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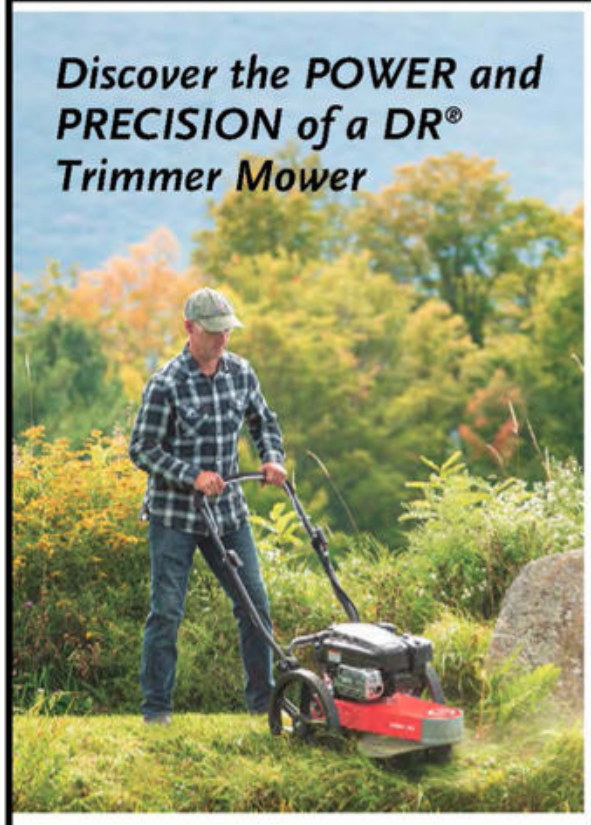

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BUILDING A SUSTAINABLE FUTURE

DIYERS CAN HELP LEAD THE WAY

Farm Director Don Oberdorfer (center) with editors Mike Berner and Brad Holden.

What comes to mind when you hear the word *sustainability*? Resourcefulness? Creativity? Community? Quality? Those are some of the defining terms we use when discussing sustainable home improvement here at *Family Handyman*.

If they hit home with you too, perhaps you'd also agree with the idea that *sustainability* has become an overused word, yet an under-realized practice in our world.

Our team aims to change that. We want to help demystify stigmas around sustainable products and empower readers to find new ways to embrace sustainable living. We want to help you truly live out the word's meaning, and we've dedicated this entire issue to that goal.

We believe sustainability isn't just one thing. It's not simply using "green" materials, recycling soda cans, owning a rain barrel or powering your path lights with solar power. It's all those things, and so much more. It's building high-quality items that last a lifetime. It's reusing materials that would otherwise end up in a landfill. It's purchasing products that are responsibly sourced. It's looking beyond whether something is marketed as "sustainable," and instead asking questions about where that thing came from and where it will go once you're done with it. It's being curious. Being mindful. Being invested. That, to us, is sustainability.

In this issue, we spotlight the products, building materials and building techniques that we feel best represent sustainable living. For our main project, we built a freestanding multiuse structure using several sustainable techniques and building materials. It could be used for a variety of purposes: a backyard workspace, a fun playhouse for kids or grandkids, an art studio or even an absurdly fancy shed.

SCAN THIS CODE GET DON'S TAKE ON THE IMPORTANCE OF A SUSTAINABLE ECOSYSTEM.

To build it, we couldn't have found a more like-minded partner than Dodge Nature Center, a beautiful 460-acre nature preserve and educational destination—complete with community gardens, a working farm and a nature-based preschool—right here in the Twin Cities. In fact, my kids attended school and summer camps at Dodge. I loved the education they received, and the kids loved every minute of their time there.

Dodge allowed *Family Handyman* to build and film this structure on their property, and we, in turn, donated the structure to the nature center. Resident Farm Director Don Oberdorfer was among the many lovely Dodge staff members who lent a hand with our project. He has been working at Dodge for more than 20 years and plays a key role in delivering on Dodge's environmental impact promises. "This building being sustainable is important to me because it's what we teach; it's a culmination of all those lessons about the broader ecosystem, nature and the economy."

Also included in these pages: instructions for creating a recycling/compost bin that you can build right into your kitchen cabinets, and plans for making a gorgeous one-of-a-kind headboard out of reclaimed wood. Repurposing materials. Seeing an old thing in a new light. Wasting nothing. This is sustainability too.

As you flip through this issue, consider what works for you and your family. Since a sustainable future is achievable in many different ways, there's no one path. Find something that works and make efforts where you can, keeping in mind that several small efforts eventually become one big one.

We're hoping our small efforts inspire you to share what you're working on as well. We'd love to hear from you!

Happy creating,

AMY NOVAK
CONTENT DIRECTOR

SEPTEMBER 2023

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FEATURES

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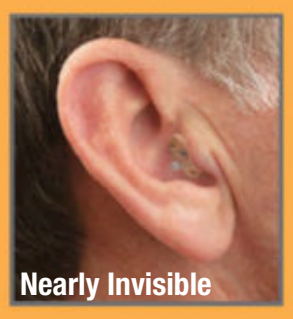

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David (right) and his brick-loving dad, Lawrence Hill Moore

If you've built a project using repurposed materials, we would love to see it! Send your photos to submissions@familyhandyman.com

READER PROJECT

LIKE FATHER, LIKE SON

Inspired by Brad Holden's editor's letter recounting his backyard do-over (June '23, p. 2), reader David Moore shared his family's story:

"When I was growing up, my dad was not one to pass up on anyone's offerings. One day, someone offered him some used brick—A LOT OF BRICK. He loaded up me and my brother, and off we went. We filled the truck with as many bricks as it could hold, and back home we went to unload them. In the ensuing days, it was our chore to clean and stack them. After what seemed like an eternity, we finished handling the approximately 2,000 bricks.

"This was in about 1970 to 1972 when I was 11 or 12, but let's fast-forward to 2018. Both my parents had died earlier that year, and in October, Hurricane Michael paid a visit to southwest Georgia and destroyed our childhood home. With destruction everywhere, my brother and I started walking the property to see what was salvageable.

"When we reached the back, we found, covered in vines and debris, the bricks we had cleaned and stacked some 50 years earlier. We had often reminisced about our dreaded 'brick duty,' but little did we know that the bricks would eventually find their way to our own homes.

"The walkways shown are just two I've made from those bricks. Now when I see free bricks or an old building being torn down, what do I do? I do as my dad did: I jump in the truck and load them up. And yes, I too have a stack at the back of my property, pending the next project. I guess you can say 'Like father, like son.'"

PHOTOS SUPPLIED BY DAVID MOORE

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HANDS ON

TOOLS, GADGETS + GEAR WE RECOMMEND

MODERNIZE YOUR TOOL BELT

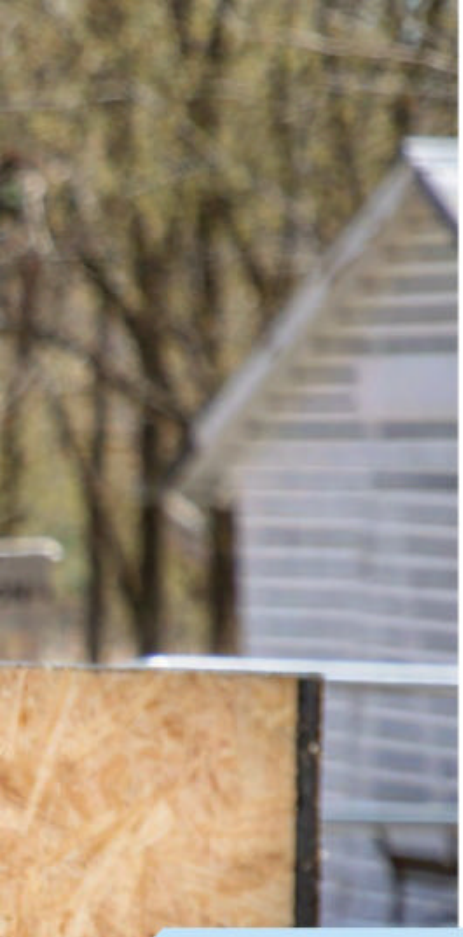
I've had the same old tool belt for about 15 years. My only real complaint about it is that it's constantly trying to pull my pants down, so I'm always adjusting it.

When my colleague showed up wearing a fancy tool belt with suspenders, I immediately wanted to jump on that bandwagon. But it cost way more than I wanted to spend. And my current tool belt is in perfectly good condition, so I didn't need to replace it.

While shuffling through the options at the home center, I found that I could buy just the suspenders for less than $15 and fit them to my old tool belt! I made haste to the checkout with my new ToughBuilt GelFit Suspenders.

Once on the job, I could easily hook the suspenders to my old belt. Because the belt part of my old tool belt has gotten soft in its old age, the straps that hold it to the suspenders tend to slide toward the center in the back. Not that much of a problem, but I might just staple them in place. Either way, these suspenders gave new life to my old tool belt and made me a much happier worker, not having to constantly hike my pants back up! APPROVED

BRAD HOLDEN *DEPUTY PROJECT EDITOR*



CLEVER SHEET CARRIER

Twenty years ago, I didn't think twice about toting heavy sheet goods around in the standard body-breaking fashion. Today, however, I do think twice (or more) about it. If there's an extra body around, I ask for help.

The folks at Kreg are always coming up with innovative products; notably, they're the go-to brand for pocket hole jigs and accessories. Their Panel Carrier is a real back saver. You just slip it over the edge of the sheet you want to carry. Lifting up on the handle closes the jaws securely. With your hand right at shoulder height, just lift and walk away. If you're under 5 foot 6 or so, the Panel Carrier is less convenient. It's available at home centers or online for about $25. APPROVED

BRAD HOLDEN *DEPUTY PROJECT EDITOR*

CLEAN YOUR INDOOR AIR

Smog, smoke, allergens and even viruses have homeowners wondering about indoor air quality and what they can do to improve it, especially if they're spending more time at home. So I was excited to try the Honeywell HPA300 HEPA Air Purifier.

HEPA stands for "high efficiency particulate air." These filters are proven to remove microscopic particles such as dust, pollen, pet dander and smoke. HEPA filters are often used in air purifiers, but you can also find HEPA vacuums and furnace filters, although they may not be the best choice for your furnace.

The model we tried, the HPA300, is intended for rooms up to 465 sq. ft. There are four filters inside the filter housing—three certified HEPA filters and one odor-reducing prefilter. This air purifier is just under 2 ft. tall and weighs only 17 lbs. It's not for use in bathrooms or other damp locations. The HPA300 boasts 4.8 air changes per hour in a 465-sq.-ft. room. The odor-reducing prefilter should be changed every three months, while the HEPA filters should be replaced every 12 months.

I've used it for trash and burnt food odors, and even for neighbors' cigarette smoke coming in our windows. When using the air purifier for a specific odor, I set it to high or turbo. I also ran the air purifier for extended periods without a triggering odor to test the timer feature, which is handy when you want the unit to turn off after a set time period. In that case, I used the low or medium setting.

It's hard to measure the true effectiveness of an air purifier in a home, so I judged it by smell. I noticed a difference each time I turned on the air purifier. Standing next to it, you can feel air blowing that has a fresh, clean smell.

This is one of the more expensive options in Honeywell's air purifier lineup, but it works for a large space and comes with all the necessary filters. It has a five-year warranty. If you have allergies or deal with a lot of smog, wildfire smoke or dust storms, this product is worthwhile. The Honeywell True HEPA Air Purifier costs about $250. APPROVED

ETHAN O'DONNELL *EDITOR*

MAKE BUCKETS WORK BETTER

Have you ever used a 5-gal. bucket as a sawhorse? I think most of us have been down that road. The team at Bucket Builder took that idea and ran with it, creating a heavy-duty molded plastic universal lid. It's modeled off of the Home Depot bucket, but it fits most 5-gal. buckets.

The top securely holds two 2x4s flat, or one 2-by on edge. The bottom is molded for holding pipes or other cylindrical items. The lid can snap on to either the top or bottom of a bucket, providing lots of versatility. With two buckets and two 2x4s, you have a sturdy assembly bench or sawhorse.

Need a taller work surface? Start with two buckets, each capped with a Bucket Builder, then stack another upside-down bucket on each one and cap off the stack with another Bucket Builder. Four such stacks topped with a plywood sheet make a workbench. To make the workbench more stable, fill the bottom buckets with sand or even water. Another nice feature for solidifying the assembly are the predrilled pilot holes in the raised moldings. Use these to drive screws at an angle into your 2-by stock.

When you're done, Bucket Builders nest together for compact storage. A four-pack is $28 at bucketbuilder.com and other online retailers. APPROVED

BRAD HOLDEN *DEPUTY PROJECT EDITOR*

SLIDING T-BEVEL GETS AN UPGRADE

When I first encountered the General Angle-izer Digital Sliding T-bevel, I thought it seemed gimmicky. Once I started using it, I was sold.

When you use a standard sliding T-bevel, you often still have calculations to do. The digital version helps with that. For instance, if I need to bisect an angle, I don't need to draw it like I learned in junior high. I can just divide the angle shown by two. Also, it makes angle duplication a snap. It's like having a digital protractor and a sliding T-bevel. And the tool is accurate to within 0.3 degrees.

The buttons on the Angle-izer allow you to read the reverse angle, flip the display and enter an angle into the tool's memory. It requires a CR2032 battery, but the good news is, even with a dead battery, it still works as a standard sliding T-bevel. You can buy one online or at woodworking stores for about $25. APPROVED

MIKE BERNER *SENIOR PROJECT EDITOR*

THINKING ABOUT YOUR FUTURE

By: Beth Giles

Life really does fly by. Before I knew it, my 60s had arrived, and with them came some new gifts from dear ol' Mother Nature—frequent knee pain, stress, low energy and sleeplessness. Now, I'm a realist about these things, I knew I wasn't going to be young and springy forever. But still, with "golden years" nearly on my doorstep, I couldn't help but feel a little cheated. That is until I found my own secret weapon. Another gift from Mother Nature.

It began a few months back when I was complaining about my aches and pains to my marathon-running granddaughter, Jen. She casually mentioned how she uses CBD rub to help with her joint pain. She said that CBD gave her more focus and clarity throughout the day and that her lingering muscle and joint discomfort no longer bothered her. She even felt comfortable signing up for back-to-back marathons two weekends in a row this year. That made even this self-proclaimed skeptic take notice.

But I still had some concerns. According to one study in the Journal of the American Medical Association, 70% of CBD products didn't contain the amount of CBD stated on their labels. And, as a consumer, that's terrifying!

If I was going to try CBD, I needed to trust the source through and through. My two-fold research process naturally led me to Zebra CBD.

First, I started calling my family and friends. Call me old fashioned but I wanted to know if there were people whom I trusted (more than anonymous testimonials) who've had success using CBD besides my granddaughter.

Secondly, I wanted cold hard facts. Diving deep into the world of CBD research and clinical studies, I came across Emily Gray M.D., a physician at the University of California at San Diego (UCSD) Medical School and medical advisor to Zebra CBD who is researching the effects of CBD. Dr. Gray wrote "early results with CBD have been promising and we have a lot of research underway now. I've had several patients using CBD with good success. It's important that you know your source of CBD and how to use it properly."

After hearing it from the doctor's mouth, I returned to my research, asking more people and was amazed by the number of close friends and family who were already on the CBD train. Apparently, I was the only one without a clue! And funny enough, a couple of friends who commented were using the same brand as my granddaughter—Zebra CBD. There was no consensus as to why they were using CBD, but the top reasons given were for muscle & joint discomfort, mood support, sleep support, stress and headaches, as well as supporting overall health & wellness.

Eventually, even the most skeptical of the bunch can be won over. With a trusted CBD source in mind, I decided to give it a go.

When I viewed Zebra CBD's selection online, I was impressed by its array of products, including CBD oils called tinctures, topicals, chewable tablets, mints and gummies. After reading on their website that all their products are made with organically-grown hemp, I ordered... and it arrived within 2 days!

The first product I tried was the Rub. Now this stuff was strong. Immediately after rubbing it on my knee, the soothing effects kicked in. It had that familiar menthol cooling effect, which I personally find very relieving. And the best part is, after two weeks of using it, my knee pain no longer affected my daily mobility.

The Zebra Sleep Gummies, on the other hand, had a different but equally positive effect on my body. To take it, the instructions suggest chewing thoroughly. This was simple enough, and the taste was, well, lemony. After about 15 minutes, a sense of calm came over my body. It's hard to describe exactly; it's definitely not a "high" feeling. It's more like an overall sense of relaxation—and then I fell fast asleep. Needless to say, I slept great and woke up refreshed. I haven't slept like that in a long time.

While it hasn't been a catch-all fix to every one of my health issues, it has eased the level and frequency of my aches. And it sure doesn't seem like a coincidence how rejuvenated I feel.

All-in-all, CBD is one of those things that you have to try for yourself. Although I was skeptical at first, I can safely say that I'm now a Zebra CBD fan and that I highly recommend their products.

Also, I managed to speak with a Zebra CBD spokesperson willing to provide an exclusive. If you order this month, you'll receive $10 off your first order by using promo code **"FH10"** at checkout. Plus, the company offers a 100% No-Hassle, Money-Back Guarantee. You can try it yourself and order Zebra CBD at ZebraCBD.com/FH or at 1-888-762-2699.

HANDY HINTS

fh CLEVER SOLUTIONS FROM OUR READERS

NO JOINTER? NO PROBLEM

Not all of us have the room or the budget for a dedicated jointer machine. Here's a great way to true the edge of a board with a router.

- Make a jointing guide by ripping a 6-in. strip from the factory edge of a piece of plywood. Be sure your jointing guide is a little longer than the boards you're jointing.
- Install a bearing-guided router bit in the router and clamp your jointing guide over the board you'll be jointing. Let the edge of the board project just beyond the factory edge of the jointing guide all along its length.
- Run the router to joint the edge, keeping the bearing firmly against the factory edge of the jointing guide and the router base pressed down. This will ensure a finished edge that's 90° to the board faces.

JAY CORK

SHARE YOUR HANDY HINTS WITH US

submissions@familyhandyman.com

LOW-FLOW AERATORS SAVE WATER

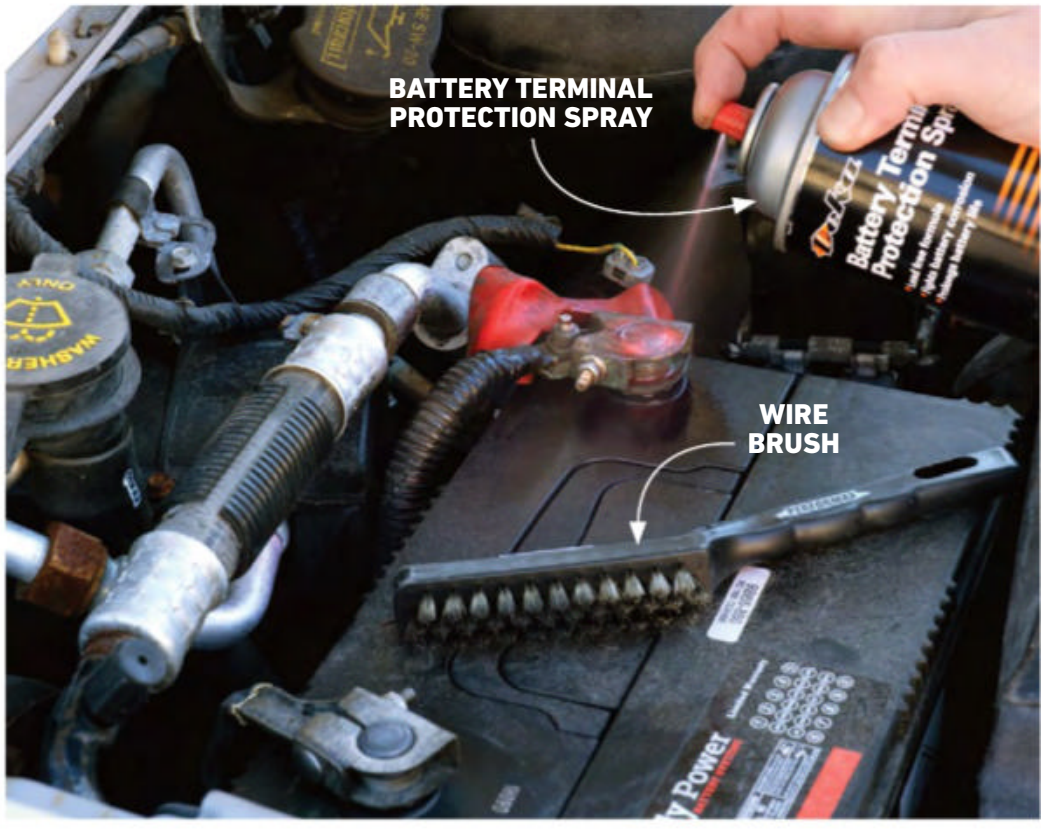
All the faucets in your home have aerators—small screens threaded onto the faucet to limit the volume of water. Standard aerators allow 2.2 gallons of water per minute (GPM), and high-efficiency aerators drop that to 1.5 GPM, but you can buy aerators that reduce the flow to as little as 0.5 GPM. The downside: If the flow is too low, you'll be waiting awhile for your pot to fill.

DANIEL CAIRNS

SECURE YOUR DOG WASTE BAGS

Dog owners will understand this problem: The tether attaching the dog bag dispenser to the leash swings and knocks around as you're walking. It drove me nuts. So I secured the dispenser to my leash housing with hook-and-loop tape. As a bonus, I can remove it easily to refill the dispenser.

BRAD HOLDEN



EXTEND BATTERY LIFE

Even a small amount of corrosion can have a huge impact on a charging system's ability to recharge the battery. Prolonged undercharged conditions dramatically reduce battery life. To remedy this, remove the terminals and clean them with a wire brush. Then clean the posts. Spray battery neutralizer/cleaner on the battery and hold-down hardware. Protect from further corrosion with battery protectant spray. Allow it to dry before driving; some of these sprays are flammable.

RICK MUSCOPLAT

UNDER-THE-BED DRAWERS

Drawers from old dressers can be given new life as under-the-bed storage bins. Fasten small casters to the bottoms and slide the drawers under the bed to store your bedding, seasonal clothes, extra blankets, toys and more.

EMMA BOWMAN

TINY TOUCH-UP TRAY

While working on a siding project, I needed to do some paint touch-ups and I didn't have a paint tray. So I used an empty screw box. These plastic boxes have a hinged lid and fit a 2-in. chip brush perfectly. When I was done, I closed the lid to keep dust out and the paint from skinning over.

GABE BROWN

COLLECT FOOD SCRAPS

Cleaning the plates from my three kids usually ends up clogging the sink strainer and makes the sink fill with gross food water. Lately I've been rinsing dishes into a colander, which makes it easy to empty the food scraps into the compost bin or garbage can.

MIKE BERNER

For the Man Who Gives Everything and Expects Nothing

If you're anything like my dad, you give your family everything. Your name, your time, your values — the people in your life know they can depend on you for practically anything. In exchange for imparting all of this energy and experience, you expect nothing in return.

The point? You deserve to treat yourself once in a while. You do so much for the people you care about. Now it's time to focus on you for just a few minutes. That's where the Men's Due Volta Watch comes in. This astonishing innovation provides a digital readout that's powered by a precise quartz engine, combining both analog and digital timekeeping.

Outfitted with a stopwatch, alarm, a.m./p.m. settings, and day, date and month complications, this timepiece stands out from the crowd. With its large face and handsome, masculine design, this watch is perfect for the back nine and the happy hour afterwards. Water-resistant up to 3 ATM, this timepiece won't wimp out if you have a run-in with a water hazard.

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SUSTAINABLE RETREAT

BUILD A VERSATILE "EXTRA ROOM" IN YOUR BACKYARD

BY BRAD HOLDEN

The inspiration for our backyard build stemmed from two ideas. First, we wanted to showcase some sustainable building products and practices. Second was the transition to a "work-from-home" lifestyle that many folks started over the last few years, creating a need for home office space. But this type of backyard building could suit many purposes. You could use it as a playroom, a music or art studio, or just a place to hang out outside of your home. Our building doesn't have plumbing—only electricity—which greatly simplified the build and kept the cost down. Because of the small space and excellent insulation, you could probably heat it with an incandescent lightbulb.

WHAT IT TAKES

TIME	COST	SKILL LEVEL
4-6 weeks	About $25,000	Advanced

TOOLS
Table saw, miter saw, circular saw, reciprocating saw, oscillating multi-tool, drill/driver, basic carpentry hand tools

SCAN THIS CODE
WATCH THESE GUYS BUILD THIS RETREAT WITHOUT MISSING A BEAT.

MEET THE BUILDERS

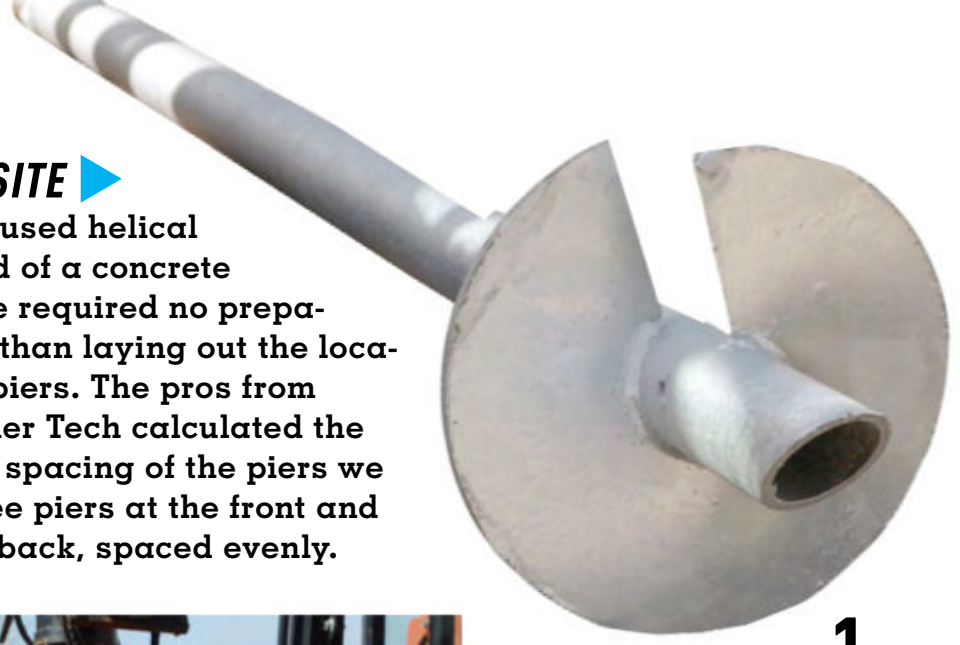
BRAD HOLDEN IS DEPUTY PROJECT EDITOR, **MIKE BERNER** IS A SENIOR PROJECT EDITOR, AND **GABE BROWN** IS A LOCAL GENERAL CONTRACTOR.

BUILDING ON HELICAL PIERS

When it was time to break ground on our build, the ground on the site was having none of it. It was way too wet to pour a concrete slab. Even accessing the site with a concrete truck would have been a big challenge. So we changed tack and opted to use helical piers for our foundation.

This proved to be a plus in several ways. First, we didn't need to disturb the ground at all. Not having to do any excavation was a big plus for this little wetland area. Second, we didn't need to wait for concrete to cure before we started building. As soon as the piers were in, we were off and running.

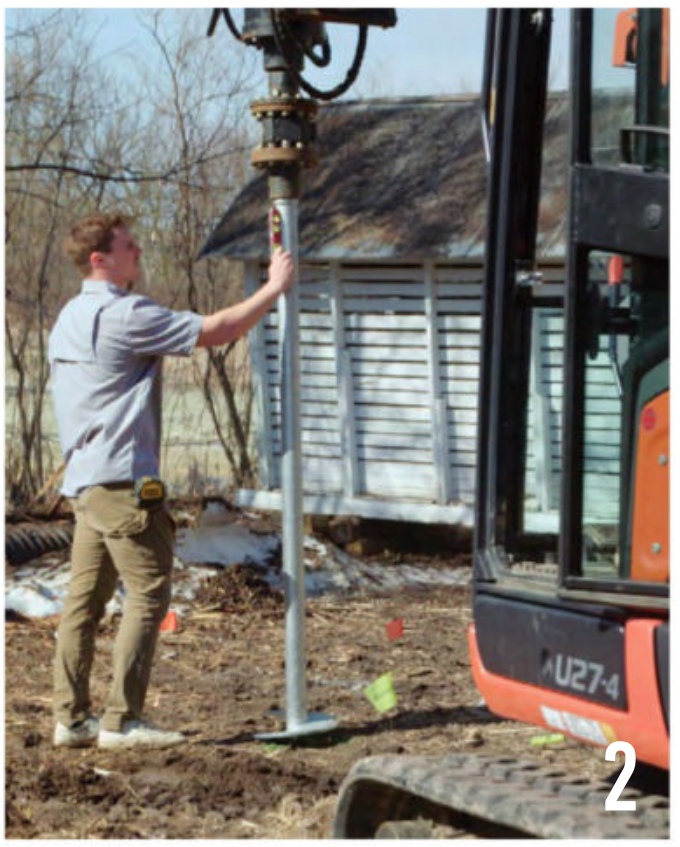
Lastly, this method saved us a lot of work. As I mentioned before, there was no site excavation, but also, there was no time spent building a form, hauling wheelbarrows full of concrete, or finishing the concrete. We may never pour a slab again!



1

PREP THE SITE

Because we used helical piers instead of a concrete slab, our site required no preparation other than laying out the locations of the piers. The pros from Structural Pier Tech calculated the number and spacing of the piers we needed: three piers at the front and three at the back, spaced evenly.



2

DRIVE THE PIERS

Helical piers are sort of like 7-ft. screws. Using special equipment, our contractor drove the piers into the ground until they reached a specific torque. If the necessary torque isn't achieved from one length of pier, they'll attach another section. Two of our piers required a depth of 21 ft.!

3

ATTACH THE POSTS

When the piers are driven, they don't end up level with each other. So we located the highest pier and used that as our starting point. We used treated 6x6 posts on top of each pier, cut to the proper height to make a level bearing for our two beams, and attached them with steel brackets that connect to the tops of the piers.

ADD THE BEAMS

We constructed our support beams by laminating three 2x8s using nails and construction adhesive. We secured the beams to the tops of the posts using special post-beam connectors.

FRAME THE FLOOR

At this point, we're on to standard deck framing. We cut the joists to length and arranged them on top of the beams, and then added the front and back rim joists. After squaring the deck assembly, we secured it to the beams using hurricane straps. We added blocking on top of the beams and at the front, where our deck would start. That way, we could insulate only the part of the floor that's under the interior portion of the finished structure.

INSULATE THE FLOOR

Since our floor is up off the ground, we needed to insulate it well to help maintain the building's interior temperature and prevent condensation. We attached a 2x2 cleat along the bottom edges of all the joists, then cut GoBoard—a foam-based, waterproof underlayment for tile—to fill each joist cavity.

On top of the GoBoard, we set in 1½-in. thick rigid foam insulation and sealed around the edges with expanding foam. This keeps out moisture. Next, we filled the joist cavities with mineral wool batts.

ADD THE DECKING

With the floor insulated, we installed the subfloor decking. For this, we used ¾-in. tongue-and-groove OSB (oriented strand board), fastened with nails and construction adhesive. Once this part was done, we were vigilant about tarping the deck during the next steps until the structure had walls with sheathing and a roof, to protect our insulated floor from rain.

FRAMING DOUBLE WALLS

Building sustainably doesn't always mean using new and innovative building products. Sometimes it's simply using a traditional building method, modified to be more energy efficient. That's exactly what we did when designing our framing. We wanted to keep it simple *and* efficient, so we built double 2x4 walls. This double-walled framing technique adds space for lots of insulation and eliminates the heat transfer that happens when individual studs are in contact with both the inner and outer wall.

FRAME THE OUTER WALLS

The first step in building double walls is to build the outer walls. Start with a top and bottom plate cut to the length of the wall and mark out the 16-in. on-center stud layout as well as the window locations with jack and king studs.

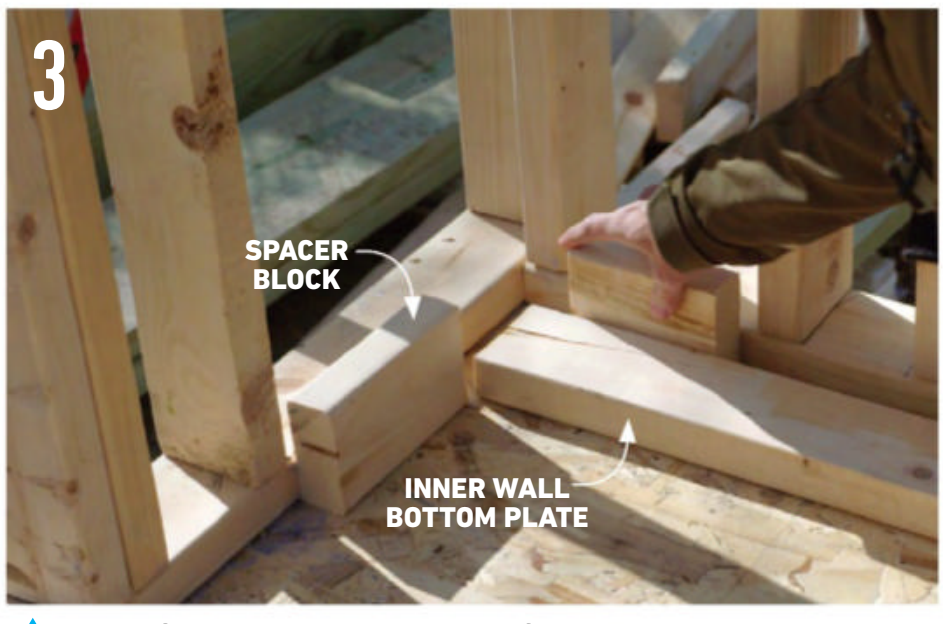
On a standard roof with a ridge beam, the layout is marked on the top and bottom plate at the same time. On this sloped-shed style roof, we laid out the heights of the walls on the floor and transferred the layout to the angled top plate to get an accurate measurement for each stud.

TIP UP THE OUTER WALLS

Cut all the studs, including the jack studs, king studs and cripple studs for the windows. Line them up with the layout marks and nail them through the plates. Tip up each wall as you build it, brace it plumb, and fasten the walls together at the corners.

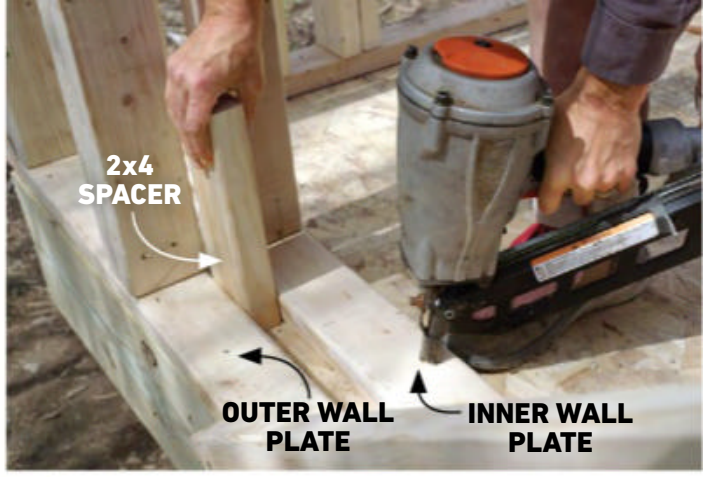
PRO TIP

When building a shed-style roof, save yourself time and write down the measurements for each stud so you don't have to remeasure for the opposite side.



LAY OUT THE INNER WALLS

Once the exterior walls are up, cut a 2x4 bottom plate 3 in. shorter than the distance between the walls. Place it between the walls with a 2x4 spacer at the ends. Then copy the layout of the exterior walls onto the new bottom plate. Transfer the marks to the top plate, then cut the studs and build the wall.



TIP UP THE INNER WALLS

We built the end walls first and tipped them up as they were built. We used a 2x4 spacer between the inner and outer walls to position them, and nailed them through the bottom plate. We made sure to nail them into the joist below whenever possible and not just the subfloor.

WINDOW DETAIL

Transferring the stud layout from the outer to the inner wall makes it easy to match the window openings. But at the windows, not all the framing parts will need to be transferred to the inner wall. Since the outer wall bears the weight of the roof, it will contain any headers, jack and king studs, reducing the amount of framing material needed and maximizing the insulation space of the inner wall.

INSTALL INSULATION

After the sheathing and roof framing, (see p. 20), the final step in making these walls extra efficient is to fill the stud spaces with insulation. We started by filling the outer wall with mineral wool insulation, cutting the batts to fit the stud bays. Next, we ran our wiring (see p. 27), then added mineral wool batts to the inner wall. Last, we covered the wall with a vapor barrier before installing the wallboard.

APPLY SHEATHING

With the walls framed, it was time to add the sheathing. We used Georgia-Pacific ForceField sheathing, which incorporates a moisture barrier as part of the sheathing. There was no need to tack up a water-resistant barrier after applying the sheathing, which was a real timesaver. All we had to do was tape the seams.

FRAME THE ROOF

We purchased engineered I-joists for our rafters. These I-joists are stiffer, straighter and lighter weight than comparable 2-by material. We placed the rafters and then attached an LVL (laminated veneer lumber) beam to the front posts to support the 3-ft. overhang and 2x10 subfascia to the back to fully tie the roof framing together. The I-beam rafters are secured to the LVL beams with appropriately sized joist hangers.

DECK THE ROOF

Once the roof was framed, we applied the roof deck, using the same sheathing material we used on the walls. That was another timesaver here, as no underlayment was required. All we needed to do was tape the seams using a purpose-made, heavier, more flexible tape than we had used on the wall sheathing. At this point, with no rain in the forecast, we moved on to installing the windows and siding before installing the roof panels.

INSTALLING THE WINDOWS

To save money—and save some perfectly good windows from the landfill—we purchased our windows from a reuse company that sells construction materials that were salvaged or misordered, or sometimes new materials that were just never used. We lucked out and found new windows at a big discount.

If these windows had been previously installed, we may have had to order some replacement parts from the manufacturer, such as nailing flanges and hardware. Another thing that's common when you're reusing windows is that you might not find a complete matching set, so you'll likely make some compromises there.

As was the case for us, you'll also need to add extension jambs to the window to meet the depth of your framing. Since our wall framing was double-thick, our extension jambs were nearly 8 in. deep, which made for useful windowsills. And we used the extension jambs themselves as the window trim.

If you want to install windows that were previously used, once you have all the necessary window parts, the installation is the same as for a new window.

1 FRAME THE OPENING

In new construction, frame in the window openings as you're framing the walls (see Photo 5 on p. 19). To find the size of the openings, measure the windows and add 1¼ in. to the width and height. This leaves space on all sides of the windows to plumb and level using shims, as well as insulation. If you're installing your windows in existing construction, know that if your windows aren't perfectly sized to your rough opening, you'll have extra work both inside and out, adding framing and refinishing and trimming out wall surfaces.

▲ FLASH THE OPENING

Cut a piece of cedar bevel siding to fit the windowsill. Set it in place with the thin edge toward the exterior. This way, if any moisture does get in around the window, it'll flow outward. Tape the sill using flexible flashing tape, extending about 6 in. up each side. Use flashing tape to tape the seams where the sheathing meets the studs.

SET THE WINDOW

Level two pairs of shims across the sill and nail them in place. Apply silicone to the flange, then enlist a helper to tip the window into the opening. Set it on the sill shims and center it side to side.

SEAL THE FLANGE

Tape over the nailing flanges using window flashing tape. On the inside, add a few trim-head screws—if possible—through the jambs into the studs to firmly secure the windows.

PLUMB THE WINDOW

With one person inside armed with a level and one outside with a hammer and roofing nails, it's time to fasten the window to the framing. Verify that the sill is level and nail the two bottom corners of the flange. Last, plumb the sides and nail the top corners. Use a straightedge on the jambs as you're nailing off the flange, shimming the jambs as needed to keep them perfectly straight.

ADD EXTENSION JAMBS

We prebuilt extension jambs for our windows using pocket hole joinery instead of installing one board at a time. This approach ensures the extension jamb is square, and it makes installation a breeze. Just set the assembled jamb into place and fasten it to the framing.

To some, sunglasses are a fashion accessory...

But When Driving, These Sunglasses May Save Your Life!

Studies by the National Highway Traffic Safety Administration (NHTSA) show that most (74%) of the crashes occurred on clear, sunny days

Drivers' Alert: Driving can expose you to more dangerous glare than any sunny day at the beach can... do you know how to protect yourself?

The sun rises and sets at peak travel periods, during the early morning and afternoon rush hours and many drivers find themselves temporarily blinded while driving directly into the glare of the sun. Deadly accidents are regularly caused by such blinding glare with danger arising from reflected light off another vehicle, the pavement, or even from waxed and oily windshields that can make matters worse. Early morning dew can exacerbate this situation. Yet, motorists struggle on despite being blinded by the sun's glare that can cause countless accidents every year.

Not all sunglasses are created equal. Protecting your eyes is serious business. With all the fancy fashion frames out there it can be easy to overlook what really matters—the lenses. So we did our research and looked to the very best in optic innovation and technology.

Sometimes it does take a rocket scientist. A NASA rocket scientist. Some ordinary sunglasses can obscure your vision by exposing your eyes to harmful UV rays, blue light, and reflective glare. They can also darken useful vision-enhancing light. But now, independent research conducted by scientists from NASA's Jet Propulsion Laboratory has brought forth ground-breaking technology to help protect human eyesight from the harmful effects of solar radiation light. This superior lens technology was first discovered when NASA scientists looked to nature for a means to superior eye protection—specifically, by studying the eyes of eagles, known for their extreme visual acuity. This discovery resulted in what is now known as Eagle Eyes®.

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The Only Sunglass Technology Certified by the Space Foundation for UV and Blue-Light Eye Protection. Eagle Eyes® features the most advanced eye protection technology ever created. The TriLenium® Lens Technology offers triple-filter polarization to block 99.9% UVA and UVB—plus the added benefit of blue-light eye protection. Eagle Eyes® is the only optic technology that has earned official recognition from the Space Certification Program for this remarkable technology. Now, that's proven science-based protection.

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That's two pairs to protect your eyes with the best technology available for less than the price of one pair of traditional sunglasses. You get a pair of Navigators with stainless steel black frames and the other with stainless steel gold, plus one hard zipper case and one micro-fiber drawstring cleaning pouch are included. Keep one pair in your pocket and one in your car.

Your satisfaction is 100% guaranteed. If you are not astounded with the Eagle Eyes® technology, enjoying clearer, sharper and more glare-free vision, simply return one pair within 30 days for a full refund of the purchase price. The other pair is yours to keep. No one else has such confidence in their optic technology. Don't leave your eyes in the hands of fashion designers, entrust them to the best scientific minds on earth. Wear your Eagle Eyes® **Navigators** with absolute confidence, knowing your eyes are protected with technology that was born in space for the human race.

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INSTALLING BOARD AND BATTEN SIDING

Siding covers all our homes, sheds, garages and every other building you see. Brick, stucco, wood, vinyl, steel—it's the first layer of protection our homes have from the elements.

Installing siding yourself is no easy task, but once you're armed with a basic understanding of the different parts and how they go together, it's a matter of making accurate cuts and following the manufacturer's recommendations for fastening. We used an engineered wood siding from Sherwin-Williams to create this classic board and batten look.

We're big fans of engineered wood siding. The boards are lightweight, tough and always straight and can be ordered prefinished with a special coating that comes with a fade warranty of 15 years or more. It's also made using otherwise wasted wood chips from the wood processing industry, keeping them from the landfill. On top of that, the siding can be cut with regular saw blades and it's easy to install.

LEVEL THE SKIRT TRIM

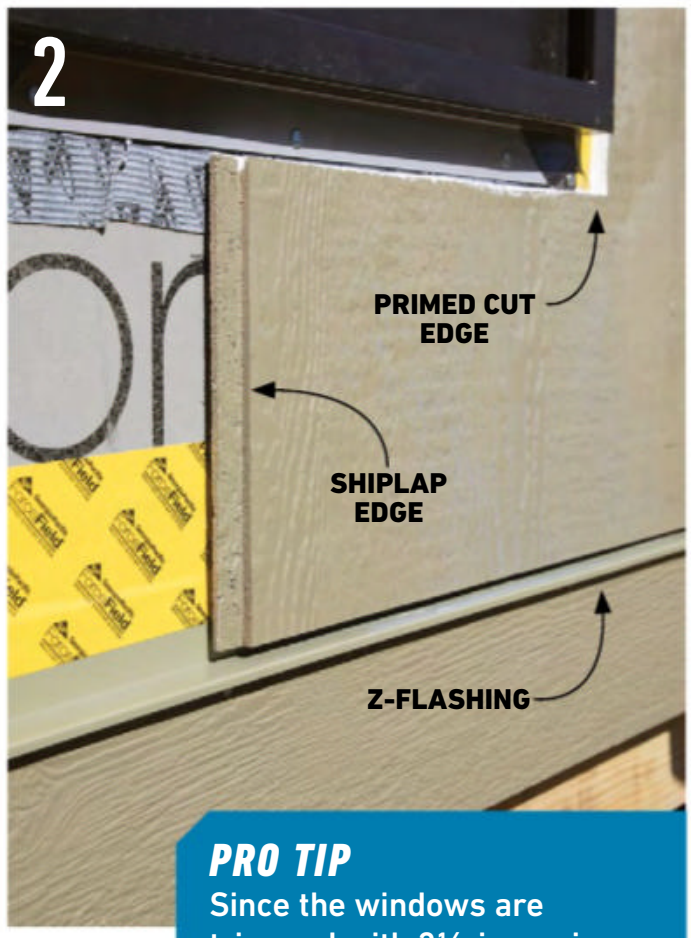
We fastened 1x6 trim at the bottom of the building, making sure it was level all the way around. This skirt trim gives the bottom of the siding a finished look and provides a ledge for the tall siding panels to rest while nailing them on. Fasten the skirt trim with 2-in. siding nails. Then, secure 1-in. Z-flashing on the top edge of the trim to prevent standing water from wicking into the trim.

PRO TIP

On the Z-flashing, mark all the studs that land every 16 in. on center, trimmers, cripples and headers to make fastening the siding less of a guessing game.

INSTALL THE SHIPLAP PANELS

The siding panels have shiplap edges, so we started from one corner and worked across the walls, making sure the panel edge joints overlap the previous one. After each panel was cut to length and width and the window cutouts were made, we raised the panel ¼ in. above the skirt trim, made sure it was plumb and fastened it to the studs. As you're cutting panels, be sure to prime any raw edges to prevent moisture damage.



PRO TIP

Since the windows are trimmed with 3½-in. casing, we made the notches for the window about 1½ in. larger. This allowed us plenty of wiggle room to position the panel *and* avoid further build-up over the window's nail flange.

On this project, our 8-ft. panels were not tall enough to cover the entire wall, so we were left with a horizontal seam. If left without flashing, it would collect water and rot the siding. So we installed ⅜-in. Z-flashing on top of the seam to keep out water.

3

4

ATTACH THE CORNER TRIM

Engineered siding companies manufacture a special trim piece to make covering outside corners of buildings much easier. The corner trim comes preassembled so you can simply cut it to length and nail it on.

APPLY THE WINDOW TRIM

You could nail the window trim pieces up individually, but we decided to prebuild the window casing using pocket hole joinery and then nail them on as one piece. This was faster and ensured the trim joints were lined up perfectly. To size the opening in the finished frame, start by cutting the bottom piece ¼ in. longer than the window's width. The sides cover the ends of the bottom piece and should extend up to a height that's ¼ in. taller than the window. The top piece attaches to the top ends of the side pieces. The length of the top is the full width of the assembled bottom.

ADD THE SOFFIT PANELS

The soffit is the underside of the roof overhang. There are special soffit panels made for this purpose, but we cut leftover siding panels to fit. Attach the soffit panels with 2-in. siding nails.

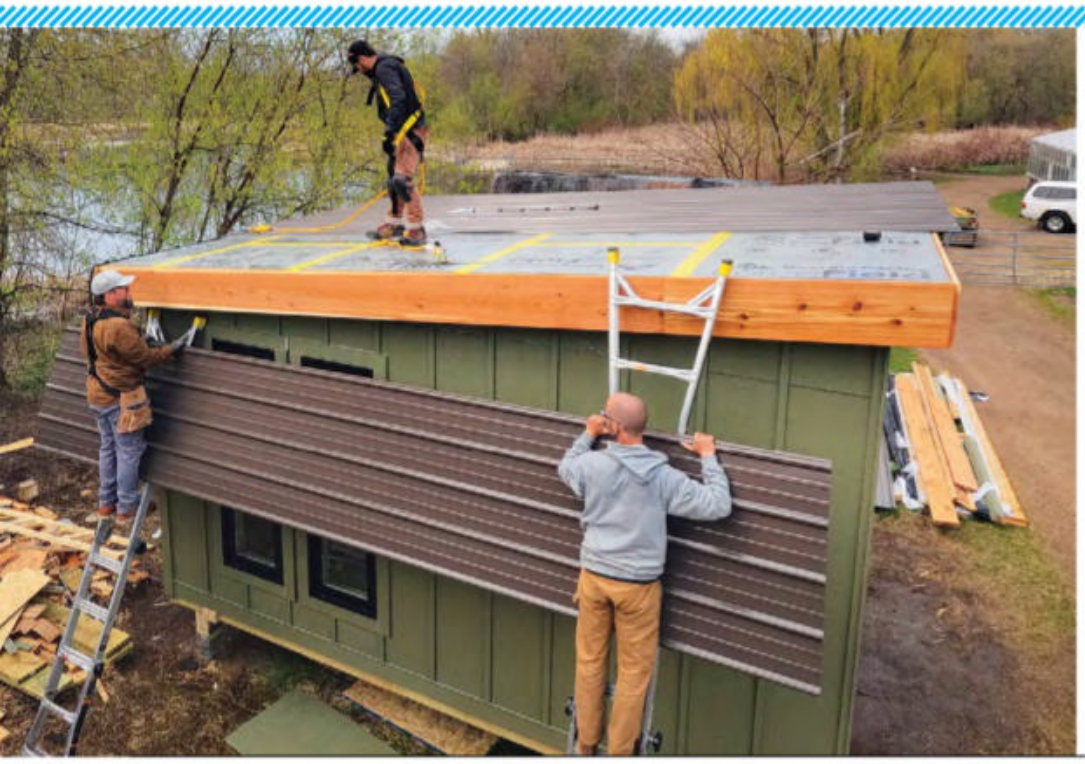
5

APPLY THE BATTENS

Next, install the battens. Battens are decorative 1x2 trim pieces that are nailed on top of the siding panels to hide the seams. Cut the battens to fit vertically between the drip cap, window trim and soffit. Fasten them using siding nails, making sure they're perfectly plumb.

FINISHING DETAILS

Once the siding is up, the last step is to seal the windows to the trim with a color-matched caulk. Only caulk the sides, though. If any moisture does get in, you want it to be able to drain out at the bottom of the window instead of getting trapped. Paint any exposed nailheads and touch up any other blemishes on the siding.



INSTALL THE ROOF PANELS

Aside from the teamwork required to get long metal panels up the ladders, roofing a simple shed roof like this is about as easy as it gets. Including all the edge trim, we finished it in a morning. When you're working on a roof, be sure to wear a safety harness.

ROUGH-IN THE ELECTRICAL

Attach the electrical boxes for receptacle outlets, lighting or other wiring needs. With our double-wall framing, it would be simple to run the cable in the space between the walls, but we drilled holes in the inner wall, as in a typical installation. This makes securing the cable, and knowing exactly where it is, much easier. All electrical work, including installation of a panel, by code, must be done by a licensed electrician and be inspected before any interior wall covering is applied.

INSULATE THE WALLS AND CEILING

This step is shown in the final step of the framing process (see p. 19). Fill the wall cavities by cutting insulation batts to fit. Here's where our double-wall framing method really pays dividends! We hired a spray foam contractor to insulate our ceiling, mainly because in order to reach the required R-value using batts, we would have needed a 16-in. thick roof system.

INSTALL CEILING BOARDS

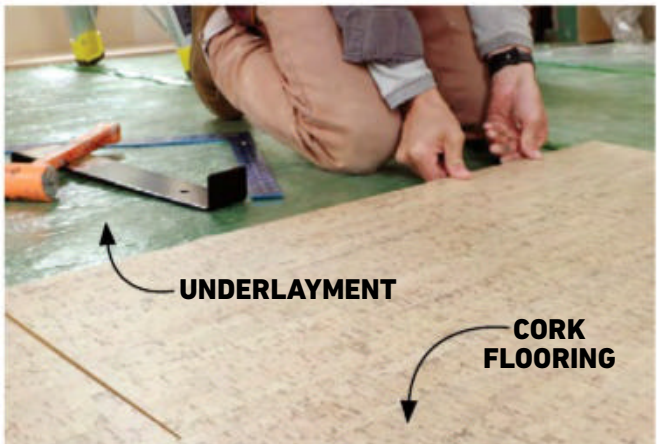
We used tongue-and-groove pine V-groove siding for our ceiling, leaving it natural with no finish. Starting on the low side, set a board in place with the groove against the wall and the tongue toward the room. Face-nail the wall edge of the board, then nail through the tongue at an angle to finish fastening, using 15-gauge finish nails. On the remaining boards, you'll only need to nail through the tongue until you reach the final board. Be sure to measure as you go to verify that you'll come out with a straight board when you reach the high wall.

APPLY INTERIOR WALL COVERING

Before applying the wall covering, we assembled extension jambs for each window and fastened them to the framing. We made these extension jambs deep enough to stand proud of the wall covering, creating a no-work window trim.

We finished the interior with a product called Homasote. It has a fabric-like texture and is sort of like papier-mache inside. It's used widely for soundproofing underneath drywall.

We opted to leave the Homasote as the finished wall surface, letting the seams show. No mudding or painting needed—just careful cutting around the window and door extension jambs. To finish up, we applied trim at the tops of the walls and applied a matching caulk in the corners.



INSTALL FLOORING

For our flooring, we installed a product from LL, called Castelo Cork Flooring (about $5 per sq. ft.), over its QuietWalk Max underlayment (about $1 per sq. ft.). The flooring is essentially a "cork sandwich" with an MDF core. The cork veneer face has a protective clear coating. Cork is a sustainable material, as well as having insulating properties and being warm and quiet underfoot.

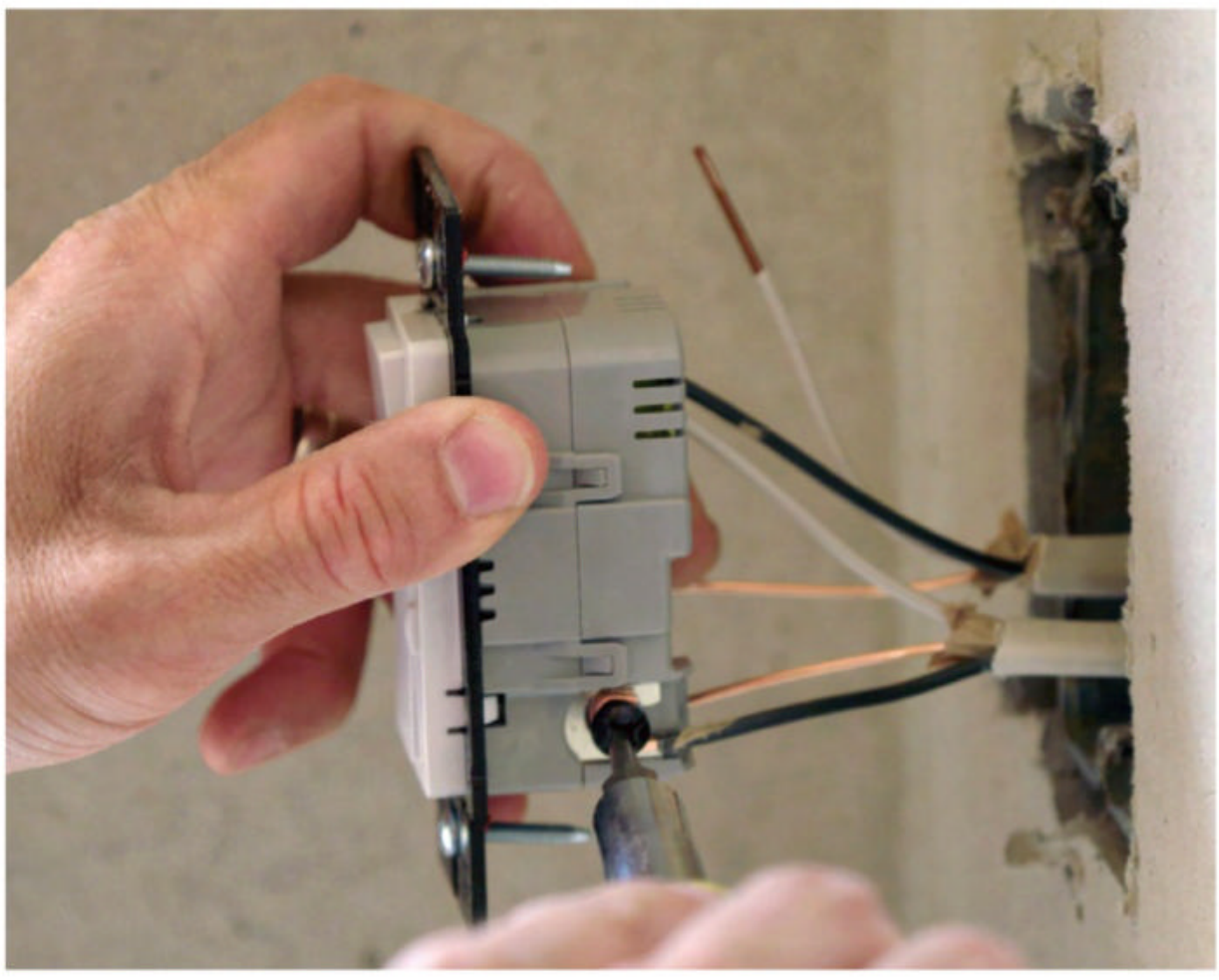
Castelo Cork Flooring features a click-together installation, just like a laminate floor. It's fast and easy to install, and we love the look! After the flooring was down, we cut and installed a square-profile baseboard to complement the window jambs.

FINISH PORCH WALLS

We clad the deck walls with 5/4 cedar decking. Before applying the decking, we covered the walls with lightweight black landscaping fabric to help hide any flashing tape that might show through the gaps in the decking boards. On top of the fabric, we tacked on ¼-in. thick furring strips at an angle to prevent water from getting trapped behind the decking boards. To install the boards, we used the CAMO hidden fastening system. This hides the fasteners by allowing you to drive the screws through the edge of the board at an angle.

FINISH THE DECK

We decided to run our stairs all the way across the deck. First, we calculated where the stair stringers would hit the ground. Then we dug a trench and laid in a grade beam on top of gravel. This creates a solid foundation for the bottom ends of the stringers. We installed the deck boards aligned with the wall boards. When the deck was finished, we sanded off any footprints and rolled out a temporary protective covering to prevent marring as we walked in and out to bring in furniture.



ADD OUTLETS, SWITCHES AND LIGHTS

To finish up, we installed receptacle outlets, a light switch and lights. These lights look like recessed can lights, but they're actually Feit Electric Ultra-Thin Canless LED lights. They're about $21 each. Each light comes with its own junction box to connect to the wiring. These boxes have a switch that allows you to choose a color temperature. The lights are dimmable, and include the option to illuminate only the outer rim.

CREATE A MORE SUSTAINABLE HOME

12 TIPS TO SAVE MONEY & REDUCE YOUR CARBON FOOTPRINT

BY ALLY CHILDRESS

1 BUILD A CLOTHESLINE

People have been drying their clothes outside for millennia. (Sunshine is the best disinfectant, after all.) Tumble drying your clothes, especially on a high heat setting, is rough on fabrics. It also takes energy. Why not reduce your footprint by building a clothesline? Jhánneu Roberts, sustainability expert for Opendoor's 2023 Eco-Forward Cities, says using a clothesline is a great way to save energy and extend the life span of your clothes. "It's also a great way to enjoy some fresh air while doing your laundry." Many space-saving options are available.

While you're in laundry mode, think about switching to cold water. "Washing clothes in cold water uses less energy than hot water," Roberts says. Bonus: "Many detergents today are formulated to work just as effectively in cold water."

LEAD PHOTO: WESTEND61/GETTY IMAGES

2 REDUCE VAMPIRE LOADS

Many of today's appliances and electronics aren't really off when we turn them off. Smart TVs, coffee makers, toaster ovens and other appliances draw small amounts of energy just waiting for the signal to come alive when we need them. These "vampire loads" account for 5% to 10% of your home's energy use and can cost about $100 a year.

Greg Fasullo, CEO of Elevation, a residential clean technology company, says vampire loads add up, but there's an easy solution: Just unplug the appliance when it's not in use. To make it easier, plug your electronics and computers into power strips so you can cut the power with one switch. And Energy Star appliances are designed to use less vampire power, so always look for that blue sticker when you shop.

3 HARVEST RAINWATER

Watering the lawn and other outdoor irrigation use massive amounts of water—about 8 billion gallons a day. In fact, most households use more water outside than for showering and doing the laundry combined! Joe Raboine, vice president of design at Belgard, says rainwater harvesting reduces water use and can be accomplished in a couple of ways.

"At a simple level, you can do this with rain barrels," Raboine says. Rain barrels capture water from your downspouts, storing it for later use, and can be purchased or made yourself. With a larger investment, you can include permeable pavers with an underground capture system in your patio and outdoor landscaping for a less visible system.

4 AIR-SEAL YOUR HOME

When you put your hand to your windows, do you feel a breeze? Drafty windows can account for 25% to 30% of heating and cooling costs, but doors, electrical outlets, attic hatches and ductwork are prime culprits for air leakage too. Caulking and weatherstripping are easy DIY fixes that can pay dividends when it comes to reducing your energy usage and costs.

Walk around your house and look for cracks in the facade and gaps around windows and exterior penetrations (like pipes). Inside your home, use rubber gaskets behind switch plates and outlet covers, and make sure your windows and doors have adequate weatherstripping. The Inflation Reduction Act provides help for homeowners wanting to upgrade to energy-efficient windows and doors.

5 CHANGE TO LED LIGHTBULBS

If you're still buying and replacing incandescent lightbulbs, it's time to switch to LEDs. After a brief delay by the previous administration, the Department of Energy is moving forward with a long-proposed rule that phases out inefficient lighting. Changing your home's lightbulbs and fixtures to LED saves money and reduces your carbon footprint.

"LED lights use up to 90% less energy than incandescent, and 80% less energy than halogen bulbs," according to Michael Meiser, lighting expert at Lumilum. They also last longer—a lot longer. LEDs have a typical life span of 25,000 hours, compared to a paltry 1,200 for incandescent and 2,000 for halogen.

MIDDLE LEFT: THINKSTOCK IMAGES/GETTY IMAGES

6 INSTALL A WATER FILTER

When you want a drink of water, do you reach for a disposable plastic bottle? Thirsty Americans toss out 2.5 million plastic bottles *every hour*, and only about a quarter are recycled. That means millions of tons of plastic waste end up in landfills and the oceans every year.

Drinking tap water significantly reduces our plastic trash burden, but many people simply think bottled is better. If that describes you, try a water-filtering system. Water filtration significantly reduces your household trash footprint, saves money and gives you clean, fresh-tasting water. Lots of bottled water is simply municipal tap water anyway, so why not cut out the intermediary?

7 RETHINK YOUR LANDSCAPING

Traditional turfgrass lawns need lots of water, and xeriscapes can be a great sustainable alternative. "Xeriscaping is increasing in popularity and involves using native plants, turf, gravel or other materials to reduce or eliminate the usage of grass," Raboine says. Consider planting edible landscapes such as blueberry bushes, pollinator gardens, rainwater gardens and native prairie plants and wildflowers.

If you're not interested in gardening or maintaining plantings, try decorative gravel or artificial turf. If you opt for a straight hardscape like concrete, Raboine says to consider permeable pavers. "These pavers allow for rainwater to permeate the surface and return to the ground, replenishing natural aquifers." This will also reduce the burden on stormwater drains.

8 UPGRADE YOUR INSULATION

Is your home drafty? Do you routinely wear sweaters when your thermostat is set to 75 degrees? "Poor insulation can account for 35% to 40% of a home's heat loss," Fasullo says. Instead of staying put in the living areas, warm air ends up flowing into your attic, garage and basement. But that's not the only problem.

"Homes that lack adequate insulation don't just waste energy through lost hot and cold air," Fasullo says. "Those inefficiencies can lead to expensive damage to other parts of your home." Your HVAC in particular can suffer from a shortened life span when you're trying to make up for drafts and leaks. Luckily, 30% of the cost of new insulation can be claimed as a home energy efficiency tax credit (*energystar.gov/about/federal_tax_credits/insulation*).

SEE *BETTER HOME INSULATION,* **P. 40**

TOP PHOTO: MAUREEN P SULLIVAN/GETTY IMAGES; BOTTOM LEFT: VENUS ANGEL/SHUTTERSTOCK

9 INSTALL A BIDET

People around the world use a staggering 42 million tons of toilet paper every year, according to Spencer Weidner, digital marketing director at Bio Bidet by Bemis. And even though toilet paper goes right down the drain, most of it is made from trees chopped down for just that purpose. One way you can reduce this heavy environmental toll is to install a bidet.

You're not just saving the trees, either. Weidner says the amount of water involved with using a bidet pales in comparison to the amount used in toilet paper manufacturing, so you're reducing your home's environmental impact on two fronts. Plus, bidets clean better!

Bidets are easy to install too. "Bidet toilet seats and bidet attachments are actually designed for an easy at-home installation," Weidner says. "They connect to your existing plumbing using the provided adapter and hose in a matter of minutes." (Electric models require a nearby outlet.)

10 LOOK FOR REBATES

Upgrading old appliances, replacing windows and doors and sealing ductwork can drastically reduce your energy consumption and save money in the long run. You can get help on the initial cost too. "Looking at rebates available for home efficiency and improvement projects, the Inflation Reduction Act offers up to $840 back on efficient appliances, $600 on new windows, $500 on new doors and $1,600 for insulation and air duct sealing," Fasullo says.

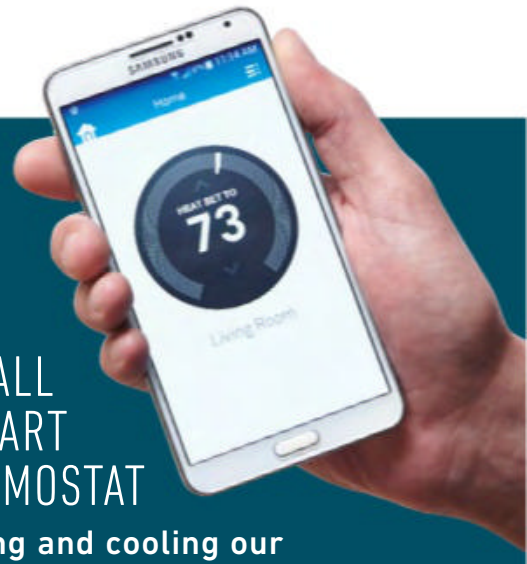
Look for Energy Star ratings when you purchase any major appliance, and check utility company and manufacturer websites for additional promotions. The Energy Star website can also hook you up with qualified contractors. "The electrical or wiring work required to install upgraded appliances, solar or home energy storage also qualifies for rebates," Fasullo says.

11 GET A HOME ENERGY AUDIT

The first step to understanding the sources of your home energy costs and emissions is to get a home energy audit. Fasullo says these assessments can cost as little as $100 to $150 and reveal areas of your home where you're wasting the most energy and money.

Home energy auditors check for air leakage, determine your insulation levels and inspect your fireplaces, lights and smoke detectors. They'll even do an analysis of your electrical bills. Best of all, Fasullo says the Inflation Reduction Act covers 30% of the cost of the audit (up to $150), making this step a no-brainer.

TOP LEFT PHOTO: SINISA KUKIC/GETTY IMAGES



12 INSTALL A SMART THERMOSTAT

Heating and cooling our homes accounts for more than half of our total energy usage, so it's a logical place to target for reductions. Step one should be installing a smart thermostat. "Maintaining a more consistent home temperature, particularly during summer months, can drastically reduce your utility costs and keep your AC running at its best," Fasullo says.

Automating your heating and cooling system makes your life easier too—no more remembering to turn the thermostat down when you leave the house or go to bed. "Smart thermostats can be programmed with eco-friendly settings that keep a home's heating and cooling set point at a comfortable and efficient temp," Fasullo says, "and adjust for daytime or nighttime hours automatically."

But don't stop at thermostats. "Adopting smarter, automated appliances across the board can help reduce inefficiencies and take the guesswork out of optimizing energy use," Fasullo explains.

FOUR-BIN RECYCLING STATION

IT CAN HANDLE YOUR HOUSEHOLD RECYCLING, COMPOST AND GARBAGE

WHAT IT TAKES

TIME	COST	SKILL LEVEL
2 days	$300	Intermediate

TOOLS
Drill, tape measure, level, circular saw, jigsaw, miter saw, table saw, multitool, pocket hole jig, clamps, safety glasses

BY SAMUEL ROSENMAYER

This project is just the thing to organize your kitchen waste. It's not hard to build your own in-cabinet station that will hold not only your garbage but also recycling and compost. The convenience of this setup will make you wish you had made one sooner.

GETTING STARTED

To calculate your pullout size, remove the cabinet doors and measure the height, depth and width of the inside of the cabinet. For the pullout height, subtract at least 2 in. from the opening's height so the bins will clear. Subtract an inch from the width to allow for the drawer slides. Your pullout's depth should be about ¼ in. less than the cabinet's depth.

Our cabinets don't have face frames. If your cabinets do, you'll need to add a build-up strip behind the frames for mounting the drawer slides. Cut these strips to be flush with the inner edge of the face frames.

1 CUT THE PARTS

Cut the parts (A-E) using a circular saw and a guide. Finish the smaller cuts on a table saw.

2 CUT THE ANGLES

Cut the partition (B) angles using a circular saw. I'm using a track saw, but you can use any circular saw and a simple shop-made guide to get a perfectly straight cut.

3 ATTACH THE PARTITIONS

Mark the partition locations on the front (A) and predrill holes for the screws. Fasten the partitions (B) to the front using wood glue and No. 8 x 1½-in. wood screws.

4 ADD THE BACK

Attach the back (D) to the partitions the same way you attached the front, by predrilling holes, adding wood glue and using No. 8 x 1½-in. wood screws.

5 DRILL POCKET HOLES

Drill pocket holes in the inside dividers (C) to attach them to the angled sides and center partition.

6 FASTEN THE DIVIDERS

Fasten the dividers (C) in place between the partitions (B) using glue and 1¼-in. pocket screws.

7 MARK THE BIN PLACEMENT

On the underside of the top (E), lay out the bin locations and then trace the top lip of each bin. Measure the inside of the bins to find the cutout size; this will ensure there is enough overhang to support the bins. The amount you reduce depends on your bin overhang. I reduced the outline by ½ in. to support my bins.

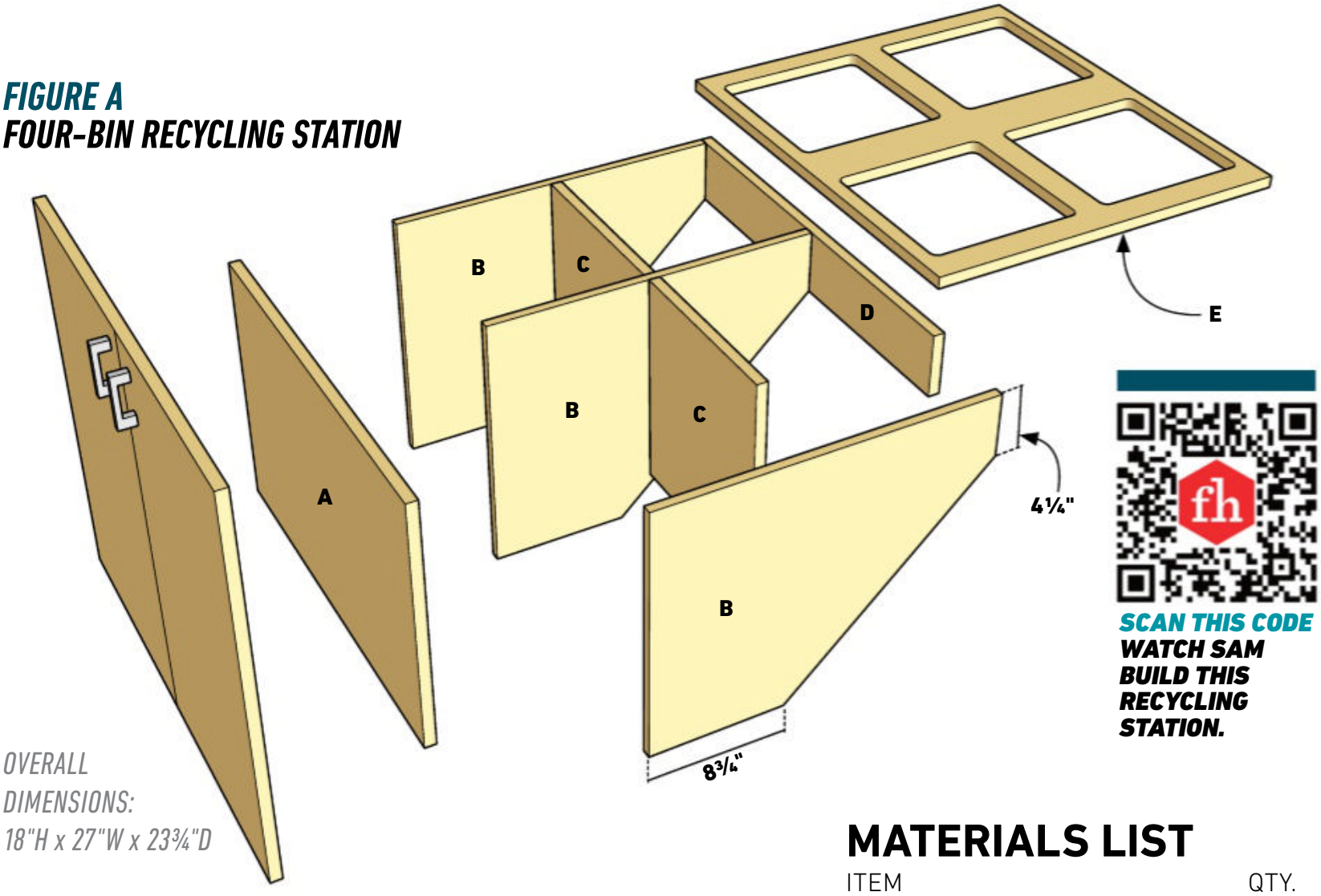
COMPOST BIN

We included this All Seasons Indoor Composter bin because of the convenience it provides—a good incentive for those new to composting. The 5-gal. bin is the right size for our recycling station, and it comes with an airtight lid.

8 CUT THE BIN OPENINGS

Drill a starting hole large enough to insert a jigsaw blade. Cut the outlines using a jigsaw, and then sand the openings smooth.

FIGURE A
FOUR-BIN RECYCLING STATION



OVERALL DIMENSIONS:
18"H x 27"W x 23¾"D

SCAN THIS CODE
WATCH SAM BUILD THIS RECYCLING STATION.

CUTTING LIST

KEY	QTY.	DIMENSIONS	PART
A	1	¾" x 17⅜" x 27"	Front
B	3	¾" x 22¼" x 17⅜"	Partition*
C	2	¾" x 14⅝" x 12⁷⁄₁₆"	Inside divider
D	1	¾" x 27" x 4¼"	Back
E	1	¾" x 27" x 23¾"	Top

*See diagram for the angled cut

MATERIALS LIST

ITEM	QTY.
¾" x 4' x 8' maple plywood	1
22" soft-close side-mount drawer slides	Set of 2
Waste containers	3
Indoor compost bin	1
1¼" pocket screws	
No. 8 x 1½" wood screws	
Wood glue	
180-grit sandpaper	
Polyurethane	1 qt.

9 CUT THE NOTCHES

If your bins have stiffening ribs like ours do, make marks on the top to show their location and cut a notch for each.

10 ATTACH THE TOP

To attach the top, drill pocket holes along the top edge of the front, back and partitions. Lay the top upside down, then glue the top edges of the pullout and set it in place on the top. Fasten the top with 1¼-in. pocket screws.

11 PREDRILL HOLES

Mark and predrill eight holes through the front—two holes evenly spaced at the top and bottom—to attach the cabinet doors.

MEET THE BUILDER

SAM ROSENMAYER, PROJECT EDITOR/BUILDER, IS HAPPY TO WRAP UP HIS FIRST PROJECT FOR *FAMILY HANDYMAN*.

12


13

14


15


16

12 ATTACH THE DRAWER SLIDES

Attach drawer slides to the assembled pullout, 2¾ in. down from the top and flush with the face of the pullout. It's best to use a spacer or jig to be sure the slides are mounted perfectly square.

13 APPLY A TOPCOAT

Apply three coats of polyurethane and allow each coat to dry for 12 to 24 hours. Sand lightly with 220- to 320-grit sandpaper between coats. Or, paint the pullout if you prefer.

14 ATTACH DRAWER SLIDES TO THE CABINET

Attach the drawer slides 15¾ in. up from the cabinet bottom. This measurement will depend on your particular cabinet. Predrill the screw holes and make sure the drawer slides are flush with the cabinet face. Again, use a spacer or jig to ensure the slides are square to the cabinet.

15 INSERT THE PULLOUT

Engage the slide members on the pullout into the slide members in the cabinet, then push the pullout completely in until you hear the slides click into place.

16 ATTACH THE DOORS

Drive screws into the predrilled holes from the inside of the pullout, just far enough so their points poke through the outside. With the pullout all the way in the cabinet, hold each door in place and push it into the screw points. With the pullout extended, locate each door on its screw indentations and drive two screws. Close the pullout and adjust the door alignment. Do this by loosening one of the screws, adjusting the door and driving in a different screw.

TOP AND CELLULOSE: COURTESY OF GREENFIBER, CORK: PETERHERMESFURIAN/GETTY IMAGES, SHEEP'S WOOL: HAVELOCK WOOL, DENIM: BANKSPHOTOS/GETTY IMAGES

BETTER HOME INSULATION

IMPROVE THE ENERGY EFFICIENCY OF YOUR HOME—AND PROTECT THE ENVIRONMENT TOO

BY SAMUEL ROSENMAYER

Most homeowners know insulation affects a house's energy efficiency and sound barriers, but it also affects our environment and health. If you notice your home doesn't maintain temperatures well, sounds are amplified, your home feels drafty and your energy bill is extremely high, you may want to evaluate your home's insulation. A home that isn't well insulated will release more greenhouse gases because the HVAC system will work much harder to keep the house at desired temperatures.

To learn about the best insulation options, I talked with Tony Leiner, who is the owner of Whole House Insulation Inc. in Milwaukee, Wisconsin, and has been in the industry for 41 years. His advice to homeowners is "Do your homework on different insulations and know what chemicals you're exposing yourself and others to."

The good news is that we have come a long way with insulation, and we are not stuck with products that are packed with toxic and carcinogenic fumes. Without compromising efficiency, here are some sustainable insulation options that are safe and good for the environment, and do an exceptional job of insulating.

Your insulation needs depend on the climate you live in and the R-value insulation levels required by local building codes.

R-value refers to the resistance (hence the "R") of heat transfer from hot air to cold air, or how well an insulation material resists this heat transfer. The higher the number, the more thermal-resistant the material is, and the more effectively it insulates.

CELLULOSE INSULATION

A green product derived from recycled materials, cellulose insulation comes in a loose-fill or blow-in form. It is treated with boric acid to repel mold and pests, is safer to install than fiberglass because it doesn't contain carcinogens or gases, and is noncombustible. Cellulose provides a good sound barrier, and it costs about the same as fiberglass. Cellulose is Leiner's preference. "This insulation provides thermal protection, and our customers are happy with the product," he says. "New construction is beginning to use cellulose insulation because it is better for the environment and is the best product to install." For every inch of thickness of cellulose insulation, there is an R-value of 3.5.

MINERAL WOOL INSULATION

Also known by the brand name Rockwool, mineral wool insulation is manufactured by melting basalt rock with slag—a byproduct of the copper and steel industry—and spinning the resulting material into fibers. The fibers are then woven into batts, which are about the same size as fiberglass batts, but denser.

Mineral wool also repels water, so mold can't grow on these batts. The batts' extra bulk also provides better soundproofing. Mineral wool batts are about 25% more expensive than fiberglass, however. Mineral wool has an R-value of 4 per inch.

DENIM INSULATION

Did you ever think your old jeans could someday become insulation for someone's home? Denim insulation, also known as UltraTouch Insulation, is composed of 80% recycled denim jeans. It's flame retardant and treated with boric acid, which helps prevent bacteria growth and repels bugs.

Denim has properties that can reduce the transfer of heat, which makes it a good barrier and a competitor of traditional fiberglass insulation. You can purchase denim insulation in batts so it is very easy to install in walls, attic floors and ceilings. This has a good R-value of 3.5 per inch, but the downside is that this tends to be 10% more expensive than fiberglass insulation.

DENIM: BANKSPHOTOS/GETTY IMAGES

SHEEP'S WOOL INSULATION

Sheep's wool insulation naturally collects humidity in the air while acting as a purifier. The process of making the insulation once the wool has been sheared from the sheep consists of cleaning and drying the wool, combing the fibers to create multiple layers. Some companies add a polyester adhesive to hold the layers together. You can find it in batts or blow-in form, making it a good insulator for ceilings, floors, attics and walls. The R-value for sheep's wool is 3.5 to 3.8 per inch and it can be 25% to 50% more expensive than fiberglass.

CORK INSULATION

Cork is derived from the external bark on a specific type of oak tree from the Mediterranean and North African region. Cork is unique in that it regenerates itself after it has been harvested. Cork naturally has antifungal, fire-resistant and antimicrobial properties, so additional chemicals aren't needed for it to be an effective insulator in homes.

Cork insulation comes in the form of corkboards and can be used for roof or wall insulation. It has an R-value of 3.6 to 4.2 per inch and is one of the most sustainable insulations, but it can be expensive. Depending on the thickness of the corkboard, it will cost about $4 to $12 per square foot, which is significantly more than the 40¢ to $2 per square foot for fiberglass. fh

MEET THE EXPERT

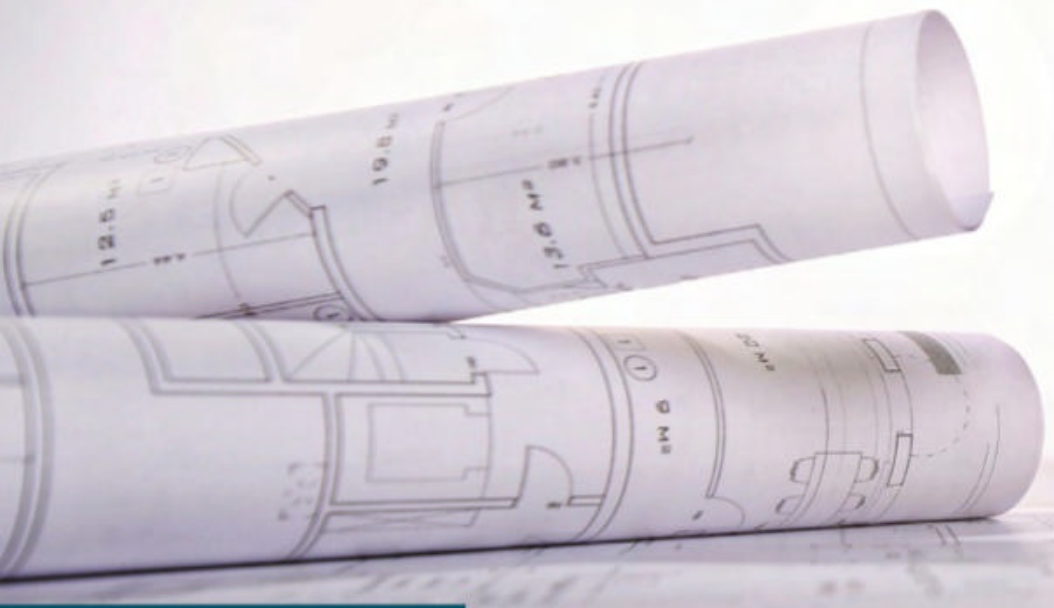
TONY LEINER IS THE OWNER OF WHOLE HOUSE INSULATION INC.

SHEEP'S WOOL: HAVELOCK WOOL. CORK: VIKTOR FEDORENKO/GETTY IMAGES. BOTTOM RIGHT: TONY LEINER

TRADITIONAL VS. SUSTAINABLE BUILDING MATERIALS

THE DIFFERENCES AND THE PROS AND CONS

We see so much about sustainability in the news, and it's becoming important to many homeowners and contractors to use more products that are environmentally friendly. These sustainable materials are becoming more readily available to DIYers, so let's look at sustainable building products and how they compare with traditional ones.



BY MIKE BERNER

TRADITIONAL BUILDING MATERIALS

Quite simply, traditional building materials are ones we DIYers and contractors have been using for years. Although there has been an evolution in these products as the decades go by, the evolution has been more about health and safety, or efficiency, rather than a move toward eco-friendly materials. Because of their long-standing use, they are familiar to use, and they are often less expensive.

SUSTAINABLE MATERIALS

In general, sustainable materials are produced, used and disposed of in a way that keeps the environment in mind. The sustainable materials I've used have been manufactured using waste products, come from properly managed forests, and have characteristics that will ensure their longevity. These materials are often more expensive than traditional ones, and sometimes require new installation methods.

PHOTO: GUY45/GETTY IMAGES

VS.

FIBERGLASS INSULATION

For many years, fiberglass insulation has been the gold standard to insulate our homes.

PROS:

- It has a relatively high resistance to heat transfer; a 2x4 wall is rated an R-11.
- It's easily accessible and comes in batts of many widths and as loose-fill, making it easy to install in any wall or attic space.
- Can come faced in kraft paper for a built-in vapor barrier.
- Very affordable.

CONS:

- Contains only 20% to 30% recycled material.
- When it's compressed or it becomes wet, its R-value is significantly decreased.
- It's noncombustible but won't provide the best fire block.

MINERAL WOOL INSULATION

Mineral wool is made by heating and spinning slag, a byproduct in steel production, into a fibrous, wool-like material.

PROS:

- It has a higher R-value; a 2x4 wall will have an R-value of up to R-15.
- It's very dense, making it great for isolating sound.
- It will not absorb water and is very fire resistant.
- Contains 70% recycled material.

CONS:

- Higher in cost.
- Heavier than other insulation options.
- Although mineral wool is made with recycled material, the manufacturing process is energy intensive. This is not uncommon with insulation products.

TOP LEFT: DONNICHOLS/GETTY IMAGES, TOP RIGHT: MICHALPUCHALA/GETTY IMAGES, BOTTOM RIGHT: VIA AMAZON

SMART VAPOR RETARDER VS. 6-MIL POLY SHEETING

One new-to-us product we included in our "sustainable retreat" is referred to as a smart vapor retarder. We chose MemBrain vapor retarder by CertainTeed over the 6-mil poly sheeting type because it allows moisture to escape the wall cavity while keeping moisture out.

SUSTAINABLE CLADDING: A TOSS-UP

In many neighborhoods, you can observe several different types of siding on a walk around the block: stucco, vinyl, wood, masonry and even the newer engineered wood choices. Most houses are donning their original siding, which attests to their sustainability. Here are the pros and cons of a few popular cladding choices.

STUCCO

Stucco is a popular cladding in the western half of the U.S., but it can be found across the country. It's made with a mixture of cement, sand and water.

PROS:

- Durability. When properly installed, stucco can last many decades.
- Stucco has insulating properties and can help regulate the temperature inside a building, helping with energy costs.
- Low maintenance. Once installed, stucco does not need to be painted and requires only occasional cleaning.
- Easily recycled and crushed into aggregate to be used for new stucco.

CONS:

- Not a DIY-friendly option.
- The production of stucco requires a high amount of energy to extract raw materials.
- Repairing and patching pose difficulties in matching both texture and color.

VINYL

Because vinyl is a type of plastic, not everyone considers it to be sustainable, but it is reusable. It is used nationwide and is popular in new construction and renovations.

PROS:

- It's very tough and will look good for decades as cladding.
- Its manufacturing process produces nearly zero waste; any trimmings or scraps are processed into more siding.
- It is recyclable. If it makes it to a recycling center, it will be shredded and reused to produce other usable items.
- Very inexpensive.

CONS:

- The color fades over time.
- It can crack or break.
- If it doesn't get recycled, it will sit in the landfill forever.

ENGINEERED WOOD

Like OSB sheathing, engineered wood siding is made with wood chips that are compressed and glued to form different siding products.

PROS:

- Comes in many styles: lap, board and batten, panels, trim boards.
- Cutting it does not require special blades.
- Uses waste from lumber processing, keeping it from entering the landfill.
- Long lasting and maintenance free (no painting, up to a 30-year warranty).

CONS:

- More expensive.
- Requires careful adjustment of pneumatic nail guns to prevent overdriven nails.
- Each cut needs to be sealed before installation.

What constitutes a sustainable deck material is a matter of debate. Two top options are cedar and composite boards. Look over their pros and cons to see which one would make more sense for your application.

CEDAR DECKING

A very popular real wood option for long-lasting decks.

PROS:

- An all-natural renewable resource.
- Resistant to insects, weather and rot.
- Can be stained or left raw.
- Easy to recycle at the end of its life.
- Easy to work with and install using deck screws or hidden fasteners.

CONS:

- Prone to cracks, splinters and splits.
- Needs yearly maintenance, and sanding and refinishing every few years.

VS.

COMPOSITE DECKING

Composite decking is made up of to 95% recycled plastic and wood pulp.

PROS:

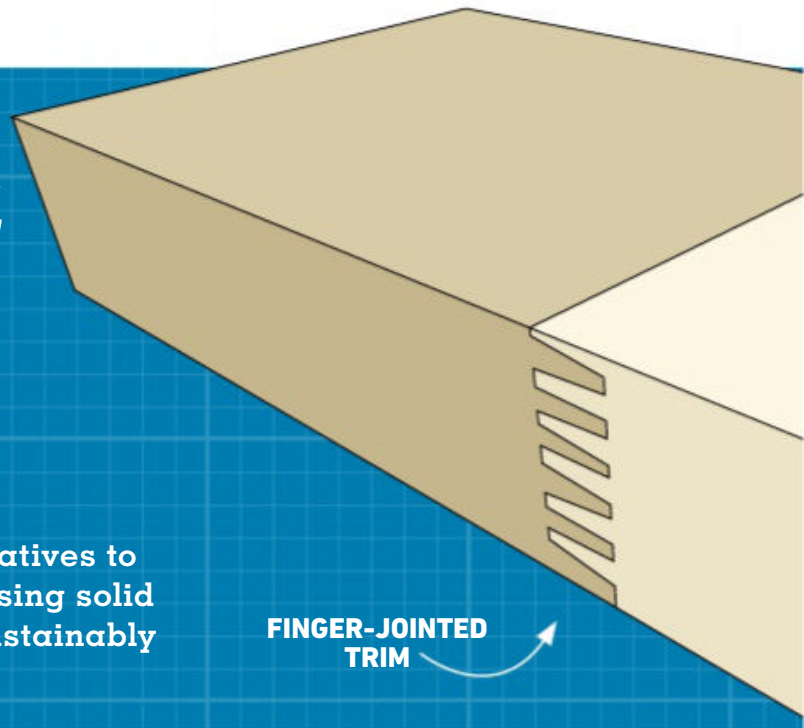
- Is made of up to 95% recycled plastic.
- Will last a very long time. Some decking manufacturers offer up to 20-year warranties against fading.
- Zero maintenance outside of occasional cleaning.

CONS:

- Not recyclable at the end of its life cycle because it is combined with wood pulp.
- Needs a special composite cutting blade to cut boards to size.
- Much heavier and more expensive than wood options.
- May require additional framing for support.

SOLID WOOD TRIM VS. FINGER-JOINTED TRIM

You may not have thought about trim in terms of its sustainability, but more sustainable choices do exist.



STAINED AND FINISHED SOLID WOOD

If you're seeking the look of hardwood, there are few alternatives to solid wood trim, and none pass the eye test for me. When using solid lumber, look for the FSC stamp, which verifies it is being sustainably sourced by the Forest Stewardship Council.

PAINTED

Most trim I see in new homes now is painted. I've installed miles of "primed for paint" trim, and I always use finger-jointed trim. As its name indicates, this trim consists of many small cutoffs that are finger-jointed together. This process takes pieces of wood that were unusable and joins them to create the straightest trim in the lumberyard.

CEDAR DECK: SIMPLYCREATIVEPHOTOGRAPHY/GETTY IMAGES

PALLET WOOD HEADBOARD

BUILD AN HEIRLOOM PIECE USING RECLAIMED WOOD

BY ROBERT MAXWELL

Interested in building something from reclaimed wood? Shipping pallets can be a great source of material. With 5 billion of them circling the globe at any given time, they shouldn't be hard to find! Chances are that local businesses have some they'd like to get rid of, either for free or for a reasonable price. Just be sure to ask permission before stocking up. If you're eager to try your hand at turning scrap wood into something beautiful, I'll show you how to turn pallets into a beautiful, refined headboard.

SCAN THIS CODE TO WATCH THIS PROJECT BEING BUILT!

ALL PHOTOS SUPPLIED BY ROBERT MAXWELL

1 GATHER AND DRY WOOD

Gather and break down three hardwood pallets. Allow the wood to dry indoors for a couple of weeks. Check the wood's dryness with a moisture meter. Its moisture content should ideally be between 7% and 9%, but anything under 12% is fine.

2 MAKE THE LEGS AND CAPS

For the legs, you'll use two thick outer pallet spindles. Two thinner inner spindles will make the top and bottom caps. Run the flattest face of each spindle over the jointer. Bring the blank into square by planing the opposite face until it's reasonably flat and free of paint. Rip the legs to 2 in. x 2½ in. Along the back edge of legs, cut a rabbet that's 1 in. deep by 1¼ in. wide. Cut the legs to length so that the bottom of your headboard will be at the height of your mattress.

3 MAKE THE FACE BOARDS

Using a thickness planer, plane all the top boards from your dismantled pallets to ⅝ in. thick, Rip the boards into 1⅛-in.-wide strips with your table saw.

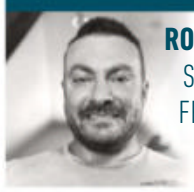
WHAT IT TAKES

TIME	COST	SKILL LEVEL
2 days	$100	Intermediate

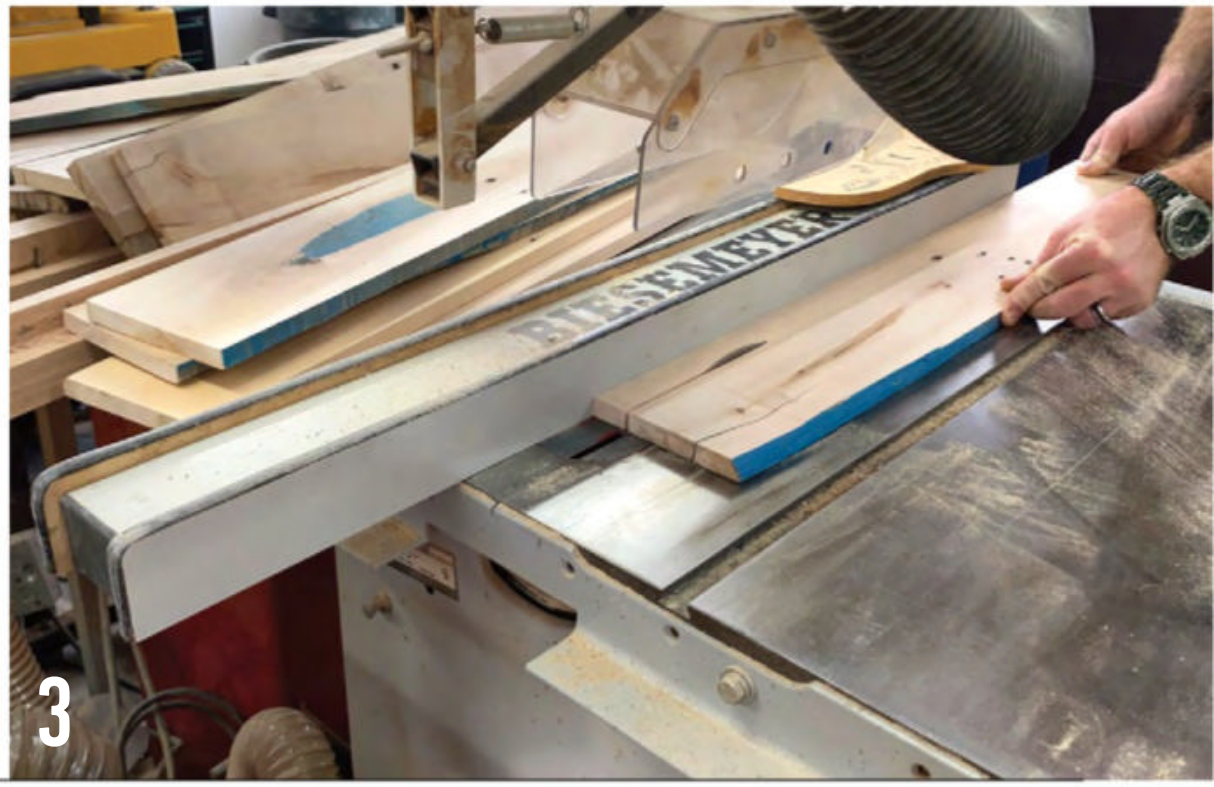
TOOLS

Drill/driver, pin nailer, jigsaw, table saw, compound miter saw, jointer, random orbit sander, belt sander, square, Speed square, caulking gun, clamps, paintbrush, yardstick or straightedge, eye and hearing protection
Optional: Track saw, edge sander, moisture meter

MEET THE BUILDER



ROBERT MAXWELL LEARNED THE SKILLS TO BUILD HIS OWN HOME FROM THE GROUND UP. HE LIVES IN NORTHERN ONTARIO.



4 MAKE THE BACKER BOARD

You'll mount the face boards to a plywood backer board. For a single bed, cut a piece of plywood 34 in. x 42 in. If you're building a headboard for a larger bed, cut your plywood accordingly.

5 PREPARE THE FACE BOARDS

Using a straightedge, divide and mark the backer board into four quadrants. Attach scrap 2x4s along the lines using 2-in. deck screws. With your miter saw, cut one end of each face board to 45 degrees.

6 INSTALL THE FACE BOARDS

Butt the 45-degree end of a face board against your 2x4 guide, as close to the center of the headboard as possible. Mark the face board at the edge of the backer board, then cut the face board to this length on your miter saw. Apply wood glue to the bottom of a face board. Place the board glue-side down against the backer board, keeping it tight against your 2x4 guide. Use a Speed square to ensure the face board is angled 45 degrees to the 2x4 guide, then fasten it in place with a pin nailer, one pin at each end.

Repeat the process with the rest of the face boards, using a ⅛-in.-thick spacer between the face boards. Remove the 2x4 guides when you've fastened all face boards in the first quadrant, then reposition the guides to work on the other quadrants. Allow the glue the dry overnight.

7 CAULK THE GAPS

Mix paint of your preferred color into a tube of tintable caulk, according to the manufacturer's instructions. Inject the caulk as deep as possible down into each gap, using enough that the beads are just slightly higher than the surrounding wood. Let the caulk harden for 24 hours.

8 SAND THE HEADBOARD AND LEGS

Smooth the faces of the legs with an edge or belt sander. Flatten and flush the face of the headboard with a belt sander and 80-grit belt. Sand until all excess caulk is gone. Transition to a random orbit sander with 120-grit paper, then finish with 180-grit paper.

9 TRIM THE EDGES

Trim the edges of the headboard to final dimensions using a track saw or a circular saw with an edge guide. For a single bed, the measurements are 41 in. wide by 33 in. tall, not including the legs. Recaulk any low areas.

MATERIALS LIST

ITEM	QTY.
Hardwood shipping pallets	3 or more
2x4 scraps	
2" deck screws	5
Wood glude	
1" pin nails	
Sheet of ¾" plywood	1
Tubes of tintable latex caulk	6
Latex paint	1 qt.
⅛" spacer material	
2½" brass screws	
Brass cup washers	
Wood finish of your choice	

10

11

12

10 INSTALL THE LEGS

Glue and clamp the legs to the edges of the headboard so the thinner side of the L-shaped profile of each leg is mounted on the front of the headboard. Ensure the tops of the legs are flush with the top edge of the headboard.

11 ADD THE TOP AND BOTTOM CAPS

Rip the top and bottom caps: The bottom is 2 in. x ¾ in., and the top 2 in. x 1½ in. Cut the top to cover the top edge of your headboard, including the ends of the legs. You can also make it long enough to overhang a bit on each end if you'd like. Cut the bottom to fit between the legs at the bottom edge of the headboard. Sand the top and bottom smooth. Clamp the strips temporarily in place, then predrill holes through the strips and into the headboard. Fasten the top and bottom caps in place with brass screws and cup washers.

12 APPLY FINISH

Vacuum all surfaces of the headboard along with the surrounding area. Apply a finish of your choice to all surfaces of the headboard. Let the finish dry, then sand lightly and recoat as needed. To install the headboard, you can bolt it to the bed frame or simply pinch it between the bed and wall.

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HOW TO FIX SIDEWALKS

ROLL DOWN YOUR SLEEVES AND PUT ON A DUST MASK—PATCHING IS A DUSTY, GRIMY JOB

Extend the life of old concrete by fixing broken, crumbling areas before the problem gets worse. A properly done repair will last decades. We'll show you how to create a durable concrete patch to fix two of the most common problems: spalling and broken corners.

BY TIM CURRAN

PRO TIP

Use an old saw if you have one. Concrete dust is really hard on electric tool motors.

A corundum masonry blade grinds through concrete, but slowly. A diamond blade costs a lot more but cuts much faster.

CONCRETE PATCH: SIZE UP THE JOB

Concrete can be intimidating, but with the proper tools and techniques shown here, even a novice can make a durable patch on the first try. Sawing concrete with a special masonry blade may be new to you, but if you've handled a circular saw, you'll quickly get the hang of it. It's less hazardous than sawing wood. However, the blade kicks up an incredibly thick cloud of abrasive dust, so be sure to wear goggles to protect your eyes, hearing protection, gloves, a dust mask and old clothes.

Size up the job first. Before beginning any repair, assess the general condition of the concrete slab. (See "Patch or Replace?") Sometimes the best strategy is to break out an entire section and repour it with new concrete rather than patch it. Patching works best for local damage in otherwise sound concrete.

We won't deal with the other common problem: cracks. You can repair them exactly as we show here, but they'll most likely return unless you can stabilize the concrete slab to prevent the movement that caused the cracks in the first place.

If this is your first concrete repair project, allow about a half day to pick up materials and complete two to three patches. It took us about four hours from start to finish to complete the two repairs we show here.

Do this job in comfortable working conditions, ideally in dry weather with a temperature between 50 and 80 degrees. Both you and fresh concrete happen to agree on this one. Fresh concrete is easiest to handle and hardens best (a process called "setting" and "curing") in this temperature range. Colder weather lengthens the setting time; freezing temperatures can ruin the concrete. Hotter weather causes faster setting and drying; the slab may harden before you can smooth it. Or the surface can dry too fast and not harden properly, eventually causing it to spall. In hot weather, work in the cooler mornings or in the shade.

WHAT IT TAKES

TIME
A full day

SKILL LEVEL
Beginner

TOOLS
Circular saw, cold chisel, 2-lb. maul, hammer, wood float, sponge float, edging tool, broom, masonry blade, shop vacuum. You'll also need a dust mask, hearing protection and safety glasses.

MATERIALS
Acrylic fortifer, concrete or sand mix

PATCH OR REPLACE?

Should you patch your old concrete or completely tear it out and repour it? While there's no hard and fast rule, here are some tips to guide your decision:

1. ASSESS THE SEVERITY OF THE DAMAGE. If your driveway is full of spalled areas and broken edges, the surface is probably severely weakened. It'll continue to deteriorate, and chances are the patches won't last.

2. CALL IN A CONCRETE CONTRACTOR (search online for "concrete contractors") to help you assess the situation and ask for a price on complete replacement. But keep in mind that contractors are in the business of selling concrete. With their labor costs, it's usually cheaper for them to replace than repair. We had trouble finding a contractor who would even do patching.

3. IS APPEARANCE IMPORTANT? A patch will be lighter-colored than the old concrete. Even after weathering for a few years, the new patch will probably still stand out. One way to hide the patch is to stain the entire surface to blend the old with the new. But you'll have to renew the stain periodically.

4. HOW MUCH ARE YOU WILLING TO SPEND? Material costs for a repair are low. Professionals would want to completely replace the slab to ensure a high-quality result. The cost would be substantial.


1

2


3

REPAIR SPALLED AREAS: CUT OUT THE DAMAGE

"Spalling" is the mason's term for concrete that's pitted or chipped, as in **Photo 1**. The key to a lasting repair is to make a saw cut around the perimeter of the damaged area, cutting back to solid concrete. The cut should be at least ⅜ in. deep: Most repairs that fail do so because the patch is too thin at the edges and breaks off. Set a masonry blade at a 5-degree angle so the cutout is slightly wider at the bottom than at the top. This helps "lock in" the patch (**Photo 1**).

Slowly guide the saw through the concrete. The masonry blade grinds a groove, so don't put a lot of pressure on the saw; let the blade do the work. Cut about ¼ in. on each pass. A diamond grit blade can cut the concrete about five times faster than a masonry blade, and it won't wear out as fast. But it also costs much more. The extra cost is worth it if you have more than about 10 ft. of concrete to cut. Or save money—and time—by renting a diamond blade or a concrete saw with a diamond blade.

PRO TIP

You'll raise an impressive dust cloud when sawing, so close nearby windows and doors. Otherwise, you'll be housecleaning too!

Once you've cut and thoroughly cleaned loose concrete from the repair area (**Photos 2 and 3**), moisten the area with a wet sponge before packing in the concrete mix. Don't leave standing water in the patch area; use just enough to dampen the old concrete and help it bond to the new.

1 CUT AROUND THE CHIPPED AREA

Cut a ⅜-in.-to-½-in.-deep "shoulder" around the edge of the spalled area with a saw and masonry blade. Move the saw slowly as you cut. Make sure you cut back into solid concrete to ensure a strong bonding surface.

2 CHISEL OUT WEAK AREAS

Break out all weak and loose concrete with a maul and cold chisel. Sharp concrete chips will come flying out, so wear safety goggles.

3 BRUSH AWAY DEBRIS

Clean the chips and dust from the repair area with a broom or shop vacuum. Be thorough. Then mix the patching material.

REPAIR SPALLED AREAS: PACK IN THE REPAIR MIX

For your patching mix, use either a prepackaged sand mix or concrete mix, depending on the depth of the patch. (See "Use the Correct Patching Mix.") Each 60-lb. bag makes about ½ cu. ft. of concrete, enough for a 2-in.-thick patch about 1 ft. wide by 3 ft. long. Estimate the volume of patching material by multiplying approximate length, width and thickness (in feet) to arrive at cubic feet, and buy a bit more than you think you'll need. Better

to have too much than to fall a few scoops short!

Mix it with water and acrylic fortifier, following the mixing directions on the package. The fortifier strengthens the new concrete and helps it bond better to the old concrete. The mix should be just wet enough to hold together when it's troweled into the repair. Don't add too much water; it'll result in weaker concrete.

We used a normal sand mix, which sets hard enough to walk on in about a day or two. It continues to cure and harden for weeks. If you have to use the area right away, you can buy a special fast-setting concrete, which hardens in about an hour. It costs about twice as much and you won't have as long to spread and smooth it, so stick to the regular mix when possible. Most building supply dealers that carry regular concrete also carry the fast-setting type.

After mixing the concrete, pack it firmly into the repair area using a wood float (**Photo 4**), the tighter the better. Mound the mix so it's slightly higher than the old concrete. Then immediately level it even with the old concrete using a straight board (**Photo 5**).

CAUTION

Wet concrete is highly alkaline and can cause severe burns to bare skin. Immediately wash off any that gets on your skin with cool water.

4 MOISTEN AND FILL

Moisten the patch area with a wet sponge. Then pack in the patch mix with a wood float. Leave the mix slightly higher than the surface of the old concrete.

5 SCREED OFF THE EXCESS

Screed off the excess material by sliding a board side to side in a sawing motion while pushing it forward. If you find low spots, pack in more mix and screed off again.

USE THE CORRECT PATCHING MIX

In a nutshell: Use a sand mix for repairs less than 2 in. deep. Use a concrete mix for repairs deeper than 2 in. Replace 50% to 80% of the water with the acrylic fortifier in either mix to improve the patch's bonding strength.

Concrete mix *consists of sand, gravel and Portland cement. The gravel reduces shrinkage, so it won't crack as readily when laid in thick. However, it may not bond well in thin layers.*

Sand mix *(sometimes called topping mix) consists of sand and Portland cement. It's easier to trowel in thinner layers (to about ¼ in. minimum) for thinner patches or patches with thinner edges. However, if you apply it thicker than 2 in., its natural shrinkage might cause it to crack or break the bond with the old concrete.*

Begin finish-trowel work when the surface moisture starts to evaporate and the patch begins to harden. It may only be 10 minutes on a warm day or perhaps an hour on a cool day. One sign of evaporation is the loss of some of the surface gloss. When the patch appears to be getting stiff, test it with your thumb (**Photo 6**). Once the surface is about as stiff as the skin of a grapefruit, begin the finish work. We used a sponge float (**Photo 7**) to match the slightly rough texture of the old concrete. A sponge float has a rough rubber surface. If you want a smooth surface, use a steel trowel; for a lightly grooved appearance, drag a stiff-bristle broom across the surface.

After using a float on the surface, cover the patch with plastic for two days. The plastic helps the concrete retain the moisture, which the concrete needs to cure and strengthen (**Photo 8**).

6 LET THE CONCRETE STIFFEN

Test the firmness of the patch by lightly pressing your thumb on the surface. When your thumb no longer leaves an indentation, go ahead and finish the surface.

7 FLOAT THE SURFACE

Match the texture of the old, rough concrete by rubbing the surface of the patch with a sponge float. Use a steel trowel for a smooth finish or a stiff-bristle brush for a lightly grooved finish.

8 COVER WITH PLASTIC

Cover the patch with plastic to retain the moisture. Weigh down the edges to keep the plastic from blowing off. Concrete requires moisture to cure properly.

CONCRETE PATCH: REPAIR BROKEN CORNERS

Use the same basic patching technique for a broken corner as for spalled areas, but add three key steps.

1. Create a ledge for the patch to make a stronger bond with the old concrete (**Photos 9 and 10**). Don't be afraid to make the cutout well beyond the edges of the original damaged area. Smaller patches simply won't hold as well as larger ones.

2. Prop a wood form tightly against the vertical portion of the step to hold the concrete patch in place (**Photo 10**). Block the form against the step with bricks or other heavy objects.

3. When the concrete begins to set, use the edging tool to create a slightly rounded edge to match the step (**Photo 11**). Then remove the form board (carefully, because the concrete is still soft) and finish all exposed surfaces with a float or trowel to match the texture of the old concrete. Cover the patch with plastic and let it cure for at least two days before walking on it.

PRO TIP
Coat the wood form with vegetable oil or WD-40 to keep the concrete from sticking to the wood.

9 CUT AROUND THE STEP DAMAGE

Square off the edges of the broken step with a masonry blade. Chip out loose and weak concrete with a cold chisel.

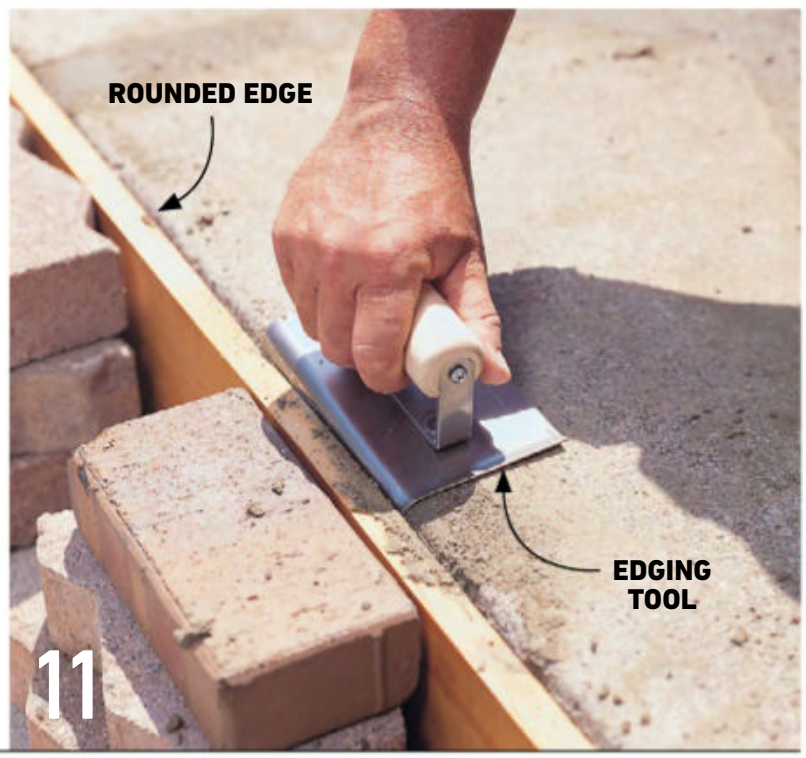
CAUTION
Cut the underside of the break as well to make a firm ledge.

10 FORM THE REPAIR AND PACK IN PATCHING MIX

Anchor a form board against the side of the step, moisten the area and pack in the repair mix. Screed off the excess patching material.

11 ROUND THE EDGE

Slide an edging tool along the step edge to round it. Use the edging tool only if the old step portion has a rounded edge.



BEST PRO TIPS

EXPERT ADVICE FROM THE JOB SITE

REFINISH FURNITURE WITHOUT STRIPPING

LESS TIME, LESS EFFORT, LESS MESS. BETTER RESULTS!

Stripping furniture is a messy, time-consuming process. And sometimes the results aren't as great as you had hoped. Fortunately, you don't always have to resort to stripping to restore your furniture to its original luster.

To show you an easier alternative, we enlisted Kevin Southwick, a furniture restoration specialist. We'll show you Southwick's tips for cleaning, repairing and restoring finishes without all the messy chemical strippers and tedious sanding. You'll save tons of time. And since you'll preserve the patina and character of the original finish, your furniture will retain the beauty of an antique. One word of caution, though: If you think your piece of furniture is a valuable antique, consult an expert before you do anything.

BY JEFF GORTON

ASSESS THE FINISH WITH MINERAL SPIRITS

Before you start any repairs or touch-up, wipe on mineral spirits to help you decide what your next steps should be. The mineral spirits temporarily saturates the finish to reveal how the piece of furniture will look with nothing more than a coat of wipe-on clear finish.

Don't worry; this won't harm the finish. If it looks good, all you have to do is clean the surface and apply an oil-based wipe-on finish. If the surface looks bad even when wetted with mineral spirits, you'll have to take other measures to restore the finish. We show some of these in the following steps.

CLEAN IT UP

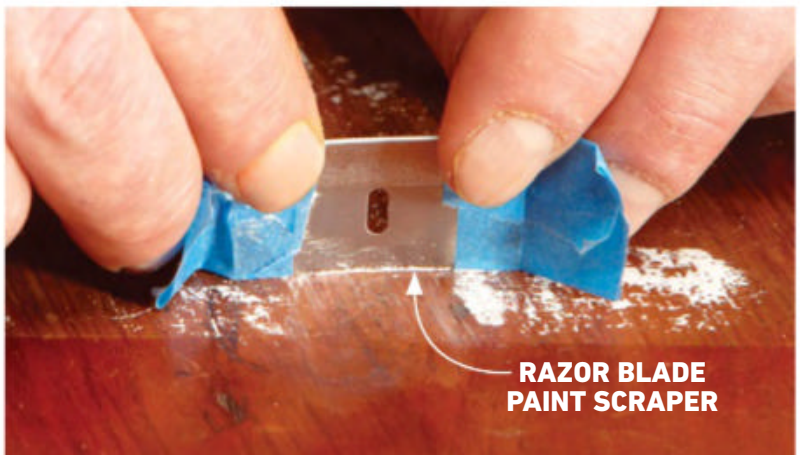
A thorough cleaning is an important first step in any furniture renewal project. Removing decades of dirt and grime often restores much of the original luster. Southwick says it's hard to believe, but it's perfectly OK to wash furniture with soap and water.

Southwick recommends liquid Ivory dish soap mixed with water. Mix in the same proportion you would to wash dishes. Dip a sponge into the solution, wring it out and use it to gently scrub the surface. A paintbrush works well for cleaning carvings and moldings. When you're done scrubbing with the soapy water, rinse the surface with a wrung-out sponge and clear water. Then dry it with a clean towel.

FIX WHITE RINGS

White rings can be easy to get rid of, or they can be a real nightmare. First, slather the ring with petroleum jelly and let it sit overnight. The oil from the petroleum jelly will often penetrate the finish and remove the ring or at least make it less visible.

If that doesn't work, you can try a product such as Homax White Ring Remover ($12 online) or Liberon Ring Remover (about $30 at woodworking stores or online). They often work but may change the sheen. If these fixes don't work, consult a pro to see what your other options are.



SCRAPE PAINT WITHOUT DAMAGING THE FINISH

Paint spatters are common on old furniture, and most of the time you can remove them easily without damaging the finish. Here's a trick we learned from Southwick to turn an ordinary straightedge razor into a delicate paint scraper. Wrap a layer of masking tape around each end of the blade, then bend the blade slightly so it's curved.

The masking tape holds the blade slightly off the surface so you can knock off paint spatters without the blade even touching the wood. Hold the blade perpendicular to the surface. The tape also keeps you from accidentally gouging the wood with a sharp corner of the blade. The curved blade allows you to adjust the depth of the scraper. If you tilt the blade a little, the curved center section will come closer to the surface to allow for removing really thin layers of paint.

GET RID OF DENTS

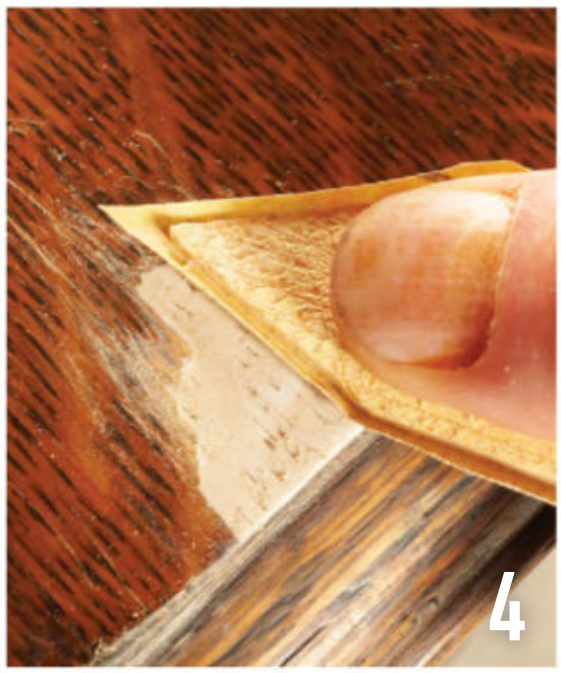
You can often get rid of small dents by wetting them. The moisture swells the crushed wood fibers back to their original shape. (You can't fix cuts or gouges this way, though.)

Moisture must penetrate the wood for this to work. Because finishes prevent water from penetrating, Southwick suggests using a razor blade to make a bunch of tiny slits to allow the water to penetrate. Use the corner of the blade, keeping the blade parallel to the grain direction. Then fill the dent with water and let it dry. If the dent is less deep but still visible, you can repeat the process. As with most of the repairs we talk about here, the repaired surface may need a coat of wipe-on finish to look its best.

REPLACE MISSING WOOD WITH EPOXY

If you discover missing veneer, chipped wood or a damaged molding, you can fix it easily with epoxy putty. Southwick showed us the process he uses, and the resulting repair is so realistic that it's hard to spot. When it's hardened, the epoxy is light colored and about the density of wood. You can shape, sand and stain it like wood, too, so it blends right in. QuikWood and KwikWood are two brands of this Tootsie Roll–shaped epoxy. You'll find it at home centers and specialty woodworking stores for about $14 a tube.

To use this type of epoxy, you slice off a piece with a razor blade or utility knife and knead it in your gloved hand. When the two parts are completely blended to a consistent color and the epoxy putty starts to get sticky, it's ready to use. You'll have about five or 10 minutes to apply the epoxy to the repair before it starts to harden. That's why you should only slice off as much as you can use quickly.



1 FILL THE DAMAGE WITH EPOXY

When the epoxy putty is thoroughly mixed, press it into the area to be repaired.

2 SMOOTH THE PUTTY

Use your wetted finger to smooth the putty. Press the putty until it's level with the surrounding veneer.

3 ADD WOOD GRAIN

On open grain wood like this oak, use a razor blade to add grain marks.

4 SAND THE EPOXY

Sand carefully to avoid removing the surrounding finish. Make a detail sander by gluing sandpaper to a thin strip of wood.

5 STAIN THE EPOXY TO MATCH

Stain the patch with gel stain to match the color and pattern of the grain. Match the stain color to both the light and dark areas of the wood. Create a range of colors by blending them. Then use an artist's brush to create the grain. If the sheen of the patch doesn't match the rest of the wood when the stain dries, recoat the entire surface with wipe-on finish to even it out.

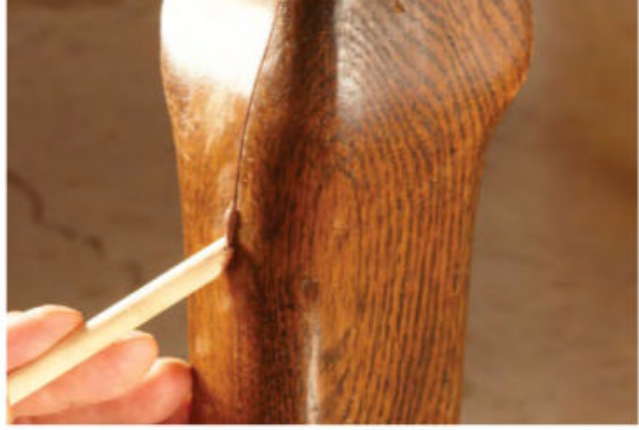
MEET THE EXPERT

KEVIN SOUTHWICK SPECIALIZES IN THE CONSERVATION AND RESTORATION OF ANTIQUES AND IN CUSTOM WOOD FINISHES.

RESTORE THE COLOR WITH GEL STAIN

It's amazing what a coat of gel stain can do to restore a tired-looking piece of furniture. The cool part is that you don't need to strip the old finish for this to work. Southwick demonstrated the tip on this round oak table. The finish was worn and faded. He loaded a soft cloth with dark gel stain and worked it into the surface. Then he wiped if off with a clean cloth. It was a surprising transformation. Of course, gel stain won't eliminate dark water stains or cover bad defects, but it will hide fine scratches and color in areas where the finish has worn away.

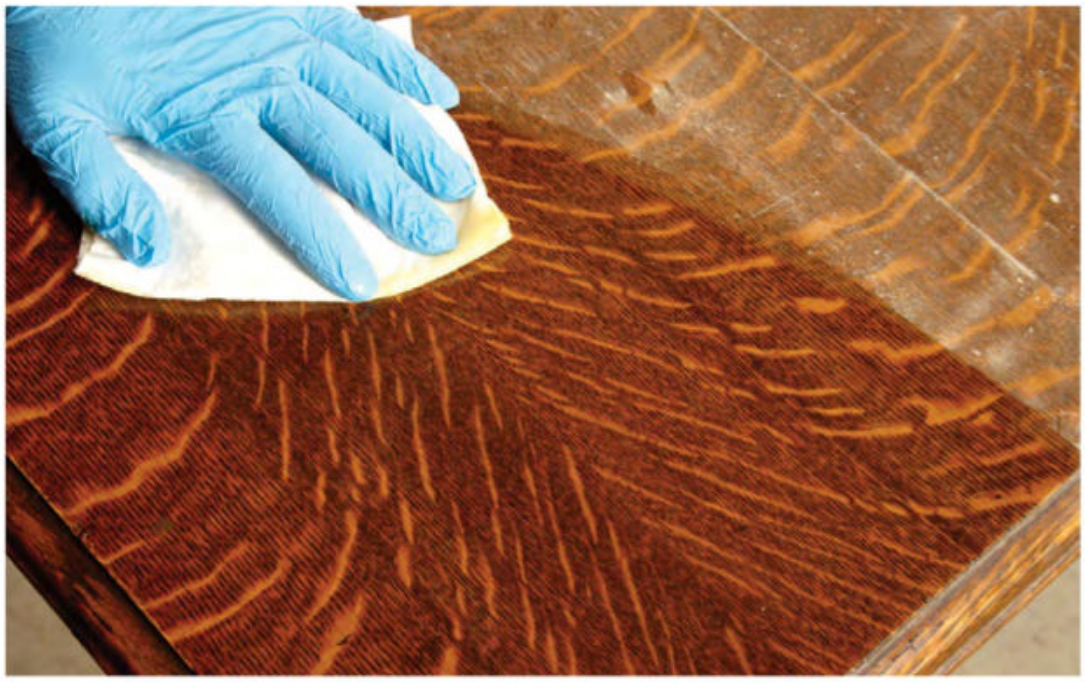
There are other products, but Southwick prefers gel stain because he finds it easier to control the color and leave a thicker coat if necessary. Also, since it doesn't soak in quite as readily as thinner stains, gel stain is somewhat reversible. Before it dries, you can remove it with mineral spirits if you don't like the results. Gel stains offer some protection, but for a more durable finish or to even out the sheen, let the stain dry overnight and then apply a coat of wipe-on finish.



FILL SMALL CRACKS

If you find nail holes or tiny cracks after applying the final finish, fill them with colored wax fill sticks, wax repair sticks or fill pencils, found at home centers and paint stores.

The directions tell you to rub the stick over the defect. But Southwick recommends breaking off a chunk and warming it in your hands. Then shape it to fit the flaw and press it in with a smooth tool. He uses a ⅜-in. dowel with an angle on the end. For cracks, make a thin wafer, slide it into the crack and then work the wax in both directions to fill the crack. Buff with a soft cloth.



RENEW THE LUSTER WITH WIPE-ON FINISH

The final step in your restoration project is to wipe on a coat of finish. After you clean your furniture piece and do any necessary repairs and stain touch-up, wiping on a coat of finish will restore the sheen and protect the surface. Any wipe-on finish will work—Minwax Wipe-On Poly is a common brand (about $20 a pint). But Southwick prefers a wipe-on gel finish like General Finishes Gel Topcoat Wipe-On Urethane (about $25 a pint). It's thick, so it's easy to put on with a rag. One coat is usually all you need to rejuvenate an existing finish. To find a store near you that sells General Finishes Gel Topcoat, go to generalfinishes.com.

To apply wipe-on finish, first put some on a clean rag. Apply it in a swirling motion as you would with car wax. Then wipe off excess finish, going in the direction of the grain. Let the finish dry overnight, and you'll be ready to proudly display your furniture restoration project.

9 THINGS ELECTRICIANS ALWAYS DO IN THEIR OWN HOMES

Flipping a light switch, plugging in a toaster and charging a smartphone are simple electrical tasks that are not risky. But your home's electrical system is complex and potentially dangerous, says Christopher Haas, owner of Haas & Sons Electric in Millersville, Maryland.

Electrocution, Haas says, occurs more frequently with 120 volts of electricity—the standard in a home—than any other level of voltage.

"And, unfortunately, home electrocution claims lives every single year," Haas says. "So don't think of it as 'just' 120 volts—think of it as something that could permanently injure you."

How can you keep yourself safe while also keeping your lights, outlets and appliances in good working order? Start by following the same set of upkeep guidelines and best practices that pro electricians follow. Here are nine things professional electricians always do in their own homes.

BY DAWN WEINBERGER

1 USE VOLTAGE TESTERS WITH DISPLAYS

Naturally, professional electricians always check the voltage before they start working with wires—and so should you! But they don't use any old voltage tester. "I personally recommend [that] people always use a tester with a display, whether it be digital or analog," says Jake McKusker, general manager of McKusker Electric in Mead, Colorado.

A full display, he says, is better than pin-style testers that only indicate the presence of voltage without giving specifics. If the voltage is low, a pin-style tester might not "read" it—but you could still get shocked. Digital and analog voltage testers with displays will let you know exactly how many volts of electricity are running through wires, so you'll know whether it is safe to proceed. If it turns out your wire is "live," you can stop, troubleshoot and avoid electrical shock.

2 WEAR SHOES WITH RUBBER SOLES WHEN WORKING WITH ELECTRICITY

If you step in water or slip and contact a live wire, it's possible you'll get shocked. To stay safe, electricians wear closed-toe shoes with rubber soles, whether on the jobsite or while doing electrical upgrades at home. "A thick rubber sole helps insulate you from grounding out," McKusker says. Wear protective gloves and other safety gear too.

3 MAINTAIN THE ELECTRICAL PANEL

If you have stacks of boxes, shelving or stuff stacked in front your electrical panel (also known as a circuit breaker or breaker box), clear the area.

"Your electrical panel should be clean and accessible," says Dan Mock, brand manager for Mister Sparky, a national electrical services franchise. Blocking access to the panel, he says, makes it more difficult if you or the fire department needs to access the panel quickly. Electrical malfunction results in 51,000 fires each year, according to the Electrical Safety Foundation International. Sometimes those fires originate in the electrical panel.

Furthermore, it's vital to make sure all the switches on your electrical panel are properly labeled and kept "on," Mock says. If you're unsure about the labels, consider calling an electrician to help sort it out. And don't ignore a breaker that is constantly tripping. That's a sign of a short circuit or some other problem that needs to be addressed immediately.

4 TEST GFCIs MONTHLY

You probably know that electricians always use ground-fault circuit-interrupter (GFCI) outlets outdoors and in specific indoor areas of the home, such as bathrooms, kitchens, laundry rooms and crawlspaces. But installing the GFCI is just the beginning.

GFCIs need to be tested regularly to be sure they function properly, says McKusker. He advises testing them once a month or on the manufacturer's schedule. In most cases, to conduct the test, you simply press the "test" button on the outlet. Here are the basic instructions:

- Plug an appliance into the outlet. A hair dryer or lamp works well for testing.
- Turn on the appliance and press the (usually red) test button.
- If the GFCI is working properly, the appliance will "trip"—meaning electricity will stop flowing to the appliance and the test button will pop out. "If it trips, it is working correctly," McKusker says. "If it doesn't trip, that is a big indicator that you shouldn't use it." McKusker says a GFCI that doesn't trip needs to be replaced immediately.

If you have a new GFCI that keeps tripping, the device you are plugging into it could be the culprit. Try another appliance to be sure, then replace that faulty hair dryer, lamp or toaster.

5 AUTOMATE AS MUCH AS POSSIBLE

Electricians know that devices like programmable thermostats, lighting timers/motion sensors and electronic door-locking systems (including those that are smart/Wi-Fi enabled) offer much more than convenience. They also offer a sense of security, and save money and energy. For example, a programmable thermostat can potentially reduce heating and cooling costs by up to 10%, according to the U.S. Department of Energy.

Lights with timers and motion sensors allow you to make sure lights are not left on unnecessarily. McKusker says he sometimes installs motion sensor lights in kids' rooms, because kids are notorious for leaving lights on. That's bound to cut your monthly power bill.

Motion sensors and timed lighting also offer a sense of security. You'll know your outdoor lighting will come on, for example, if someone is creeping around in your yard late at night. Automatic/smart door locks let you unlock your door from your driveway, and some can even monitor the arrival and departure of family members.

"Once people use this type of technology, they generally don't go back," says Mock.

6 USE THE CORRECT LIGHTBULBS

When the bulb in your favorite lamp or fixture burns out, don't just grab the first replacement bulb you can find. "Make sure you put the correct wattage bulb into the fixture," says McKusker.

If you use a 100-watt bulb in a light fixture that's designed for 40 watts, McKusker says you will essentially "cook" the fixture. This will degrade the wires and create a fire hazard. The extra light output is not worth the risk! On the other hand, a bulb with wattage that's too low is likely to leave you sitting in a room that's darker than you want. Your lamp or fixture should have a sticker or printed text telling you how many watts are required.

7 CHECK CARBON MONOXIDE AND SMOKE DETECTORS REGULARLY

You're probably aware you're supposed to check the batteries in your smoke and carbon monoxide detectors regularly. But do you actually do it? "Most people don't test them until they start chirping," says McKusker. Electricians, however, are good about keeping up with this task, because they know the stakes are high if they put it off. Namely, you might sleep through a fire or fail to recognize a carbon monoxide leak. The rules, which apply to all smoke and CO detectors (even those that are hard-wired into your home's electrical system) are straightforward:

- Check your smoke detector and CO detector batteries once a month.
- Replace the batteries once a year, even if they still seem to be working.
- Replace the entire unit every 10 years because the devices are only designed to last a decade.

8 USE OUTLETS WITH INTERNAL USB PORTS

If you're like us, you probably have USB power adapters to charge your phone, tablet and other devices cluttering the electrical outlets all over your house. Not only do these adapters take up valuable outlet space, they're also easy to misplace.

Electricians know the secret to avoiding the hassle—they install electrical outlets with the USB ports built right in. This means you don't have to choose between charging your device and turning on a lamp, and you won't have to worry about finding an adapter. "All you have to have is the cord to plug it in," says McKusker.

9 RESPECT ELECTRICITY

Finally, and most importantly, electricians understand that electricity is powerful, so they treat it with respect. This means always following code and safety guidelines, Haas says, and understanding that shortcuts are never an option. Shortcuts, he says, can quickly lead to injury.

As a homeowner, you can respect electricity by checking and double-checking to make sure the power is off before you start working with your electrical system. And don't even attempt electrical projects unless you are 100% confident in your knowledge and skills. If there's any doubt, call a pro.

SAFER SCENTS

Pleasant scents can lift our mood and help us destress, so it's no wonder that people buy air fresheners, candles, aerosol room sprays and other products. The problem is that many of these products contain harsh chemical compounds, and many require open flames, batteries or electricity.

Reed diffusers are a safer option that give you control of the ingredients. Making your own is easy and inexpensive.

- Round up a clean glass container with a narrow opening to help prevent evaporation. Often you can find one at a thrift store.
- Measure ¼ cup of sweet almond oil and mix in 12 drops of lemon essential oil and 12 drops of lavender essential oil. Pour the mixture into the glass container.
- Add diffuser reeds (available at discount and home goods stores and online) to the container. After a few hours, invert the reeds to allow them to become saturated. Enjoy the relaxing scent!

SAMUEL ROSENMAYER PROJECT EDITOR

HOW MUCH DOES WINDOW REPLACEMENT COST?

New windows are appealing for a lot of reasons: transforming the look of your house, getting rid of windows that are hard to open and close, eliminating drafts and more.

Another big motivation is energy savings. Contemporary windows feature double- and triple-pane glass and thermally insulated frames, things that weren't available when older homes were built and energy costs were lower.

In part because of the energy-saving benefit, window replacement can increase home value. Homelight estimates an 81% return on investment. And with energy prices unlikely to drop, upgrading your windows could save you money in the long run.

A new window generally costs $600 to $800. What you'll pay depends on several factors, including labor. The latter can run from $400 to $500 per window, according to Wayne Owczarzak, owner of Mr. Handyman, a Neighborly company.

On average, it costs about $7,500 to professional replace 10 double-hung windows in a typical 2,500-sq.-ft. home. High-end wood windows will cost more. But there are ways to lower your window replacement costs.

FACTORS THAT AFFECT COST

Unlike new windows, window replacements fit inside the existing window frame. Owczarzak calls these "pocket windows."

These factors influence the cost of window replacement:

- **WINDOW FRAME MATERIAL:** The most common are vinyl, fiberglass and wood. Less common options include composites and metal.
- **WINDOW TYPE:** All have different price tags and installation requirements (details below).
- **SIZE OF THE WINDOW OPENING:** Larger windows obviously cost more.
- **CONDITION OF THE WINDOW OPENING:** Severe rot and deterioration drive up labor costs.
- **WINDOW PLACEMENT:** Upper-story windows may call for extra skill and equipment.
- **AGE OF HOME:** Older homes often have nonstandard window openings that require custom-made replacements.
- **TYPE OF GLASS:** Most contemporary windows have double-pane glass, but triple-pane is available for extra insulation. You can also order windows with tempered or laminated (safety) glass and UV-resistant coatings.

DIY VS. PRO WINDOW REPLACEMENT

Window replacement isn't all that complicated, and in many cases it requires minimal exterior work. You can often remove old sashes from indoors after prying off the molding, pop in pocket windows and replace the molding. Some homeowners may have the DIY skills to install their own windows, depending on window type and placement. Experts like Owczarzak say most shouldn't attempt it.

It takes a contractor from two to four hours, on average, to install a replacement window. But unless you're skilled, it will likely take you longer. Consider the following before you decide to DIY:

- Contractors get a discount on replacement windows unavailable to homeowners.
- Contractors are better equipped to handle problems, such as windows that don't fit exactly and crumbling or out-of-square window frames. Owczarzak says window replacement won't improve efficiency if air is coming through the gap between the window and the framing. It often takes professional skill to resolve issues like this.
- Replacement windows can be heavy, and it often takes two people to lift one and set it in the window opening. If you drop the window, you pay for a replacement. A contractor who drops one is the person who pays, not you.
- Poor installation practices, like improper sealing or omitting weatherproof frame lining, shorten the life of the window and negate the insulation benefits. A contractor guarantees work against such defects. If you do the job yourself, you assume the liability.
- DIY installation may void the product warranty.

PHOTO: JP WALLET/SHUTTERSTOCK

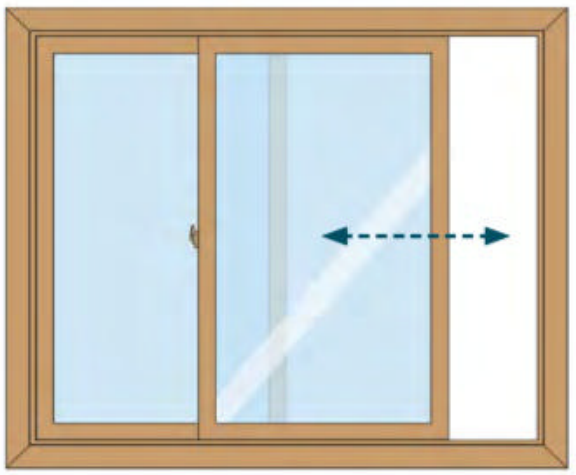
REPLACEMENT COSTS OF DIFFERENT TYPES OF WINDOWS

For cost estimation, you can classify windows by frame material and window type.

FRAME MATERIAL

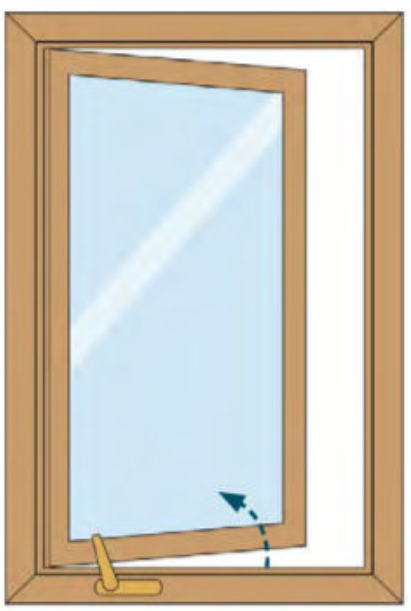
- **ALUMINUM:** Aluminum frames are cheap, but they don't insulate well. They're usually reserved for utility and commercial windows. Each window unit costs from $100 to $400.
- **VINYL:** After aluminum, this is the least expensive frame material. It runs $200 to $500 for a standard double-hung window.
- **WOOD:** This traditional material never falls out of favor. A double-hung wood window costs $300 to $600.
- **FIBERGLASS:** Fiberglass can be molded to look like wood and offers the best durability and energy efficiency. A double-hung window costs $800 to $2,000.

WINDOW TYPE

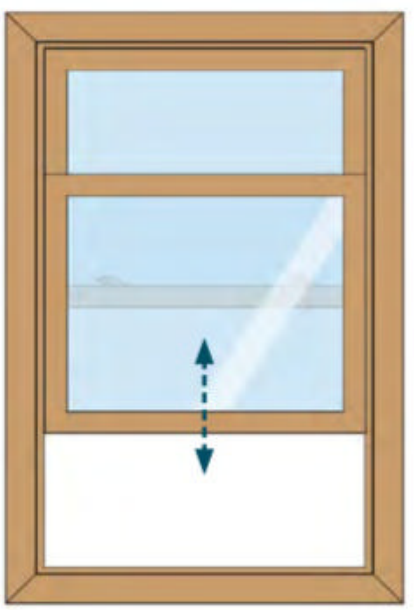


SLIDING: These open and close along a horizontal track. Quality varies widely, and so does cost—from $200 to $2,000.

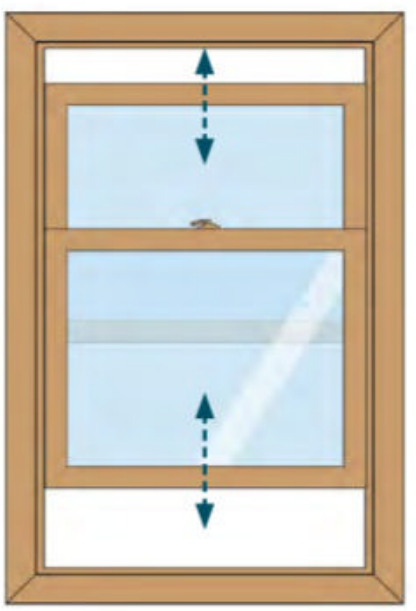
PICTURE: These are fixed but often nonstandard sizes. Costs range from $300 to $800.



CASEMENT: The sash on a casement window pivots on a vertical axis, operated by a crank. An awning window is similar but pivots from the top on a horizontal axis. Replacement costs are $300 to $600.



SINGLE-HUNG: Found in older homes, these feature a lower sash that slides up and down and a fixed upper sash. A replacement single-hung window costs $100 to $400.



DOUBLE-HUNG: These have two sliding sashes that tilt inward, making it safe and easy to clean the outside glass. They cost $300 to $600.

TIPS FOR SAVING MONEY

Over and above doing the installation yourself, you can control window replacement cost in these ways:

- **Install windows with a simpler design than the ones you're replacing, such as solid panes instead of panes with grids.**
- **Stick with standard colors and sizes.**
- **Replace several windows at once so you can buy them in bulk.**
- **Pay by cash or check. A window supplier who incurs a 3% swipe fee for a credit card usually passes on that fee to the consumer.**
- **Look around for seconds. Builders often sell unused windows on craigslist.com or Habitat for Humanity's ReStore.**
- **Choose Energy Star windows, which qualify for any applicable energy efficiency tax credits. The federal Residential Energy Efficiency tax credit expired in 2021, but some state and local governments still offer incentives for energy-efficient windows.**

CHRIS DEZIEL CONTRIBUTING WRITER

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GREAT GOOFS

LAUGHS AND LESSONS FROM OUR READERS

DOGGONE BAD MEASURING!

I was installing a new icemaker water line. First I measured from the outside wall of the kitchen to the location of the tubing at the back of the refrigerator. Then I went downstairs to the basement and measured from the outside wall to the same spot. I drilled the hole through the floor and went upstairs to admire my handiwork. But the hole wasn't where I thought it should be.

I suddenly remembered that the house floor cantilevered over the foundation, and I had drilled the hole 18 in. in front of the refrigerator.

After a bit of a hunt, I finally found the hole in the hardwood floor—directly under the dog's dish! Without skipping a beat, I cut a piece of ⅜-in. dowel, plugged the hole and slid the dog's dish over it. I figured no one would be the wiser (as long as we have a dog, anyway).

LAURENCE SIMON

WOOD YOU LIKE CHIPS WITH THAT?

My brother and I, a medical doctor and an IT professional, started a small hobby ranch where we raised Tibetan yaks. One day we rented a fairly large wood chipper to mulch a pile of branches and small saplings. We positioned the chipper to send the shredded mulch into the bed of our truck.

After about a half hour, I noticed the chipper discharge spout was no longer discharging into the bed. It had shifted upward, broken the rear window and completely filled the cab with wood chips. We were plucking chips out of it for months. Two morons who should have stayed with medicine and computers.

DAVE KOEHLER

A SHOCKING EMAIL

I'll tell you right off that working with electricity scares the heck out of me. But I had to replace an outlet, so I shut off the proper circuit breaker and checked the outlet with a voltage tester. The power was off. OK, no big deal.

I started unscrewing the wire from the outlet, and just as the screwdriver touched the head of the terminal screw, someone sent me an email, which caused the phone hanging at my hip to vibrate. Thinking I was being electrocuted, I threw the screwdriver across the room, where it crashed right through the window. This is one time that hiring an electrician might have been cheaper.

JERRY DOLAK

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