . The Zinger.

Throughout the ages, there have been many important advances in mobility. Canes, walkers, rollators, and scooters were created to help people with mobility issues get around and retain their independence. Lately, however, there haven't been any new improvements to these existing products or developments in this field. Until now. Recently, an innovative design engineer who's developed one of the world's most popular products created a completely new breakthrough . . . a personal electric vehicle. It's called the **Zinger**, and there is nothing out there quite like it.

"What my wife especially loves is it gives her back feelings of safety and independence which has given a real boost to her confidence and happiness! Thank You!"

—Kent C., California

The first thing you'll notice about the **Zinger** is its unique look. It doesn't look like a scooter. Its sleek, lightweight yet durable frame is made with aircraft grade aluminum. It weighs only 47.2 lbs but can handle a passenger that's up to 275 lbs! It features one-touch folding and unfolding – when folded



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Black (shown) and Blue

it can be wheeled around like a suitcase. The Zinger folds to a mere 10 inches. and fits easily into a backseat or trunk. Then, there are the steering levers. They enable the **Zinger** to move forward, backward, turn on a dime and even pull right up to a table or desk. With its compact yet powerful motor it can go up to 6 miles an hour and its rechargeable battery can go up to 8 miles on a single charge. With its low center of gravity and inflatable tires it can handle rugged terrain and is virtually tip-proof. Think about it, you can take your **Zinger** almost anywhere, so you don't have to let mobility issues rule your life.

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LAUGHS AND LESSONS FROM OUR READERS

THE BATHROOM IS OCCUPIED

To save a few bucks, I decided to cut down one of our trees myself. I easily removed all the lower branches with my pole saw, and then I had the brilliant idea of taking the saw upstairs and hanging out the second-story bathroom window to remove the upper branches.

All went well until the last (pretty large) remaining limb. I planned the cut so the branch would fall into the "safe and open space" in the yard.

Unfortunately, the nearly 12-ft. limb had other ideas. I narrowly avoided being skewered as it crashed through the window opening and came to rest a few inches from the door. People do a variety of things in their bathrooms—but how many have cut firewood while standing in the bathtub?

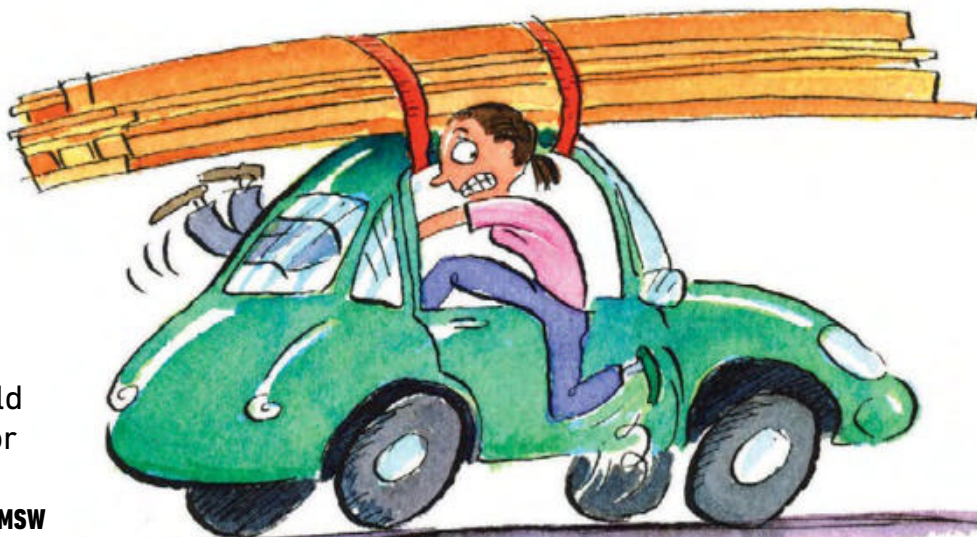
GREG RUVOLO



THE BENEFITS OF HIGHER EDUCATION

My husband and I bought some lumber at the local lumberyard and proceeded to tie it to the top of our car. We're intelligent and educated people with an abundance of common sense. (Between us we have 11 years of higher education: an architectural degree, an undergraduate in prelaw and a master's in social work.) We placed a blanket on the car to protect the roof, lowered the windows and proceeded to secure our purchase. When we were done and trying to get into the car, we two "geniuses" discovered that we had tied the doors closed! Our mouths dropped. Then we looked around, quickly climbed in through the open windows and drove off before anyone could see us. So much for higher education.

KAREN ADELWERTH, LMSW



FUZZY TROUBLE-SHOOTING

Our dryer was taking a long time to dry our clothes. I thought the vent line, which had a long horizontal run through the second-story floor joists, must be clogged with lint. I set up a reasonably safe system with our shop vacuum and a ladder, even attaching PVC pipe to the vacuum hose to extend my reach.

I was removing some lint, but it wasn't enough to affect the drying time. So I removed the PVC pipe from the hose, moved the vac inside, moved the dryer out and ran the hose through the vent from the other direction. Not much lint there either, so I figured it must be lint inside the dryer. While I was gathering my tools and looking at the many screws on the back of the dryer, my wife looked inside it and asked, "Could the dryer sheet covering this vent in the drum be the problem?"

ANDY WAY

ILLUSTRATIONS: STEVE BJÖRKMAN

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