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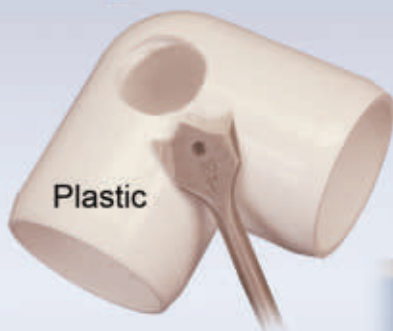
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Q: How do I shorten an interior door to clear a floor register?

A: Lay a sheet of cardboard or plywood on the floor that is the same height (or higher) than the floor register you need to overcome. Apply a strip of painter's masking tape along the edge of the door. Position a pencil on the cardboard and trace a straight line over the tape to indicate where to cut, clearing the surface of the floor register by at least 1/8in. Remove the hinge pins to remove the door. Rest the door on the sawhorses and clamp securely. (First cover your sawhorses with a blanket to protect the door finish.) Use a circular saw with a thin-kerf blade to cut along the pencil line. It may help to clamp a straight-edge or use the saw's rip guide to ensure a straight cut. The masking tape will protect the finish and reduce splintering when you cut. Remove the tape and sand the cut edge with a sanding block. Hang the door and put the hinge pins back in place.

Q: What is the "pitch" of a roof?

A: Roof pitch is a numerical measure of the steepness of a roof. The roof's pitch is the measured vertical rise divided by the measured horizontal span or run. It is the same thing as what is called "slope" in geometry. The purpose of a pitched roof is to redirect rain or snow. In the United States, slope is typically given in inches per 1 foot, or as a ratio of inches per 12 inches, and commonly referred to with units of "pitch." For a roof slope of 1/3, a "4 pitch" roof indicates 4 inches of rise over 1 foot of run. Pitch can also be written in ratio format; a "4:12 pitch" is 4 inches of rise over 12 inches of run.

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Q: How do I install a peephole in a fiberglass door?

A: Fiberglass doors are built with two fiberglass panels with wood blocking and insulation at the core. You can drill through these materials to install a peephole. Most peepholes require 1/2 in. hole. Locate the peephole in the center of the door and approximately 58 in. from the bottom. Start with a 1/8-in. spiral bit at the center of the peephole location. Run the drill at full speed and press lightly to bore a clean hole through the fiberglass and into the inner foam core. Drill through the insulating core and through the fiberglass panel on the other side. Switch to a 1/2 in. spade bit. On the inside of the door, insert the tip of the spade (or hole saw) into the pilot hole and drill your peephole. To reduce chipping the exterior, stop drilling when the tip of the bit begins to penetrate the exterior fiberglass panel. From the outside, place the tip of the spade bit into the pilot hole and drill through the exterior fiberglass panel, completing the hole. Dab the drilled holes with sealant or epoxy. Unscrew the "door viewer" or peep-hole assembly into two sections. Insert one section into each side of the hole made in your door, making sure the appropriate lens is on the correct side of the door. Twist the pieces together to tighten. **EHT**

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DIY Floating Shelves

How to Make Floating Shelves with a Table Saw



By Matt Weber

By appearing to hover on the wall with no visible mounting hardware, floating shelves are an interesting design element that provides surface storage while optimizing space. With no brackets to contend with, shelves can often be situated more closely together, granting more room for more shelves. Floating shelves are essentially made of flat, hollow boxes. Depending on the method of construction, the hollow shelf mounts to either metal rods or a wooden cleat that fits inside the rear of the box and supports it from within. The rods or cleat are fastened securely into the

wall studs for the strongest holding power.

DESIGN

The first step is to decide the size and shape of your shelf as determined by its location. I was mounting to a partition wall next to a bar pass-through, leaving me about 4-1/2 ft. of room. On the other side of the wall is the doorway to the kitchen. I wanted to prevent having people turn the corner and get hooked by the shelves, so I decided to keep the depth close to the wall and the shelves narrow. (A kitchen island also rested beneath the mounting

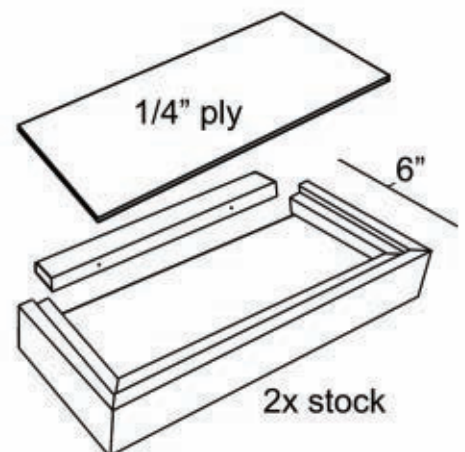
location, which kept traffic safely routed away from the shelves.)

Another consideration when designing the shelves is the hollow nature of the construction. Since the mounting cleat only extends about 2 inches into the shelf, the shelf must be lightweight and well-balanced so as not to pull away from the fasteners. For my design, the upper and lower panels are made of 1/4-in. plywood—not exactly heavy-duty material. For this reason, it's smart to limit the shelf size to a fairly shallow depth. My floating shelves extended only 6 inches away from the wall.

CONSTRUCTION

My first step was to rip the rounded edges off 2x4 stock using my table saw. I then ripped the 2x4 in half lengthwise into two nominal 2x2's.

The edges of the shelf are made of the 2x2 pine material, while the upper and lower panels are made of 1/4-in. stain-grade birch plywood. To ensure a flat, flush shelf surface, I cut 1/4-in. deep rabbets along the upper and lower edges of the 2x2's. When arranged as



Basic construction

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Rip 2x4's into 2x2's and square the edges of the 2x stock.



Sand the wood to prep for stain.



Measure and mark rabbets to seat the 1/4" plywood.



Make intersecting partial rips to cut the rabbets.



Cut the corners for the shelf at 45-deg. miters.

the sides of the box, these rabbets would form an interior channel or trough for the plywood.

For a solid mounting surface with plenty of nailing room, I cut the edge rabbet 1 inch wide on the top and bottom. I simply used a combination square to mark "mirror-image" 1/4-by-1-in. rab-

bets on both sides of the 2x2. The grooves were cut by adjusting the blade depth to make intersecting partial rips on the table saw.

Next, cut the 2x2 channeled blocks at 45-degree corner joints on a miter saw, according to your shelf size. When cutting, hold or clamp the stock firmly so it does

not rock beneath the blade since it now has a partial bottom side. The shelf requires two side rails with opposite 45-deg. miters on one end, and square cuts on the other end will butt against the wall. The front rail should extend the length of the shelf and have matching 45-deg. miters on each end. The back side will be left open for the cleat.

Loosely assemble the rails and check the miters for fitment. Note: When measuring for the plywood panels, place the end of your tape at the corners of the rabbets and not at the outside corners of the rails, otherwise you'll cut the panels too large.

I trimmed the plywood to size using my table saw and miter gauge. Dry-fit the panels in the rails before final assembly.

To join the mitered rails, I used a combination of wood glue and finish nails. To ensure a super-solid joint, I used 3-in. finish nails.



When measuring for the plywood, take the measurement from the corner of the rabbet, not the outside corner of the stock.



Trim the plywood to fit inside the groove.



Test-fit before assembly and make any necessary adjustments.



I fastened the corners with a combination of 3" finish nails and wood glue.



Predrill holes for the fasteners.



Apply glue to the corners and clean up any excess that squeezes from the joint.

You should always predrill the nail holes, and finish hammering with a nail set to bury the head below the wood.

Be sure to select the most attractive panel side for the top, keeping the unfinished surface facing inside the box. The panels should fit snugly into the groove.



I anchored them with wood glue and pin nails.

To make the mounting cleat I used the leftover T-shaped 2x rail material with the rabbets. I simply ran the piece flat-side downward on the table saw, shearing off the "ears" of the profile so that the "T" became shaped like an "I". I then cut the length to fit snugly between the two side rails of the hollow box. Test-fit the cleat in the hollow shelf before mounting to the wall studs.

Before mounting, I filled all fasteners holes, sanded the shelves, and added wood stain and varnish.

Set the nail heads below the wood surface to leave room for wood filler.

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PROJECT NEXT



The plywood should fit snugly in the grooves along the top and bottom of the shelves.



Apply wood glue to the rabbets.



I fastened the 1/4" ply with a pin nailer while the glue set.



Rip the "ears" off the grooved 2x stock to create the mounting cleat. Make sure the cleat fits inside the hollow shelf.

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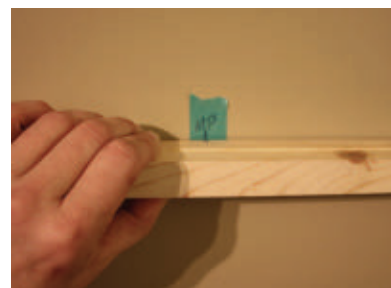
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INSTALLATION

For this project, I was centering the shelves on the wall, so I used the wall's mid-point as the control point for my shelves. I marked the midpoint with painter's tape at the approximate height on the wall, and then aligned the mid-point of my shelf to get my horizontal orientation. It may help to mark the ends of the shelves on the wall with painter's tape.

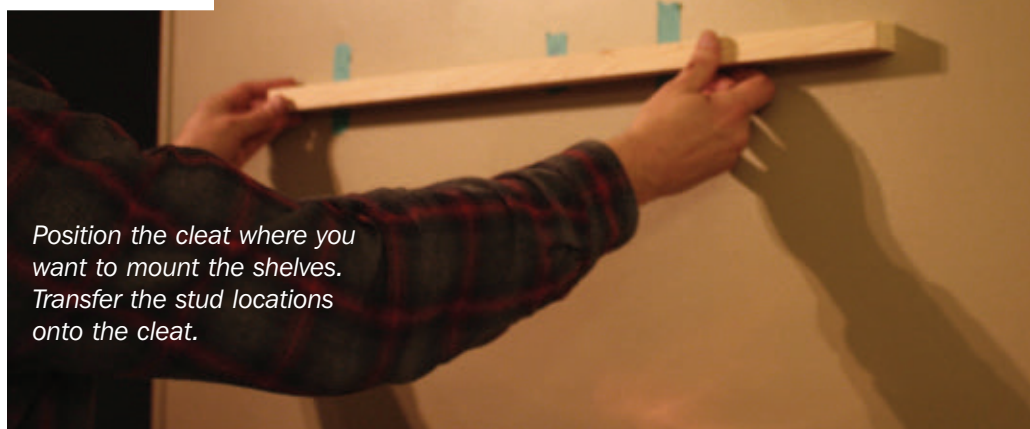
Within the span of the shelf's mounting cleat, mark the wall framing using a stud finder. Use a level to mark the studs in a level



I chose to align the center of the shelves with the midpoint of the wall.



Locate and mark the wall studs.



Position the cleat where you want to mount the shelves. Transfer the stud locations onto the cleat.

plane. Avoid marking within 1 inch of the end of the cleat, because the mounting screw will likely split out the wood. You'll achieve the most holding power by screwing into two studs, but if necessary you can use a bracketing wall anchor if you can't fasten to two studs

Next, transfer the stud measurements to the wood cleat and predrill holes for your mounting screws. The screws should penetrate through the cleat, through the wall board (5/8-in.



Predrill the cleat for the mounting screws.



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PROJECT NEXT

drywall) and sink at least 1 inch into the studs. I used a couple of 3-1/4-in. RSS screws from GRK Fasteners. For shorter screws, you may have to countersink the screw heads to ensure a solid bite.

Next, align the mid-point of the cleat, check for level and then sink the mounting screws into the studs so the cleat tightens to the wall.

The floating shelves should fit snugly over the cleat and flush with the wall.

Next, drill pilot holes on the top panel (along the back edge of the shelf) for a few wood screws spaced 8 to 10 inches apart. Drive screws through the plywood and solidly into the wood cleat.

In my case, I repeated the process for Shelf Number 2, although you may opt for Shelves 3 and 4, as well. **EHT**



Level the cleat and screw into solid wall framing.



Fasten the shelf to the cleat with wood screws.



Slide the hollow shelf over the wood cleat for a snug fit.



The size of the shelves is up to you, but should be built in proportion to the wall or the living space.

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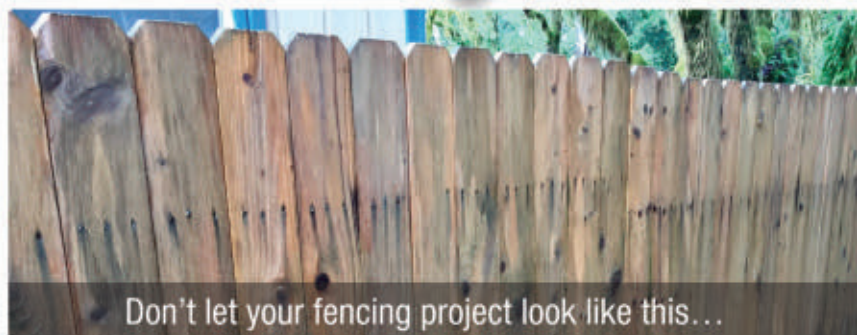
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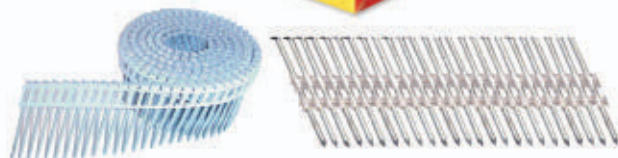
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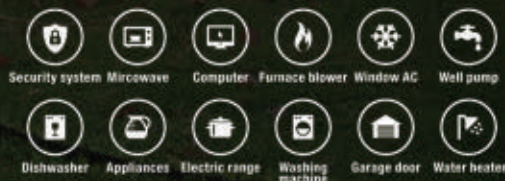
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don’t: more cutting edges. The Kik brad-point bits are tipped with six cutting edges to provide 20-percent more cutting surface when compared to standard brad-points. This means the Kik bits bore faster, cleaner and last longer due to decreased wear. In fact, the tip cuts so aggressively the bit requires an extraction ridge inside the flutes that removes material quickly to prevent heat buildup.

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Like the Kik Forstners, the Kik spade bits can also cut a curved path. The spade bits from TG Tools are engineered with 30 percent more cutting surface, resulting in faster boring and longer life. Plus, the Kik bits eliminate the spur commonly found on similar bits, which allows these spade bits to drill curved holes for plumbing and electrical installations. Visit www.mytgtools.com.





BLACK+DECKER GUTTER CLEANER ATTACHMENT

Black+Decker's new Gutter Cleaner Attachment helps homeowners clear hard-to-reach gutters of debris—a crucial task before winter weather hits. Best of all, this system lets you clean most gutters without climbing a ladder. The Gutter Cleaner Attachment connects to most blower models, including the recently launched 3-in-1 VAC-PACK (sold separately). The attachment extends up to 12 feet using the four quick-connect tube sections, and the flexible tube provides

maneuverability to help make the job easier. During fall cleanup, homeowners can also use the new Black+Decker Leaf Collection Bin to hold a 39-gallon disposable bag upright for easy filling. Visit blackanddecker.com.

SCALE MASTER PRO XE

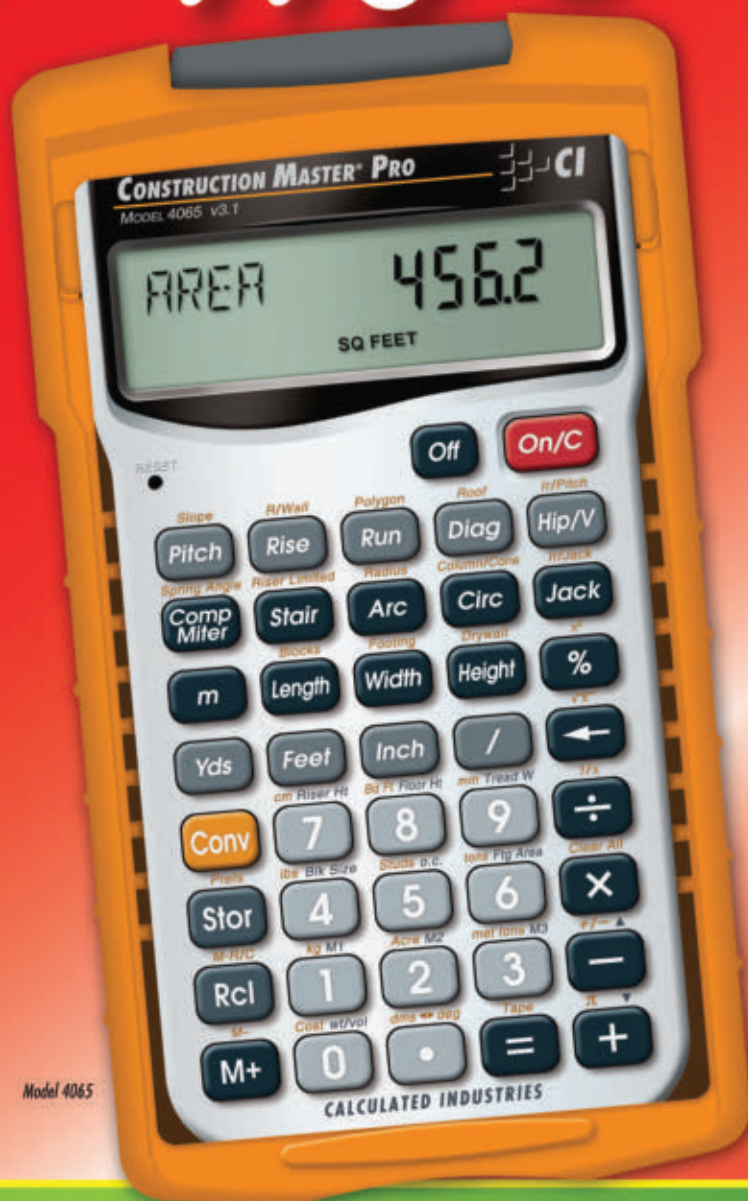
For professional builders, the Scale Master Pro XE makes digitizing architectural and engineering plans and doing takeoffs for estimating, bidding or planning easy. Specifically designed to simplify getting linear, area and volume takeoffs from blueprint drawings, the Scale Master Pro

XE finds linear measurements, rectangular areas and volumes—and it converts between scales and dimensions. It has 91 built-in scales—50 U.S. (feet-inch) and 41 metric—for maximum versatility in architectural, engineering and civil/map scaling. It features ten custom scales enabling you to calibrate to any scale, even from plans that have been reduced, enlarged, or are just out of scale. You can store new scales permanently into the device for future use. Other features include two built-in memories; dedicated length, width, and height keys; push-button counter to keep track of items while rolling; switch for locking in mode, scale and units while rolling; and a subtract key that allows you to deduct rolled distances. You can also connect it to your PC with an optional interface cable to transfer rolled values directly into

commonly used spreadsheets or estimating programs to create a permanent record of dimensions and values. The easy-to-learn and use Scale Master Pro XE has dual LCD displays, which show more information that will save professionals time and reduce errors on estimates and bids. Visit calculated.com.



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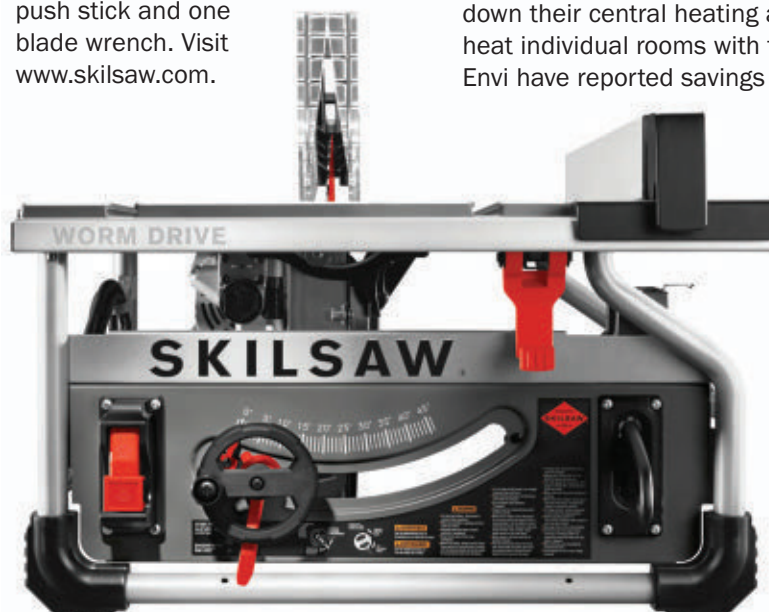
DEWALT 20V MAX MID-RANGE IMPACT WRENCHES

DeWalt announces two new 20V MAX 1/2-in. Mid-Range Impact Wrenches (DCF894 and DCF894H). They are available in detent pin-style for users who need maximum socket retention and hog-ring style, for users who value quickly being able to change sockets. Each tool is ideal for use overhead or when space is constrained in applications that require high torque, including plumbing, mechanical, concrete and masonry, automotive, steel erection and elevator repair. At 3.48 lbs. (tool only) and 6.95 in. to the front of the anvil, the 20V MAX Mid-Range Impact Wrenches are compact yet deliver high-power and torque. Each tool achieves 330 ft.-lbs. of maximum torque, 0-3,100 impacts per minute, and no-load speeds from 0-900 and 0-2,000 RPM in two mode settings (low and high) designed for use in a wide

variety of applications. These applications include threaded couplings, pipe flanges, wheel lugs, concrete anchor setting and more. Visit dewalt.com.

SKILSAW PORTABLE WORM DRIVE TABLE SAW

Built with worm-drive gearing for maximum torque and power, the SPT70WT-22 features a best-in-class Dual Field motor to increase cutting speed and keep the motor cool, extending the overall motor life. Large cuts can be managed more easily with the saw's ability to rip full sheets of plywood in half with more than 24 in. of cutting capacity. And with a cut depth of 3-1/2 in., cutting 4x material is quicker than ever. The SPT70WT-22's all-metal roll cage design and a die cast aluminum table top add to the saw's durability while staying lightweight, making for quick and easy setup and transportation. Included with the SPT70WT-22 is a 10 in. Diablo carbide blade, a miter gauge, self-aligning fence blade, an insert plate, push stick and one blade wrench. Visit www.skilsaw.com.



ENVI WALL-MOUNTED ROOM HEATER

The Envi Heater is designed to squeeze every last drop of heating power from a low-wattage design using a patented process called "Stack Convection Technology" that boosts airflow without the need of a fan. It works by drawing cold air into the heater and then rapidly heating and circulating



warmth around a room. The result is a very efficient heater, which costs as little as 4 cents/hour to operate. Customers who turn down their central heating and heat individual rooms with the Envi have reported savings of up

to 50 percent or more on their heating bills. Built with fire-retardant materials, the Envi Heater is cool to the touch, has a thermal cut-off switch, and an additional wall-sensor that cuts power if the heater is knocked off the wall. With its fanless design, the Envi is totally silent and blows no dust or allergens into the air. It reduces the need to use ductwork plus the low-energy heating core maintains humidity and doesn't dry out the air. The Envi can be simply installed in minutes by anyone, with just a screwdriver – no drilling required. Visit www.eheat.com.

ZIRCON STUDSENSOR L50

The StudSensor L50 stud finder locates the edges of wood and metal studs and joists behind walls, floors and ceilings. Its easy-to-read LCD display screen indicates stud edges, the SpotLite Pointer shines a beam of light on the wall to



clearly identify the target, and WireWarning detection indicates the presence of live AC voltage. Its patented pivot-pinch grip and contoured shape provide an easy, secure hold in either hand, at any angle. StudScan mode locates the edges of wood or metal studs up

to 3/4 in. deep. DeepScan mode doubles the scanning depth to 1-1/2 in. A READY icon displays when calibration has completed successfully, and Zircon's patented "over-the-stud" indication alerts the user to start the scan in a new location if scanning begins over a stud. Visit www.zircon.com.

CHAMPION 3500-WATT DIGITAL HYBRID GENERATOR

Champion Power Equipment's new Digital Hybrid Generator is 50 percent quieter and 20 percent lighter than a traditional 3,500-watt generator. This feature-packed power solution includes Quiet Technology, which is achieved by integrating digital components used in more advanced inverters. The Digital Hybrid also has an efficient mechanical design that decreases its overall footprint and weight. Additional features include Extended Run Time, Economy Mode and Clean Power for sensitive electronics, plus you can easily increase your power with the optional Parallel Kit. The Digital Hybrid includes some of the most important features of an inverter in an open-frame generator



configuration, and delivers those benefits at a lower price point. Visit www.championpowerequipment.com.

CHANNELLOCK E458 HIGH LEVERAGE CENTER CUTTING PLIER

Channellock's new E458 8-in. High Leverage Center Cutting Plier features XLT Xtreme Leverage Technology, enabling cutting with considerably less force required than traditional high-leverage plier designs. A precision-machined center-cut design maximizes the cutting power of this plier. It is made in the USA with high-carbon alloy steel, and the plier's cutting edges are heat-treated for ultimate performance. The High Leverage design to makes it easier to cut deck, wood and concrete screws, various nails and even welded chain link. Visit channellock.com.





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Ideally all tubeless tires should be repaired from the inside/out, but in an emergency situation that's not always possible. That's when the Stop & Go Tire Plugger can do what no other tire repair kit can. It allows for an "on the spot" and "on the wheel" repair to virtually any tubeless tire. And it seals the puncture on the inside. The Plugger is a spring-loaded gun that drives the plug into the hole. The shaft of the plug expands under pressure to fill the puncture. The mushroom head of the plug seats on the inner wall, allowing no air to escape. This ensures maximum reliability, and the tool is easy to store so you're always prepared. The hard plastic case measures 6x9x1 in. and weighs just under 2 lbs. Included

is the plug gun, nozzle, probe tool, reamer/rasp tool, retractable blade, and 25 rubber mushroom plugs that measure 5/16 in. in diameter and 3/4 in. long. Visit www.stopngo.com.

STIHL WOODCUTTER UNIVERSAL FORESTRY AXE

Sometimes you just need an axe. Not a specialized felling axe, or limbing axe, or splitting maul—just a good old-fashioned swinging axe. The Stihl Woodcutter Universal Forestry Axe is excellent for felling, light-duty splitting, limbing and other forestry work. The handle is crafted from high-quality ash wood and the head is well balanced for a variety of cutting applications. It's the axe of all trades you've been looking for. Visit www.stihlusa.com.

RYOBI 18V COOLING COOLER

Ryobi's new and improved RYOBI 18V Cooling Cooler Model P3370 is unique in that it can act as a 50 quart cooler, or can double as an air cooling unit. The cordless convenience makes this an awesome option for keeping cool on the jobsite or at any outside event. The 18-Volt ONE+



Cooling Cooler is sold as a kit with the P102 battery and P119 charger. Best of all, like every 18-Volt ONE+ blue or green tool, this cooler works with any 18-Volt ONE+ battery. Upgrade to LITHIUM+ batteries for better performance. Visit ryobitools.com.





MILWAUKEE M18 FUEL HACKZALL KIT

The new M18 Fuel Hackzall cordless mini reciprocating saw features a patent-pending dual gear antivibration system for up to four times lower vibration, granting the user greater comfort and control of the cut compared to previous Hackzall models. With three times the tool life, the new Hackzall make fast, precise cuts through a wide range of materials,

including drywall, wood and PVC. The new M18 Hackzall is sold as tool only or in a kit that includes one M18 XC5.0 RedLithium Battery Pack, charger, one general purpose Sawzall blade, and a contractor's bag. Visit milwaukeekeetool.com.

ADD-A-HANDLE

Add-a-Handle is a new multi-use tool for carrying, pouring, holding or hanging anything up to 30



lbs. with comfort and ease. Originally designed for attaching to quart-size paint cans, its uses are practically limitless. Add-a-Handle is comprised of one strong light-weight plastic handle with two 18-in. Velcro buckle straps and a magnet placed on top for resting a paint brush. The straps are removable and adjustable with easy-pull tabs, making it handy for anyone to adjust them individually for size or height to fit any project.

Add-a-Handle is simple, easy to use, and saves time on every project, be it carrying a ladder or a wine bottle. Add-a-Handle is made in the USA with genuine Velcro brand straps. See why it won the NRHA 2015 Retailer's Choice Award at Add-a-Handle.com. **EHT**



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WEATHER-READY WINDOWS

By Matt Weber

In this two-phase project old windows are upgraded with energy-efficient vinyl replacements, plus the surrounding wood trim is protected with aluminum wrap.

New windows look great, save energy and require less routine maintenance, making window replacement a top project on many homeowner wish lists. The EHT staff recently participated in a window project where old, rotted wooden windows were replaced with energy-efficient vinyl units from Simonton Windows. This article chronicles the job, from pulling out the old to putting in the new.

The replacement units from Simonton not only look beautiful, but the Low-E design significantly reduces heat transfer to save on energy bills. Plus, the vinyl construction won't require constant repainting, glazing or other associated maintenance.

When it comes to maintenance, wooden windows require a lot. If the windows aren't maintained with glazing, caulking and exterior-grade paint, the wood will rot. That's what happened to eleven windows, a mix of double-hung and bay styles, on our project house. The most evident rot was along the sill of the bay windows in the front and back of the house. The lack of overhang above the windows meant that the sill was taking the full brunt of the rainfall. In fact, the sill of the single-pane bay in the front had rotted to the point that the wood could no longer support the weight of the glass. The bay window actually sunk down into the rotted wood and opened a gap at the top of



Wood rot is caused by a fungus that thrives on dead wood in moist environments. It can wreak havoc on wood windows.

the frame, allowing significant airflow in and out of the home.

The solution was to remove the old window, rebuild the sill plate, then replace with a new vinyl unit. As a belt-and-suspenders approach to protection, the installers at Lifetime Windows & Doors “wrapped” the surrounding wood trim with aluminum. Here is how it's done.

BENEFITS OF REPLACEMENT

The necessary maintenance of older windows is one of the biggest complaints of homeowners, particularly of those with wood-framed windows. Painted windows require regular TLC—scraping, glazing, caulking, repainting—to seal out the water and protect the wood from rot. New windows made with vinyl or aluminum can eliminate this hassle. The need to prevent or repair rot is one of the main reasons homeowners across

America are opting for “non-wood” window replacements.

Vinyl replacement units offer smooth operation, modern decorative options and less maintenance. Unlike wood, vinyl windows and doors will never rot or require repainting. And unlike aluminum,



On some windows water intrusion had resulted in sills that were completely ruined by rot.

First step is to cut away all rotten wood for replacement.



vinyl windows and doors will never pit or flake. Today's windows are made from the highest quality vinyl and require almost no maintenance. In fact, an occasional washing will keep them looking like new for years.

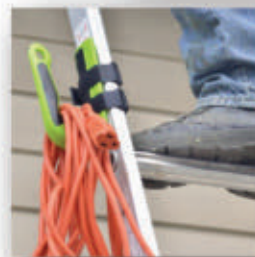
Plus, energy-efficient vinyl windows offer increased comfort and lower utility bills. New units constructed with double-paned, Low-E glass filled with harmless Argon or Krypton gas can reduce the home's power bill in the years to come. The gasses are denser than air and serve as an thermal barrier, reducing the transfer of heat and cold through the window.

REPLACEMENT SIZE

This project involved same-size replacements of the existing windows. The homeowner selected Simonton's 5500 Reflections Series. Most manufacturers will offer standard size windows, and the homeowner/contractor should order a size that most closely matches the existing units. Keep in mind that if a window is slightly smaller than the window frame, then it can be shimmed for a tight fit. However, if the window is too large, then it will not fit without substantial reconstruction of the wall.

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A PVC sill replacement will resist water and rot for years to come.

If you're considering replacing windows with a larger size, you should keep in mind how a window is framed. A header above the window distributes overhead weight to the framing members on each side of the window, and a sill plate on jack studs supports it from beneath. If you want to increase the width of a window, you will have to remove the wall covering and framing to reconstruct a header and sill to fit the larger width, which is substantially more complicated than a same-size replacement.

OUT WITH THE OLD

Once the windows are on site, always double-check the measurements for fit before removing the existing units. The Simonton replacement units are designed to fit into the window frame and rest on the existing sill. Windows are "clamped" in place with stop molding on each side of the wall. The first step to pulling out the old windows is to remove the stops.

The contractors on our project used hammers, putty knives and pry bars to dislodge the old stop

molding surrounding the windows on the outside of the house. With the stops gone, the wood windows could then be carefully pushed out of the frame and recycled or disposed of.

In some cases the new windows can be installed from inside the house by removing the interior stops, pulling the old window, and leaving the exterior stops in place. However, because the aluminum trim wrap would serve as the exterior stop, the installers did the reverse. They opted to remove the outer molding, leaving the inner stops in place, and install the replacement windows from outside the home.

As mentioned, some of the windows had significant rot damage, requiring not only the stops and the windows to be removed, but the sill plate to be replaced as well.

PREPARING THE FRAME

Because of the rotted sills on some of the windows, the old wood was demolished and removed and a new sill plate made of rot-resistant PVC was



To remove the windows, remove the stop molding along the edges.



Stop molding surrounds the top and sides of the windows.



Once the stops are removed the windows can be carefully pulled out of position.

leveled, shimmed and nailed to the framing.

Next, since the replacement window will sit on the sill, the sill was covered with aluminum casing that was custom-fabricated by the installers to fit the new sill. (This step is optional.)

To help fit the window into the opening, Simonton offers accessories such as a sill extender or snap-on flange, which help conceal any gaps between the window and the house frame. These vinyl accessories are installed prior to window installation and are weather-sealed along the joint to prevent leaks.

If the window will be installed on a sloped sill, then wood blocks should be installed along the sill to help support the window and keep it level.

When installing, tilt the new window into the opening with the sash closed and locked, setting the bottom on the sill (or wooden blocks).

It's important to remember that the replacement window must fit into the opening level,



Accessory pieces such as vinyl sill extenders should be attached before installing the window.

plumb and square, otherwise it won't open/close properly and air and water could infiltrate around the edges. Check both sides for plumb. To check for square, measure both window diagonals from corner to corner to make sure they match. Adjustments to the windows' fitment can be made with shims, which should be installed at all anchor points and anywhere necessary to keep the unit correctly in place.

The Simonton windows come with thick weather-stripping around their perimeter that

helps the windows fit snugly. The more closely a new window fits its frame, the less shimming and adjusting will be required when installing it.

Once the window is plumb, level and square, drive the installation screws (provided with the window) into the pre-fabricated holes in the jamb. However, don't over-tighten, or the window could bow and not function properly. Check the sash for proper operation once the screws are in place.

If any gaps greater than 1/8 inch exist between the window



The Simonton windows arrive with weather stripping around the perimeter of the units. This helps the window to fit snugly, and adjustments to plumb, level and square can be made with wood shims.



Because the installers were replacing the outer stop molding with aluminum casing, they opted to leave the interior stop molding in place and install the windows from the outside.

and frame, loosely pack insulation on the interior. Using spray foam is acceptable as long as the product is designated for "windows and doors", meaning the foam won't expand to the point where it could flex the window material and prevent proper operation.



Once the window is correctly positioned, mount the window with the supplied screws into the prefabricated holes.



Seal all joints on the interior and exterior with caulk/sealant.



This bay window sill had rotted to the point that it could not support the weight of the window glass.

The sill of this window had rotted to the point that it no longer supported the weight of the glass. The window sank into the rotted wood, opening a gap at the top that allowed significant airflow.



Seal all joints on both the interior and exterior of the windows with caulk, including the holes in the jambs.

At this point, new stop molding can be installed, painted and caulked to complete the window installation. Or, as in this case, the aluminum alternative can be installed.

ALUMINUM TRIM WRAP

The specialized equipment and required metal-crafting skills probably push this latter phase of the project outside the realm of most DIY'ers, but this method of weather protection conceals the brick mold and window sill. The wood trim is covered in overlapping aluminum casing that is fabricated



A reciprocating saw is a handy tool for digging out the rotted wood.



Damon Gassaway of Lifetime Windows & Doors installs the new window sill.

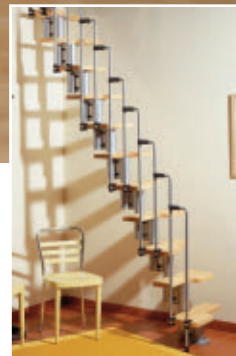
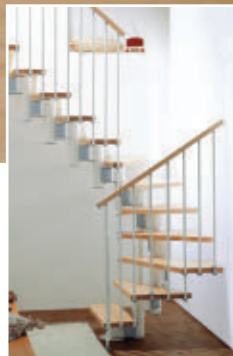
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The aluminum trim wrap is fabricated on site to match the size and shape of the wooden window trim.



The sill wrap is the first piece to be installed so the window can be placed over it.



Large units require some assistance when installing. A worker on the inside lifts the window with a suction cup.

on-site using a sheet-metal brake. The aluminum roll is cut to length and then bent on the brake into a profile that closely matches the window trim's size and shape. Metal snips and hand brakes are used to adjust its final shape. The sill piece is installed first (prior to window installation) using finish nails. Next come the side pieces that shed water over the sill plate. Finally the top piece is nailed in place overlapping the sides to shed water like flashing or roof shingles. Once completely installed, all the aluminum joints and fastener holes were sealed with silicone sealant.

The aluminum wrap is available in a selection of colors to match or complement the home's décor. The end result is "bulletproof" protection of the wood trim that surrounds the energy-efficient new vinyl windows, ensuring the entire system will stand up to weather and rot for years to come. **EHT**



The windows are carefully measured to determine the length of the aluminum wrap.



After the sides are wrapped, the final piece goes on top to divert water away from the building envelope.



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RACK 'EM UP

By Matt Weber

Organize your work space with a sturdy storage rack for sheet goods.

My workshop is a detached two-car garage that serves as my laboratory for all things related to *Extreme How-To*, from photo shoots and material storage to pre-fab work and project prep. I try to keep the place organized, but the work space goes through cycles of relative order and total chaos. During one of the recent chaotic episodes I got fed up with the various sheet goods that littered my shop, obscuring sight of tools and supplies and generally obstructing my passage from Point A to Point B. I had planned for years to build a storage rack to solve this problem and finally found the motivation to do so.

What I did not find was a plan to build a storage rack that fit my needs. Sure, you'll find a variety of woodworking plans online, but most of these storage units are very large and often designed for a great deal of capacity. While many of the plans I found would work wonderfully for a full-fledged woodworking shop, I'm not a full-fledged woodworker. I'm more of a jack-of-all-trades (master of none) DIY guy who usually has a half dozen various sheets floating around, so I did not need a monster

RACK 'EM UP



Snap a chalk line to guide the cut for your angled supports.

rack to hold dozens of sheets. Not only would the extra storage space go largely unused, but the large size of the "pro" racks would pose a new problem in my cramped shop by occupying square footage that I could put to better use.

After a few hours of research, I decided to get creative. The rack shown in this article is my own creation, a concept that I cobbled together from a few other rack/shelf designs. My design provides enough storage for my materials, keeps the supplies against the wall and out of my way, and even has an upper shelf for further storage of long items

like 2x4s and pipe clamps. If you're a part-time carpenter or hobbyist woodworker, then maybe this rack will suit your needs as well.

LOCATION

You will need probably 9 or 10 feet of available wall space for placement of the rack. However, the sheets go in and out of the end of the rack, meaning that you will need clearance at one end or the other to insert or retrieve the sheets, bearing in mind that a full sheet is 8 feet long.

My solution was to install the rack on a wall adjacent to an overhead garage door. So, whenever

I need to pull out a large sheet, I can simply lift the overhead door to gain more room. This seemed to me the most logical way to economize space, and you should plan accordingly when locating the rack in your shop.

MOUNTING

The rack is stationary and mounted to the wall of my shop to provide plenty of strength and stability to hold the heavy sheets. My shop is a wood-framed building with the interior walls sheathed in plywood. The rack's cross-braces that are installed against the wall are fastened into the solid stud framing with 3-in. screws.

If you are installing the rack on a block or concrete wall, then use the appropriate wall anchors or concrete screws to mount the rack.

ANGLED SUPPORTS

The rack shown is designed with three angled supports for the sheet goods. The angle keeps sheets tilted backward and stable, while providing solid support so the sheets do not bend or bow.

I cut the angled supports from 2x8's using a circular saw, and



I used the leftover 2x8 pieces from the angled supports as blocking for the floor of the rack.



The floor was made of 1/2" plywood.



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RACK 'EM UP



Fill the nail holes with wood putty and sand smooth to avoid snagging the corners of the sheet goods.

The angled supports are spaced 40" apart.

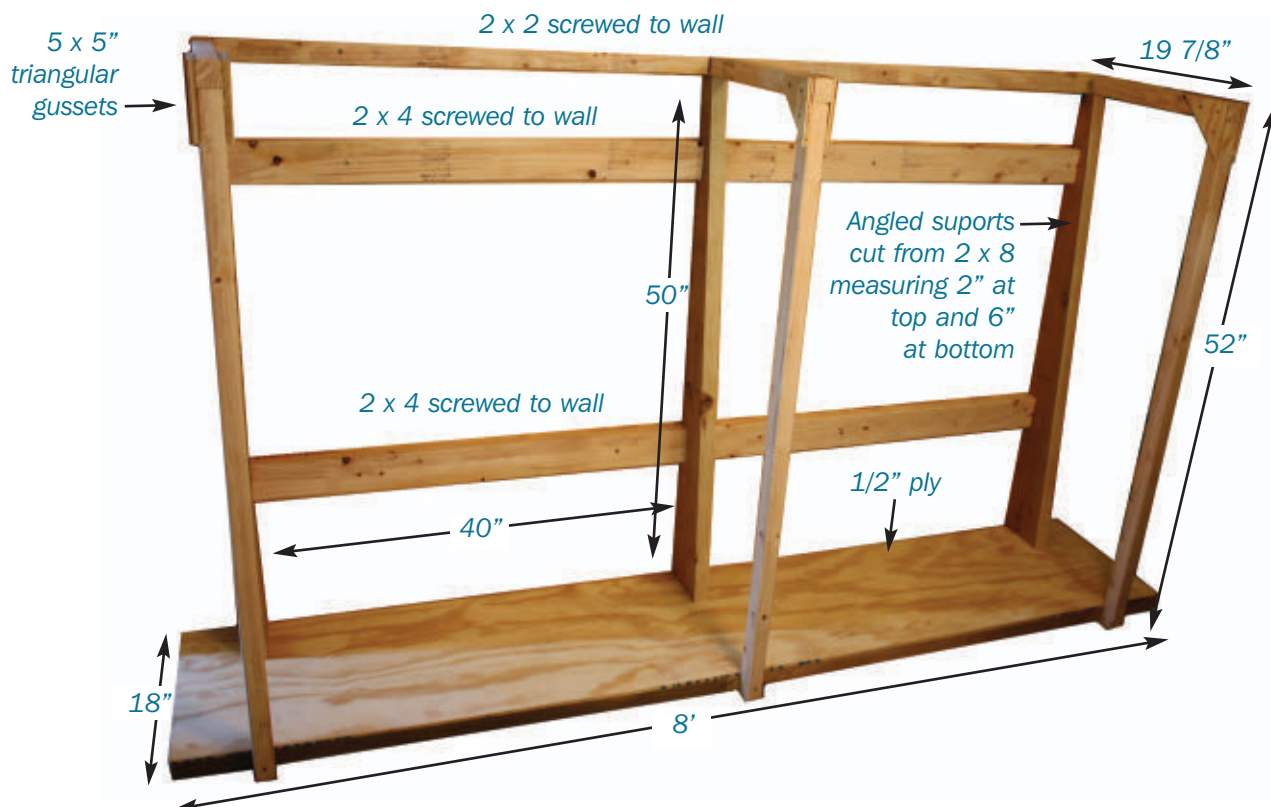


each one measures 50 inches long. The top end of the support is 2 inches wide while the bottom is 6 inches wide. I marked these measurements on each board and snapped a chalk line to guide the cut. I then ripped the angle with a circular saw.

To make the most of your materials, I recommend cutting the angled supports first and then using the cut-off pieces as blocking beneath the floor of the rack.

FLOOR

The rack rests on a raised plywood floor. The plywood is a smoother surface than the diamond-tread flooring I have on the shop floor, which makes it easier to slide the sheets in and out. Raising the floor helps prevent damaging the edge of the sheets when pulling them in and





The horizontal cross-braces are mounted into the wall studs.



I mounted the angled supports with 3" screws driven into the end grain of the cross-braces.

out, plus it protects the materials from liquid in case of spills on the floor.

For the floor I used 1/2-in. plywood at its full 8-ft. length and ripped to 18 inches wide. After installing the supports, this width affords 12 inches of space for the sheets. The thickest sheet goods measure 3/4 inch, meaning I could feasibly store almost 16 sheets on edge with this size of rack, which is more than I ever have on hand. You can, however, customize the dimensions of the rack to

accommodate whatever you need.

Any nominal 2x stock will work as blocking to raise the floor. As mentioned, I used the scrap cut-off sections from the angled supports. The idea is to have solid blocking beneath the floor to prevent it from bowing or dipping. I arranged the blocking flush with the perimeter of the plywood for a finished appearance and then fastened the floor onto the blocking with countersunk drywall screws.

Fill the recessed screw heads in the floor with wood putty and then sand them smooth. This will eliminate holes in the floor that can snag the corner of a sheet.

SHEET SUPPORT

To assemble the components that will support the sheet goods, first locate one of the angled supports at the center of the floor with the square side facing the wall. The 6-in. end rests on the floor with the 2-in. end at the top. The back of the



I cut the 5" triangular gussets on my table saw.



The L-brackets are made of 2x2 material and prevent the sheets from spilling out of the rack.

RACK 'EM UP



I installed the gussets on the L-brackets using a combination of deck screws and Gorilla Glue.



Before installing the top shelf I added 2x2 cross-braces flush with the tops of the angled supports.

support should be plumb and flush with the wall.

I located the other two angled supports on either side of the center support, spaced 40 inches apart. I then square-cut 2x4 stock into four 40-in. pieces to serve as cross-braces.

To mount the lower horizontal cross-braces, I supported them temporarily with a scrap 12-in. block as I leveled them between the angled supports. Once in position I sank 3-in. deck screws through the cross-braces into solid stud framing.

I installed the second set of cross-braces in similar fashion, mounting them level between the supports approximately 2 feet above the lower braces.

Until this point the angled supports had been standing loose and unfastened. Once the cross-braces were secured, I fastened the angled supports to them by driving screws through the sides of the supports and into the end-grain of the braces.

(Note: You will actually have to install either the left or right cross-braces first, fasten the center support, and then install the cross-braces on the other side. Otherwise, the braces block access of your drill/driver to the center support).

RETAINER BRACKETS

At this point the rack offers support for full 4x8 sheets tilted back at an angle. To browse the

sheet inventory I needed to be able to "page" through the sheets. However, to tilt the heavy sheets forward is to invite them to fall to the floor and off the rack, thus I needed a type of rail to keep the sheets contained on the rack.

I used three L-shaped brackets mounted to the tops of the angled supports and fastened to the front of the rack floor. To make the L-brackets, I ripped 2x4's into 2x2 material. The top piece of



The top shelf is made from 1/2" plywood to provide additional storage space.

The background is a dark, textured wooden surface. In the top left, a clear plastic storage bin is partially visible. Below it, a blue bit holder is filled with numerous small, numbered screws. To the right, a clear plastic case holds a set of drill bits; a white label on the case reads: "QUICKSCREWS INTERNATIONAL COMPANY", "Part#13114P", "#2 x 2-3/4\" Combo Power Bit", "QTY: 10 PCS", "PO#C109761", and "Made in Taiwan". In the center, a large, gold-colored bit holder is shown. Below it, a long, silver-colored screwdriver with a black handle is positioned diagonally. The handle has a blue logo that says "QUICKSCREWS". To the left of the screwdriver, there is a black bit holder and a small, black, T-shaped nut driver. In the bottom right, a silver-colored metal ring is visible.

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RACK 'EM UP

each bracket should measure the width of the floor plus the width of your 2x2. In my case, this meant the top pieces of the L-brackets measured about 19-7/8 in. The long, vertical legs of the L-brackets should measure the length of the angled supports plus the height of the rack floor (52 inches).

I preassembled the L-brackets prior to installing. The short piece of the brackets must be placed over the long pieces so they are supported from the floor. I fastened the bracket first with a screw through the short piece driven into the end grain of the long piece.

I then strengthened the L-bracket joint with triangular gussets cut from some scrap 3/8-in. plywood. The gussets were cut on my table saw as right triangles measuring 5

inches on each square side. I cut six gussets and installed them on each side of the L-brackets, sandwiching the joint flush along the square edges. I fastened each gusset with a combination of wood screws and polyurethane glue to prevent movement.

Screw the L-brackets onto the top of the angled supports and into the front of the floor platform. Be sure to use a level to check for plumb, and use a carpenter's square to make sure the bottom of the brackets are aligned squarely with the angled supports.

TOP SHELF

Although the rack will now hold sheet goods, you can enhance its storage capability by simply mounting a plywood shelf atop the sturdy 2x2 L-brackets. Additional 2x2 cross-braces

will help support it. I ripped an 8-ft. sheet of plywood down to a 20-in. panel, which fit against the wall and flush over the tops of the brackets. I fastened it with wood screws into the 2x2's. The top shelf gives the rack a more finished appearance, strengthens the entire structure, and provides more than 13 square feet of storage space.

When using the rack, I recommend stowing your full sheets against the angled supports to provide a large unbroken plane to lean all your other materials against, including plywood, drywall, plastic laminate, MDF, HDF or OSB. The rack's top shelf then provides a perfect place to stow long boards and other materials that you'll need for your next home-improvement project. **EHT**



The rack stores virtually any sheet measuring 4x8' and smaller, including drywall, plywood, plastic laminate, MDF, HDF or OSB.

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Replace the Switch on a Cordless Drill

Dead power drill? You might need to replace the tool's power switch.



By Alyssa Vincent

Power tools, like any other household item, wear down after years of use. When a power tool breaks down, your first instinct may be to replace it or take it to a repair center. However, taking a DIY approach to power tool repair is easier and more economical than you might think.

One of the most common power tool repairs is replacing its switch. The switch is part of the tool's electrical system and may start to wear out after a few years of use.

You'll want to eliminate battery problems first, but the most common symptom of a broken drill switch is that it won't turn on. A broken switch can also cause the

drill to lose variable speeds or fail to switch between forward and reverse mode.

Diagnosing and replacing a drill switch is a pretty straightforward repair. It'll take you roughly 20 minutes to perform. While we used a DeWalt drill for this particular repair, this how-to should help you replace the switch in nearly any drill.

To diagnose and repair a drill switch, you'll need a screwdriver, needle-nose pliers and a multimeter.

To get started, you'll first want to open the drill casing.

Unscrew the two screws holding the transmission to the case, then

a series of screws holding the two case halves together. Once that's done, separate the two halves of the drill. If there's



Remove the transmission screws.

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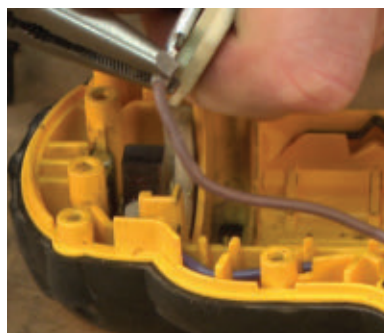
Separate the handle assembly.



Pull the motor and transmission assembly from the drill.



Remove the bearing caps.



Remove the brushes.



Remove the switch.

a sticker on the base holding the two halves together, you'll need to cut through it with a box cutter.

Next, in order to remove the switch, you'll need to remove the wires connecting the switch to the brush holder.

To do that, you'll need to remove the drill's motor assembly. Remove the motor by removing the two screws on the outside the drill case that hold the transmission in place.

Once that's done, you'll need to remove the two blocks holding

the motor assembly in place. These blocks are attached to the case by four screws.

Once those are removed, you're free to pull the motor and transmission assembly away from the drill.

Now you're able to separate the brush holders from the wires going to the switch. Be sure to make note of which wire goes to which brush holder, as you'll need to reassemble it the same way.

Next, remove the switch from the drill.

Test its electrical continuity with a multimeter.

Set your multimeter to the continuity setting. Checking for continuity is done in the ohm's settings. An ohm is the unit of measurement of resistance in a circuit. Many multimeters have an audible tone setting which can be used when checking for continuity.

Touch one of the test probes on the multimeter to one of the battery connections on the switch. Then touch the other test probe to the opposite connection and pull the switch trigger. Repeat this process on the other side. If your multimeter



The wires of the switch can be tested with a multimeter. Test the current on both switches.



Set the new switch.

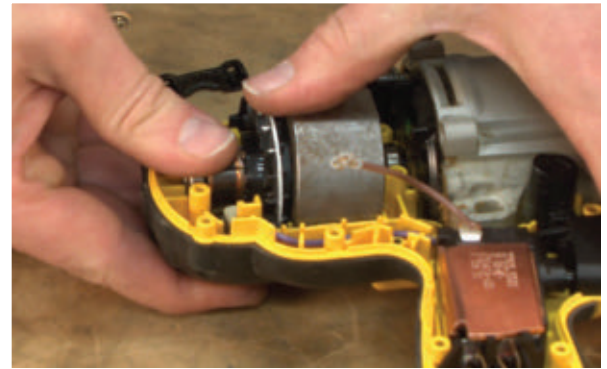


Route wires into the housing.



Replace the brush and secure the wiring.

Replace the motor and the transmission assembly.



does not beep or other-wise indicate resistance on one or both sides, you'll need to replace the drill's switch.

Replacement switches can be found at eReplacementParts.com for roughly \$50. Test the new switch with the multimeter before installing.

Place the new switch into the drill body where the old one was. Route the switch's wires back into the drill's housing.

Replace the wire to the lower brush assembly and replace the

assembly back into the drill.

Reinstall the motor and transmission assembly back into the drill, and replace the blocks around the armature bearings to secure it to the housing.

Replace the two screws on the outside of the case that hold the transmission in place.

Reconnect the wire to the second brush holder and reinstall it into the drill. Tuck any wires that come out of the casing as necessary.

Finally, reinstall the other half of the drill casing, screw it together

and install the last two transmission screws.

Your drill should now be fully operable, and it was easier and less expensive than buying a new one or taking it to a repair center. Plus, you now know how to completely take your drill apart, which will make future repairs a breeze. **EHT**



Reattach and replace the top brush.

Replace the emaining transmission screws.



Install a Foundation Vent

Bring Fresh Air to the Crawl Space



By Clint C. Thomas, Esq. Photography by Zoe Thomas

Homes are usually built one of three ways. They are either constructed on a slab foundation, on a block knee wall providing a crawl space or on top of a full basement. The first method and the latter method are not concerned with venting issues or pesky animals looking for a warm home in the winter. Houses that are constructed on a crawl space face both of these problems.

A crawl space allows the homeowner access to the underside of his home and provides a convenient place to run all of the ground-floor plumbing, electrical and HVAC lines. However, there are also negatives associated with crawl spaces. A crawl space must have a point of ingress and egress, but it should also be

secure so that the neighbor's worrisome cat or the midnight prowling raccoon don't decide to take up residence in your HVAC ductwork. In addition, a crawl space should be constructed so that it can be closed off to the

outside air in the winter months to keep out freezing air. Otherwise, pipes could freeze, and your home will be harder to heat.

It would seem simple to just simply block up every hole in the crawl space to keep animals and



This automatic vent will close at 40 degrees Fahrenheit and open at 70 degrees Fahrenheit.

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cold air out, but this is not the case. A crawl space needs to be able to breathe to reduce the buildup of moisture, especially in the warm seasons of the year. Remember, water is probably a house's number one enemy. If too much moisture builds up under a house it can cause mold and eventually lead to rot. In addition, termites enjoy warm, moist and stagnant air when searching for dead wood. Proper foundation venting will help to reduce the possibility of a termite attack.

In order to combat these problems on a crawl space, it is a good idea to have a working door that can be used for ingress and egress along with multiple vents strategically positioned around the perimeter. Vents come in various types, but I prefer ones that can be open and closed depending upon the time of year and the outside temperature.

Witten makes an automatic vent that will close itself at 40 degrees Fahrenheit and open itself at 70 degrees Fahrenheit. The Witten vents have a plastic grid on one side and wire screen on the other with louvers in between to help keep out creepy-crawly things.

Many building codes recommend one square foot of ventilation for every 150 square feet of crawl space. For homes that have polyethylene on the ground inside the crawl space the ratio changes to one square foot of ventilation for every 500 square feet of crawl space. Vents should be placed on all sides of a house to allow maximum air circulation in the crawl space. As illustrated by the changing ratio above, another very effective way to reduce moisture under a house and inside a house is to lay a 6-mil thick sheet of plastic on the ground in the crawl space. This serves as a moisture barrier and coupled with an



Once all of the bricks were removed I ran a heavy-duty putty knife along the cement foundation to clean off any loose mortar.

You'll need a masonry trowel to place the brick mortar to install the vent.



adequate number of vents will make a healthy crawl space.

I recently had to install several of these vents to my house because the brick work around my front porch had deteriorated with age, and several of the bricks had been knocked out. I began this project by removing all of the bricks that were between the brick posts that supported the deck so I could re-mortar all of them. These set directly on top of a narrow cement strip that served as a foundation point. Let me add a word of caution here: The bricks that I removed were not load-bearing. They had been installed at some time in the past to fill in between the brick support columns. Before beginning any type of work like this, determine whether or not you are working

with a load-bearing structure, and if it is, then be sure to support that portion of the house before you begin the work.

Once all of the bricks were removed, I then ran a heavy-duty putty knife along the cement foundation to clean off any loose mortar in order to have a smooth surface to work with. With the help of my son, Sterling, we mixed up small amounts of Sakrete at a time in an old wash pan. I worried that a wheel-barrel load would dry out too much before I could use it, since we were working in direct sunlight. The small size of the pan caused me to have to mix the cement literally by hand. I recommend wearing gloves to keep your hands from drying out.

I applied the mortar with a brick mason's trowel and installed one



We mixed up small amounts of Sakrete masonry mortar in an old wash pan.



As I installed the rows of bricks, I placed the foundation vent in the middle of the section of brick and simply cemented it into place. The most difficult part of the masonry job was installing the top couple of rows above the vent because of the tight space.

row of bricks at a time. I placed the foundation vent in the middle of the section of brick and simply cemented it into place.

The most difficult part of the masonry job was installing the top couple of rows above the vent because of the tight space. The wooden skirt that surrounds the outside of the porch served as an impediment. I had to butter each brick and then maneuver them up and behind the skirt to the top couple of rows of this section of brick. The tricky part was getting the brick into place without knocking off the wet mortar. Because of the limited room in which to work, I had to push some of the wet cement into the ends of the uppermost rows with my fingers since I couldn't get a trowel close to it.

My house was built in the late 1800's, and in order to retain its historic character, I purposely did not fill-in and smooth out the grout lines of my brick with a striking tool. I'm sure that the original brick masons did smooth their work, but over time some of the grout lines

have eroded and worn away. In order to keep from having a brand new brick wall next to an old looking brick wall, I attempted to replicate the look of the natural wear that the original brick showed.

Foundation venting can be as simple as turning a cinder-block on its side so the interior holes serve as a breeze-way between the outside air and the crawlspace. However, quick-fix methods such as this do not perform at the same level as professionally designed vents. As I said earlier, vents should be able to open and close, either automatically or manually, as the air temperature dictates and should be impervious to unwanted animals. A cinder-block turned sideways does neither of these. How many times have we all seen holes stuffed with newspaper to keep out the cold air, only to find that same newspaper pushed out a few days later because a cat or a squirrel wanted a warm place to sleep for the night? Therefore, invest for the long term and use

specialty vents. Admittedly, foundation vents lack the charm of new wallpaper or ornate moulding, but they are a necessary item on every house, so don't cut corners just because their only purpose is a practical one. **EHT**



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