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Cover photo © Katarzyna Białasiewicz



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Q: A local construction company offers a “helical pier system” when building a deck. How does this type of system work?

A: Helical piers are steel foundation pins that are driven into the earth below the frost line. Installation requires expensive hydraulic machinery (i.e. a skid steer or excavator). The system is often used in commercial construction, but is gaining popularity for deck construction in smaller areas and on tricky sites, such as steep inclines or poor soil conditions, where it is otherwise difficult to dig footings and pour a concrete foundation.

Q: Should I be concerned about expansion and contraction of PEX tubing when installing it for plumbing projects?

A: PEX (cross-linked polyethylene) tubing expands and contracts at a greater rate than copper, so don't install it too tightly and be sure to allow a little slack between fasteners. In fact, on long runs many professionals will include a loop to allow for contraction. The loop also provides some extra piping in case the installer needs some fudge room to make adjustments. When running the piping through framing, make sure the access holes are a little larger than the PEX to allow for expansion.

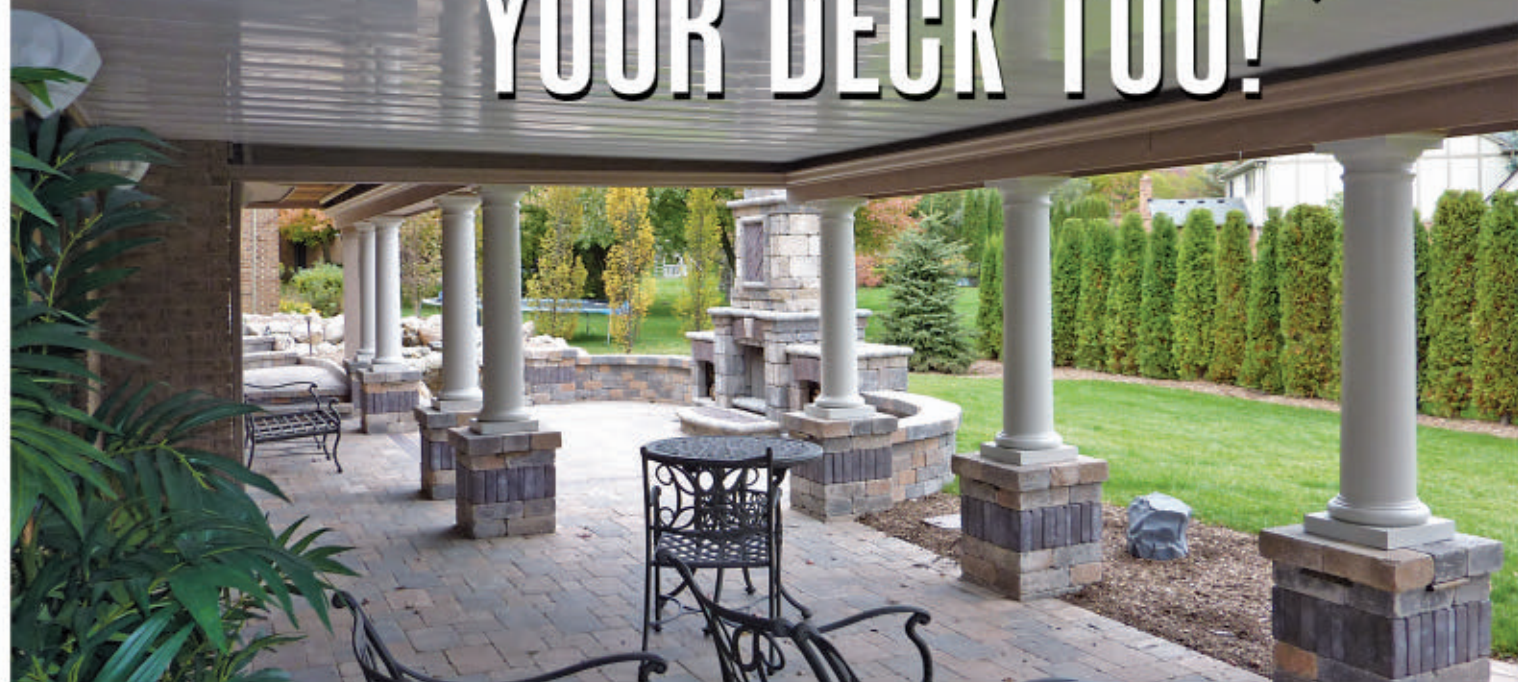
Q: What's the best way to remove pencil marks from the pieces of a woodworking project? Sanding seems unnecessarily abrasive, while using an eraser tends to smear the markings and cause an even bigger mess.

A: Try using denatured alcohol. Dampen a rag and lightly wipe away the graphite from the wood surface. This makes the wood easier to clean up before finishing, and the alcohol will not raise the woodgrain the way that water can..

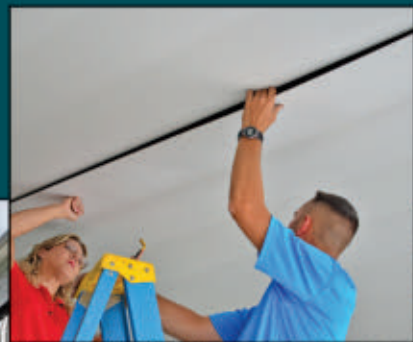
Q: How does straw-bale gardening work?

A: Next spring you would purchase enough straw bales (not hay) to line up as garden rows. Condition the bales with water and fertilizer for two weeks. During the conditioning, the inside of the bales begins to decompose. Plant your seedlings directly into the top of the bales and grow your garden just as if it were soil. You can put tomato cages right on top of the bales. When the season is over, cut the twine on the bales to expose more compost. **EHT**

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Blade Running

Edging a Lawn for Clean Cut



By Matt Weber

When it's time to give your lawn its first summer haircut, be sure to keep the edges neat. Grass and weeds that grow next to driveways and sidewalks slowly begin to creep over the edges and encroach on the paved surface. A powered edger neatly cuts this organic material to leave a well-defined edge for a clean-cut lawn.

A powered lawn edger provides a dramatic step up in cutting power

from a string trimmer, utilizing a rigid steel blade to cut through tough grass roots, thatch and soil. Although some string trimmers come with an "edging guide" for edging applications, the string is not as aggressive as an edging blade and must be used frequently to keep the cutting chore to a manageable level. String trimmers also are not designed as ergonomically for comfortable edging since edging is a secondary application,

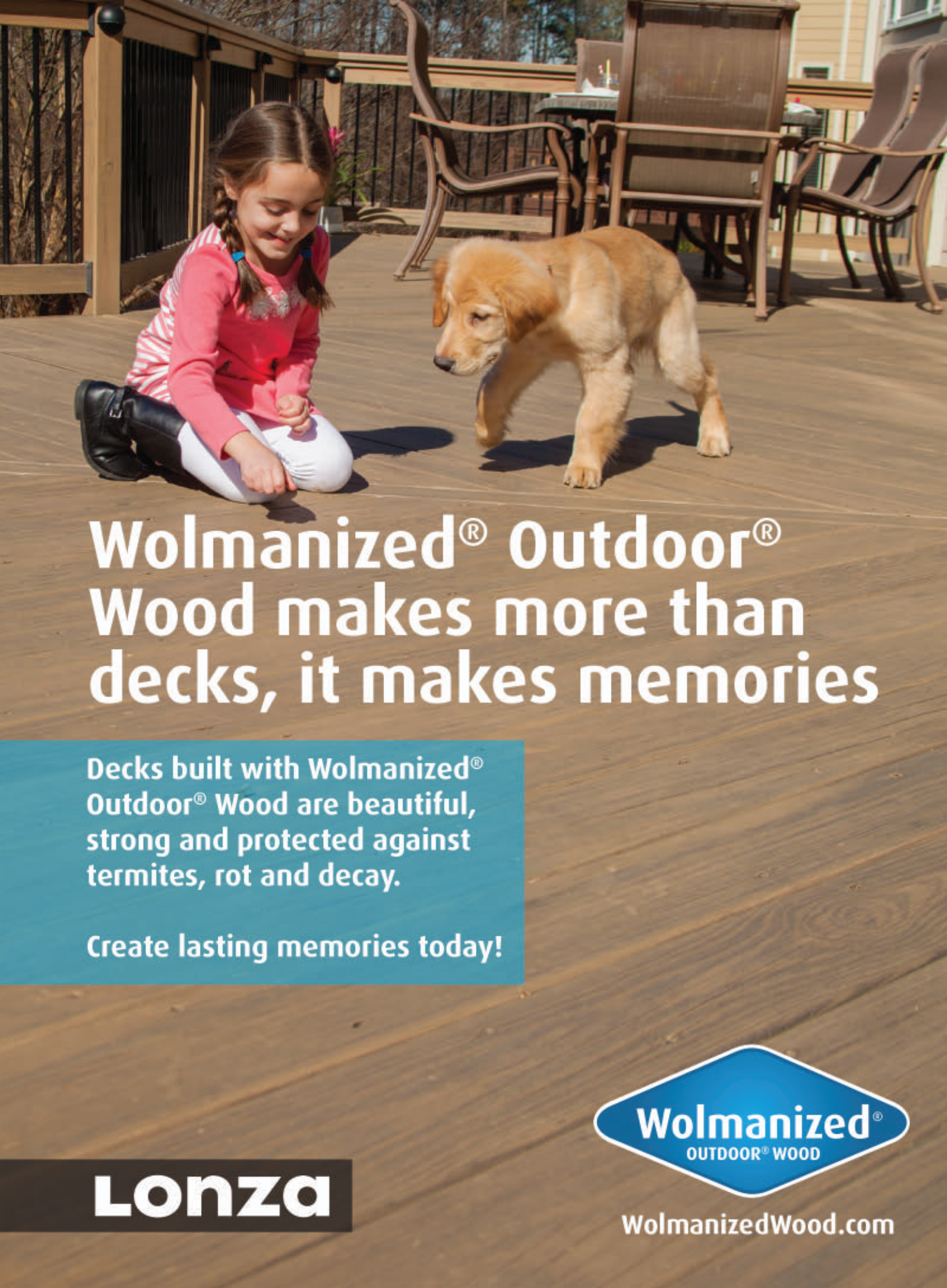
The cutting power of a dedicated edger keeps a lawn looking neat and orderly.

plus the string-line of a trimmer wears away quickly when contacting concrete. On the other hand, the vertical metal blade of an edger can cut several inches below the surface of the ground to rip through the roots of vegetation and trench a distinct separation between the lawn and hardscape features.

Edgers come in a variety of configurations; some with a single guide wheel, others with multiple wheels. The wheel rides along the edge of a sidewalk, patio, border or driveway as the offset blade cuts along the concrete or masonry. Some units start with a pull-cord, while others utilize a push-button electric start that eliminates the cord. Also, edgers are available with either electric or gas-powered motors.



The edger's rigid, steel blade cuts through thatch, root and soil. Our demo model is the Husqvarna 327ES Edger. The 7" blade provides a 2.68" depth of cut for slicing through root systems.



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For single-wheeled edgers, keep the top of the blade tilted away from the hardscape when cutting.

The purpose-built design and ergonomic advantage of a dedicated edger make it a must-have tool for landscape professionals. Homeowners who are serious about lawn care will also appreciate the cutting advantage of a powered edger and the "manicured" look it achieves. The unit shown in this article is the Husqvarna 326ES, a reliable unit for both the pro and discerning DIY'er. Equipped with the company's E-TECH II engine for power and fuel economy, the 326ES is lightweight, easy to use and quick to start. The front handle can quickly be adjusted using the thumb screw to suit the user's height and posture.

When selecting an edger, try carrying it in various working positions to make sure you choose a

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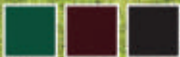
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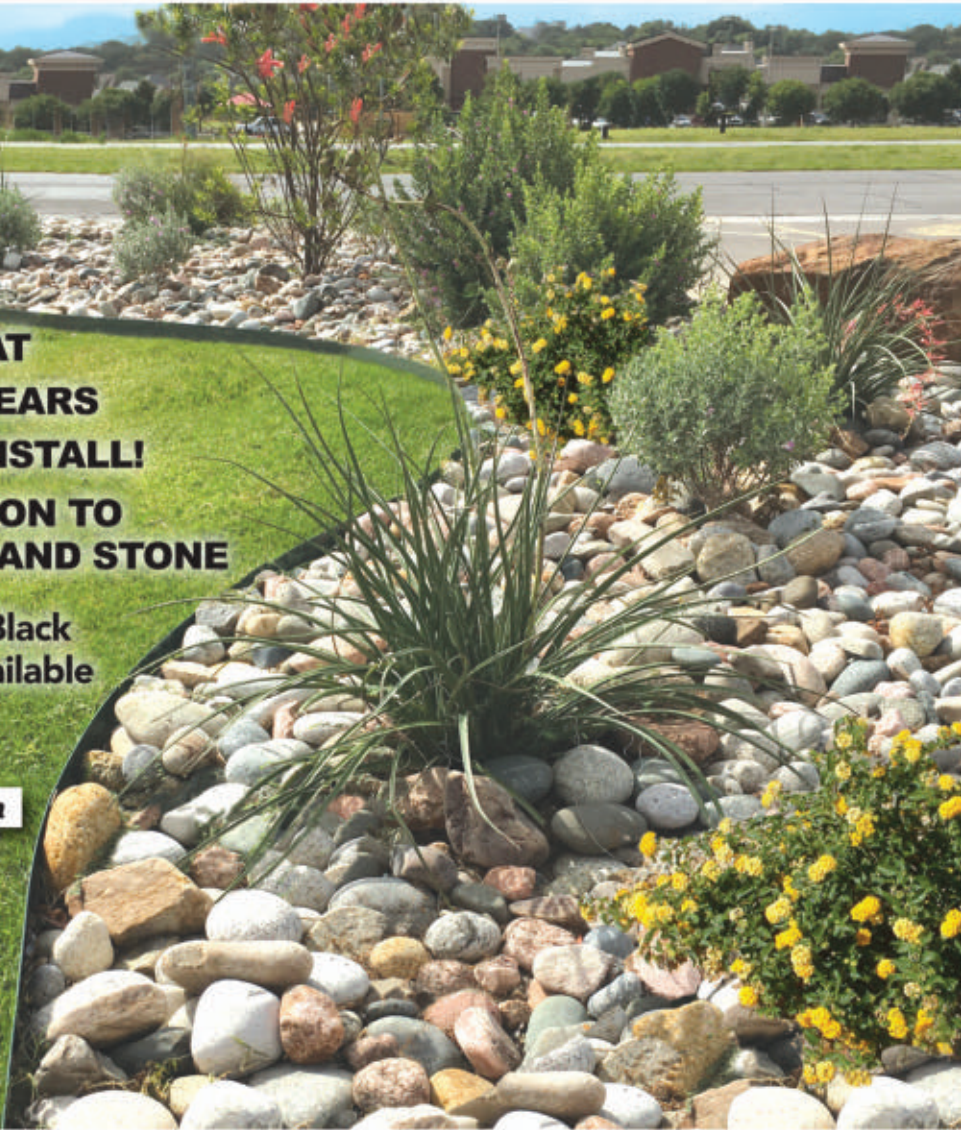
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unit that feels comfortable to operate. If possible, test the model's start-up performance and cutting action at the dealership.

When using an edger, bring the blade to full speed before

engaging the turf. You'll get the best results by setting the blade's cutting depth for a shallow pass when making your initial cut. Make progressively deeper cuts with successive passes until

you're satisfied with the grooming.

Tip: When operating a single-wheel edger, slightly tilt the cutting head so the top of the blade leans away from the hardscape. Doing so prevents damage to the upper, most visible edge of the concrete

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The overgrowth at the edge of this driveway was too thick for a string trimmer. Only an edger would do the job.



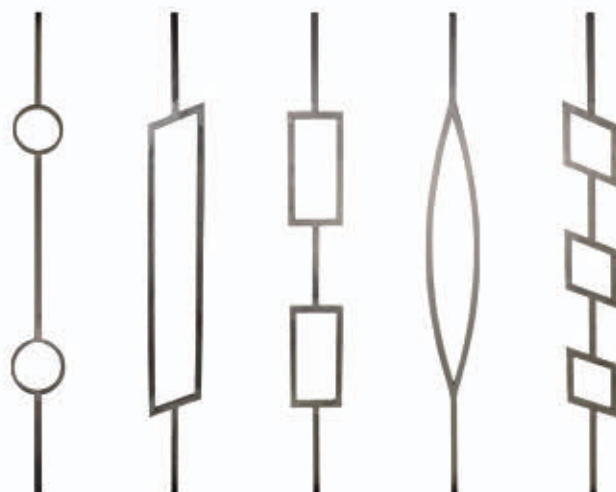
Be prepared to clean up the lawn debris. You may be surprised how much organic debris an unkempt lawn can accumulate when edging.



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By edging the driveway, we added 1-1/2 feet of usable width!

while the bottom of the blade guides the cutting action through the thatch and roots.

For lawns with a lot of perimeter or several landscape features, a dedicated gas-driven edger can be a sound investment for a professional-looking lawn. For small yards, if you don't mind the hassle of an extension cord, then you might check into an electrical edger, which typically sells for less than the gas-driven counterparts. Your lawn will love you for it. **EHT**

After edging, the driveway perimeter looks crisp and clean.



PAY ATTENTION AT THE GAS PUMP!

Leading engine manufacturers are warning users of all gasoline-powered lawnmowers and other outdoor power equipment to be vigilant when fueling their equipment. Gasoline blends containing more than 10 percent ethanol—such as E15 and E85—should not be used. These blends, which are already available in several U.S. states, can cause permanent and irreversible damage that is not covered under warranty.

The Environmental Protection Agency (EPA) recently gave approval for gas stations to start selling 15-percent ethanol-blended fuel. However, E15 is not approved for off-road engines. This includes engines found in edgers, lawnmowers, riding mowers, power washers, portable generators, weed trimmers, leaf blowers and other commonly used outdoor power equipment.

The Outdoor Power Equipment Institute (OPEI) has released the following tips to help consumers properly fuel their mowers and other equipment:

- Check your owner's manual, which will clearly explain what fuels can be used to ensure a properly functioning product. Don't put any fuel containing more than 10 percent ethanol (E10) into small engine products, unless otherwise stated.
- Check the gas pump to be sure that it is dispensing E10. Some pumps at local gas stations may offer both E10 and E15, or have blender pumps that dispense mid-level ethanol fuels for "flex-fuel" automobiles.
- Don't be tempted by price. Higher ethanol fuel (E15) may be less expensive than regular (E10) fuel, but putting E15 into an E10-approved product could cause your equipment to fail and void its warranty.

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How to Make a Compost Bin



By Mark & Theresa Clement

If the value of a project is measured in how often you use it, our compost bin is well near the top of the list. If measured like the Olympics, it'd consistently be on the medal stand.

It's a project that you can have up and running in a day, turning coffee grinds and toilet paper rolls into terrific topsoil.

MATERIALS

We used twelve 2x6x8 Western Red Cedar boards. The material is naturally rot-resistant and chemical-free. Plus, it looks great and stays looking great for years. We fastened everything together with coated deck screws.

CUT THE PIECES

Our compost bin is five individual rectangular boxes stacked together with a 3/4-in. gap in between. Each box has an outside dimension of 36 by 24 inches. To make that work, cut the front and back pieces 36 inches and the side pieces 21 inches. We added a detail that makes our bin less "boxy" by alternating each box's end-grain, lending a pleasing "box-joint" look to the corners.

Next, cut the staves. The staves are the internal vertical supports that hold the individual boxes together. We ripped a 2x6 in half on the table saw, then cut them to length at 30-3/4 inches.

The top is four pieces of 2x6 at 36 inches. It's held together by two 2x6 struts cut at 20-3/4 inches. We also beveled the ends of the struts so the lid sits inside the bin a little easier during use.

ASSEMBLE THE PIECES

Assemble the boxes and, before driving all the screws tight, make sure the box is as square as possible then send the screws home. Next, fasten a staff in each corner as square as possible to the body of your bottom box.

Add the next box. Use 1-by spacers on each corner to gauge accurate spacing, and fasten. Keep adding boxes and spacers.



Work on a flat surface. Square up the box before driving screws home.



Our bin is a series of stacked boxes.

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Note: To access the compost, we fastened the bottom two boards from the face of the bin. That way we can take them off and dig out from below, where the

best compost will typically be.

Assemble the lid. Again, use spacers. Hold it all together with the 2x6 struts fastened to the underside of the lid. Be careful not



Use 1x scraps as spacers for uniform gaps that let air into the bin.



Cut the pieces to length.



Staves are 2x6 ripped in half on the table saw.

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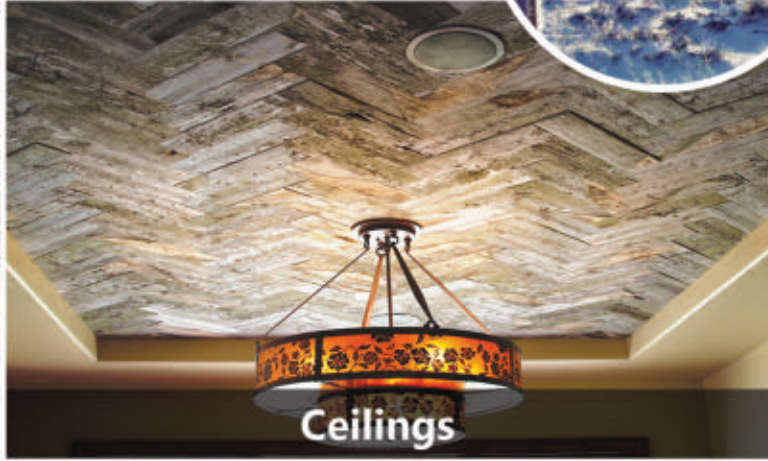
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Composting as a household routine—like laundry or lawn mowing—is often viewed as a fringe movement: something that seems cool from a distance or practical for farmers, but not suburbanites.

The reality, for us anyway, is that composting makes simple sense for regular people. It takes no more time than taking out the trash, which we all do anyway.

We're trying to build into our kids' source code that even though the world seems automatic, it isn't. We call this policy "chicken wasn't born at the grocery store." Everything you touch, buy, or use has to be invented and made. It takes persistence, effort, process—just like turning banana peels into black soil. We teach that the more garbage we divert from the waste stream—read: diesel-belching garbage truck—the gentler our impact is on the world. Our family diverts somewhere around 500 pounds of material annually. If just everyone on our street did it we would divert 10,000 pounds of uneaten salad and waffles from having to be hauled and processed.

Plus, as we try and overwrite the "no effort required" world, we're sneaking basic science and civics lessons into their everyday lives: Bananas and waffles break down naturally. The world isn't anybody's garbage dump. And, doing something for the environment is important.

We actually use the compost sometimes, mostly for lawn repairs and soil amendments to flower beds. It works, plain and simple, and creates valuable nutrients for gardeners.



We used a framing square and a layout square to get the staves nice and square.



Use spacers for the lid too.



Fasten 2x6 struts to the bottom of the lid with 2-1/2" screws.

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to overdrive the screws so they poke through the finished side. We used 2-1/2-in. screws here.

In hot weather, the bin can give off a noticeable aroma when you're near it. So, find a spot in a remote corner of the yard, set the box level—and happy composting. **EHT**

Editor's Note: Mark & Theresa Clement host MyFixitUpLife.

WHAT WE COMPOST

Basically, if it used to be a plant (plus a few other things) it can be composted. The vast majority of what goes in our bin is stuff we consume every day:

- Eggshells
- Coffee Filters/Grounds
- Non-protein, un-eaten food (salad, peels, rinds, bread, etc.)
- Paper towels
- Paper board like paper towel rolls
- Plant cuttings



We beveled the ends of the struts so the lid would more easily slip onto the bin.

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RAIN READY

Building a Patio Cover for Wet Weather

By Larry Walton, Photos by Tim Walton

It rains a lot where I live in Oregon, and for the most part we carry on with sporting events, yard work, hikes and graduation ceremonies in the rain. However, we don't mind a little shelter from the rain when relaxing on a patio. We do not, however, want that shelter to interfere with the bit of sun we get between July and October.

That's the story behind this patio cover project. Handle the rain while maintaining an open air feel. The plan: Install polycarbonate corrugated sheets high enough to allow for unobstructed views, for plenty of light and for air movement.

Simply attaching to the vertical surface of the wall or even to the fascia board would not be nearly high enough to accomplish these goals. That's why we looked to SkyLift for hardware that would enable us to securely mount the patio cover structure well above the rain gutter level and slope it for rain runoff without obstructing the view at the lower portion. (SkyLifthardware.com)

SkyLift accomplishes this by providing a vertical riser with a flat plate that penetrates the roof

and attaches to the top plate of the exterior wall. The top of the riser accepts a saddle designed to support a beam, which supports the house end of the patio cover. A corresponding beam set on posts supports the other end of the patio cover framing.

There are several advantages to the SkyLift design. First, it attaches to the wall framing without interfering with the roof support system. Second, it seals with a standard pipe jack flashing just like the vent pipes you see on most roofs. Third, it provides a way to set the roof beam into place one end at a time. Fourth, it holds the beam securely while allowing lateral adjustments to get the structure square before lag-bolting the beam in place.

Here's how we built our patio cover, which is now ready for our summer rain.

First we selected a polycarbonate corrugated roofing material that let in light but also provided UV protection. We saw that the sheets were about 12 ft. long and laid up to 24 in. wide (after overlap). We figured a 12-by-12-ft. cover would

RAIN READY



be about right for the space so we picked up six sheets along with the supporting corrugated moldings.



After carefully exploring for irrigation pipes, we determined locations for two 4x4 posts just outside of the patio slab. We dug the post holes 8 ft. apart and made each 2 ft. deep.



We dropped the 4x4 posts into the ground and drove stakes so two 2x4 braces per post could be set with one parallel to the house and the other perpendicular to the house.



We mixed up a batch of Sakrete to set the posts.



We used our 4x4 posts to estimate locations for our two SkyLift roof riser brackets. We removed two pieces of composition shingle (one above the other) at each location for the SkyLift hardware.



We drilled two 1-in. holes through the roof sheeting (one for

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RAIN READY

a flashlight, the other for an eyeball). We used a 2-ft. section of arrow shaft to move the insulation so we could see where we were.

We used a torpedo level to make sure our arrow shaft was straight up and down. At our first location we could see that we were just inside the top plate, so we planned our opening just down the hill accordingly. We had no objects interfering with our hardware.



The base of the SkyLift hardware served as the template to mark the opening.



We used our Porter Cable cordless jigsaw to cut out the opening.



We used two ratchet extensions and a socket on our impact driver to lag the SkyLift base to the top plate. We centered the base plate (inside to outside) on the wall's top plate. The left to right positioning as you look at the house is not that critical because the beams are cantilevered on the hardware.



We slipped a standard pipe jack flashing over the riser column with the top tucked under the roofing above it and the bottom overlapping the lower roofing material.



We replaced the composition shingles that were removed earlier, notching for the pipe jack flashing as needed. We were careful to use roofing tacks only in areas that were not exposed to the weather.



After laying out our roofing material on the lawn using the corrugated molding strips along one edge, we saw that the sheets would be about 145-5/8 inches in both directions. We decided our rafters should be 143-by-143-in. to allow for overhang and a trim strip along the outside edge. We left our 4x6 beams at full length and cut a little chamfer out of the bottom corner of each for looks.



We found that leaving the saddle on the SkyLift riser unbolted allowed one guy to place the end of a beam in the saddle and climb a ladder with the other end. The saddle spins to follow the beam. Nice feature.



We used a straight rafter to level across from the roof hardware to a 4x4 post. After allowing for 18 in. of fall for water runoff, we marked and cut off one 4x4 post. We leveled over to the other post to mark and cut it to height. We set our one 4x6 beam on the posts and secured by toenailing screws into the posts.

We positioned one rafter with our preferred overhang and used a level to mark the vertical line for a bird's mouth joint at the outside beam. We used a 3/4 strip on top of the beam to mark the horizontal line. We decided not to cut bird's mouth joints for the house beam for a couple of reasons, the primary being that the beams were not exactly parallel.



We used a jigsaw to cut out the bird's mouth notch in each outside rafter. A cardboard template made a great tool to lay out the notches for the remaining rafters.



We cut the rafters to 140 in. long. With a header across both ends of the rafter tails, this netted the 143 inches we needed for the frame.



After setting the outside beam, we placed the two outside rafters on our 143-in. layout and toenailed them to the beams. We then squared the structure by measuring diagonally and shifting the roof beam side to side in the the SkyLift saddles to get the diagonal measurements to match.

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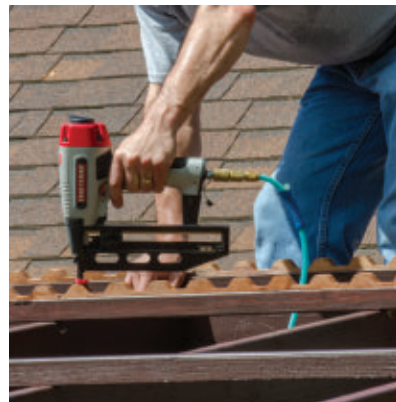
The SkyLift saddle attaches to the riser with the supplied nut and bolt.

The SkyLift saddle fastens to the roof beam using the supplied lag screws. An interesting SkyLift design is that the holes on one side of the saddle are off-set from the other side, which prevents the lag screws from colliding in the middle.



After setting the remainder of the rafters on the 24-in. layout, we made 24-in. layout marks down the two outside rafters and snapped chalk lines to set the 2x2 purlins, which run on top of and perpendicular to the rafters.

We nailed corrugated molding on top of the 2x2s, watching the peaks and valleys at the rafters to make sure they were lined up.



PRE-PAINTED

We pre-painted all of the framing lumber with primer and two top coats before we installed it on this project. Be sure to paint the end grain as well, which helps to protect the wood from moisture.



We loaded all six sheets of the polycarbonate roofing onto our structure, working from one end to the other.

After lining up the sheets with a consistent 1-in. overhang, we predrilled and fastened each with screws equipped with washers and rubber gaskets along the lower edge of the roof.



We spanned over at least three purlins at a time with plywood to distribute weight so we could screw off the remainder of the sheets. We spaced fasteners at 1-ft. intervals across and 2 ft. up and down, being sure to include the overlaps which fasten down the edges.



We attached the 4x6 beams to the 4x4 posts with custom made 1/8-in. steel straps cut at 3-by-9 inches.

It didn't take long for our Oregon climate to bring us a rain shower to test our roof. No leaks—thanks to SkyLift's bright idea of using pipe jack flashing. **EHT**

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BUILDING A WOOD STORAGE SHED

By Rob Robillard

Keeping firewood dry is critical to a successful fire. You don't want to find that your wood's wet or damp when hoping for a warm fire on the hearth or wood stove. And you don't want to have to shovel a foot of snow off a tarp to get to your woodpile! A wood storage shed is necessary if you want a wood burning fire during the cold months. It keeps your firewood stacked, dry and ready to use.

A customer recently asked me if I would build a wood storage shed large enough to hold one cord of firewood. The customer wanted the shed attached to the rear of the family garage.





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Project to
Prep for
the Winter*

BUILDING A WOOD STORAGE SHED



A gravel-covered base lined the foundation.



SCOPING OUT THE SITE

The rear of the garage faces southeast and gets a lot of exposure to sun, which I knew was going to be helpful for drying out the wood. There were three windows on the right side and no windows on the left of the structure. The left side seemed like the perfect spot and also meant that we were not taking any light away from inside the garage by removing or blocking windows.

My customer gave me free reign on the design, and I chose to build a simple open-faced, shed roof structure with clapboard siding and trim details that mimic the

details on the Colonial farm style house and garage. For the roof detail we discussed coming off the upper garage roof with a gable roof (the woodshed roof having the same pitch as the garage) but decided that was too costly. They were looking for something clean and simple.

I measured a pile of wood that they told me was the equivalent of a cord and sized their new wood storage shed accordingly. The final dimensions of the wood storage shed are 6 by 12 feet.

BEGIN WITH A SECURE FOUNDATION

Attaching the wood storage shed to the rear garage wall actually made my job easier. This meant that I could attach a ledger board

off the garage wall, hang my floor joists from it, build two walls and a roof and call it a day. The floor joists were to run perpendicular to the garage wall and sit on a double outside rim joist that would attach to two 4x6 pressure-treated posts, both attached atop 10-by-48-in. deep concrete footings.

INSTALLING THE LEDGER BOARD

Once I determined exactly where the wood shed was going, I cut my 2x6 pressure-treated ledger board to size and secured it to the garage's concrete foundation wall with 8-10 concrete wedge anchor bolts. Because the ledger board was only 8 feet long, I predrilled my holes in the ledger board with a wood drill bit and then used a ½-in. SDS hammer



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BUILDING A WOOD STORAGE SHED



The floor boards were spaced to facilitate air flow to the firewood.

The walls were assembled and tilted into place.



drill bit to drill the holes in the concrete wall.

The concrete wedge anchors secure the ledger to the wall. Once the wedge anchor bolts are tightened, wings inside the concrete anchor expand and compress against the walls of the concrete hole, securing the anchor in place and providing sheer strength.

PREPARING THE FOOTINGS

With the ledger board installed level onto the garage, I measured out a rectangle on the grass that was slightly larger than the woodshed. I used the rectangular space and 3-4-5 triangle measurements to determine the footing locations.

Tip: In order to get corners square and as close to 90 degrees as possible, I use the 3-4-5 rule based on basic geometry: $A^2 + B^2 = C^2$. This means that the square of the hypotenuse of a right triangle is equal to the sum of the square of both legs.

The purpose of the rectangular space was to create a gravel-covered ground base and drip-edge to match the existing garage roof drainage gravel.

To create this drip-edge I first removed all of the sod and organic soil, installed 2x6 pressure-treated boards as border strips and then we installed landscape fabric and filled the space with 3/4-in. river stone. Note: This was done after I poured the footings.

POURING THE FOOTINGS

A footing helps support the structure by spreading out the

We used regular 2x4 Douglas fir studs 16-in. on center for the wall framing, and built the walls tall enough to accommodate a 3- to 4-pitch roof.



A 2x10 double header carries the roof load over the wood shed opening.

The header is supported by double 2x4 king structural studs.



load created by each support post over a wider area.

Concrete footings need to be installed below the frost line typical for your region. The frost line is not consistent around the country, and there are often dramatic differences from state to state. For example in Florida the frost line is less than one foot and in Minnesota it is closer to 6 feet. The best resource to check your frost level and depth of footing is your local building department.

In my area the building inspector wants to see footings dug to 48 inches deep. Because the wood shed was only 8 feet wide I was able to span that distance with a

double rim joist and needed only two footings, one at each corner.

I used a spade shovel and a post-hole digger to get to the proper footing depth. Once there, I used 8-in. round footing forms cut at 48 inches.

Tip: To avoid having to keep pulling out a tape measure, I

measured 48 inches on my spade shovel and post-hole digger and marked this measurement with a permanent marker. That saved time and effort while digging.

I use premixed 80-lb. bags of Sakrete concrete mix for my footings. I pour the contents into a wheel barrel and mix it with water a little at a time to get the perfect consistency. If a hose is not readily available, I use a 5-gal. bucket with water.

Once mixed, I pour the concrete into the footing tubes with the wheelbarrel and use my shovel to get the droppings. No matter how careful I am there is always a ton of concrete outside the edge of the footing tube.

Often I will pour about half the concrete and then lift my tube 4 to 6 inches out of the hole. I do this to keep my 4x4 or 4x6 pressure-treated posts away from the ground. This uses a bit more concrete, but I like the look, and it's better for the longevity of the posts.

Once I have both footings poured I insert galvanized "J-bolts" into the footing center. These J-bolts will be used later to secure my post base connectors, galvanized hardware designed



We laid out a 3- to 4-pitch roof and installed a header on the side wall of the garage.

BUILDING A WOOD STORAGE SHED

to permanently attach the support posts to the concrete footing.

Note: If your deck has two wood support posts and a ledger board that is bolted to the house, each of the two deck posts hold up approximately 25 percent of the total weight. In this situation, the soil under each deck footing may be called upon to support 3,000 plus pounds.

Depending on the wood shed's load, the diameter of the footing hole will probably range between 8 and 24 inches. Larger diameter holes spread the weight out over more soil area. I used 10-in. diameter footings.

FLOOR FRAME

On small structures I like to build my floor frame, square it and then dig my footings and install my support legs. In this case the frame was too low to the ground to



The 2x6 rafters were installed and additionally supported with rafter clips or "hurricane ties."

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BUILDING A WOOD STORAGE SHED



The walls as well as the roof received 1/2-in. CDX plywood sheathing.

We secured wall and roof sheathing with 8-penny ring-shank nails every 10" in the field and every 6" at seams and edges.

We installed our rake and fascia trim and then used scrap pieces of our crown molding to figure out the size of the roof sheathing.



dig the footings so we installed the footings but not the support posts.

It is much easier to build your floor system first and use temporary stilts (or in this case a block of firewood) to hold it up, square and level it, and then get an exact measurement for your support posts.

We built our floor system out of 2x6 pressure-treated joists 16 inches on center. For strength we doubled our outside rim and side joists.

We used leftover synthetic deck boards from a prior job and spaced the floorboards 2 inches apart to facilitate airflow, rain drainage and drying of the firewood. The floorboards were secured with screws and installed under the walls to the edge of the shed.

BUILDING THE WALLS

Prior to building the walls we measured and leveled, mark, cut and removed only the garage wall siding that was in the way of the 2x4 wall and sheathing. We also removed an additional 3/4-in. of clapboard siding to accommodate a vertical corner "ground" for the wood shed and garage siding to butt into. We used a circ saw for the majority of this cut and completed it with a multi-tool.



The crown molding provided a nice finish detail.



The sheathing was wrapped in building paper.

Slowing down and taking these steps saved us from ripping a ton of siding off the garage wall and later having to replace it inside the new wood storage shed.

The owner disliked pressure-treated splinters and specified that she did not want pressure-treated 2x4's used inside this structure. We used regular 2x4 Douglas fir studs 16-in. on center for the wall framing, and built the walls tall enough to accommodate a 3- to 4-pitch roof.

A 2x10 double header carries the roof load over the shed opening and is supported by double 2x4 king structural studs. Tyvek house wrap covers the sheathing.

BUILDING THE ROOF

We laid out a 3- to 4-pitch roof and installed a header on the side wall of the garage. The 2x6 rafters were installed and additionally supported with rafter

clips. (Since this is an open structure the outer edge of this roof is susceptible to uplifting winds.)

To further protect the roof rafters from wind lift we ran 1/2-in. CDX plywood wall sheathing all the way up the sides of the two outer rafters and installed a pair

of nails every 6 inches. We then cinched the nails over on the inside of the rafter to prevent nail pokes.

The walls as well as the roof received 1/2-in. CDX plywood sheathing. We secured wall and roof sheathing with 8-penny ring shank nails every 10 inches in the field and every 6 inches at seams and edges.

DO THE ROOF FIRST

After sheathing the roof we covered every square inch with Ice and Water Shield and ran it up the sidewall of the garage. This is an unheated structure, but I consider the rubber membrane as cheap insurance against water leaks.



The roof sheathing was protected by Ice & Water Shield.



The new roofing shingles matched the existing house roof.

BUILDING A WOOD STORAGE SHED

We wrapped the roof in drip-edge and installed the same shingles that were on the existing garage. At the garage wall we installed lead flashing as a counter flashing and replaced the siding and trim.

Tip: We installed our rake and fascia trim and then used scrap pieces of our crown molding to figure out the size of the roof sheathing. This allowed me to run my roof sheathing out to cover the top of my crown molding, providing a place for it to rest as well as a secure nailing surface.

FINISHING THE EXTERIOR

The exterior of the woodshed was trimmed out in similar detail but in a smaller scale to the garage. We used all PVC trim, pre-primed cedar clapboards and stainless steel nails.

We used Western Red Cedar clapboards for this project. Cedar clapboards contain natural oils and resins that protect the wood from insects and rot. Cedar is

known for its durability and ability to withstand weather. (Problems that arise on homes are not usually attributed to the type of siding but to the installation and lack of proper flashing and drainage planes.)

Tip: If your siding is not already primed then prime it. Prime all cut ends and edges of the clapboards. The end grain of all wood products absorbs liquids up to 250 times more rapidly than other wood surfaces. Also, avoid finger-jointed clapboards for a high-quality job.

Before installing the siding, properly prepare the home exterior walls: Install building paper or a vapor barrier.

Make sure that flashings are installed to prevent moisture from entering wall and roof spaces. Flashings are important in controlling moisture in wall assemblies. Flashing intercepts and directs the flow of water away from the building to designed drainage paths. Seal doors, windows and other joints with rubber flashing, sill pans and special tapes. Use

high-performance acrylic-latex caulk to seal gaps around windows, doors, corners and other exterior joints that are exposed to potential water intrusion. Caulking will eventually fail and need maintenance. Caulking can never replace proper flashing.

Spacing for the siding should be laid out beforehand. Many builders install at 5-1/2 inches with a 4-in. exposure to the weather. Spacing can be changed or tweaked in order to get the siding to land on top of doors and windows.

For fastening, stainless steel nails are the best quality. Use No. 304 stainless for general siding applications and No. 316 for sea-coast exposures. Hand-nailing is better than using a pneumatic nailer because it allows you to determine if you're nailing into the studs, making it easier to control the depth of the fastener.

Install clapboards by face-nailing them to the house studs with 1-1/4-in. penetration into solid wood using one ring-shank nail per stud spaced at a maximum of 24 in. on center. Place the nail just above the overlap. Take care not to nail through the overlap of two pieces. Keep nails 1 inch inward from the edges.

Clapboards are installed with butt joints. I suggest using tar paper roll tape to flash behind all vertical butt joints. Make sure your tar paper overlaps the clapboard installed below so water or moisture can drain out and on top of the lower clapboard. Butt joints between boards should be staggered and made on studs. Install siding snugly to other clapboard pieces and trim, and make sure the clapboards are level.

Keep the siding a minimum of 6 or more inches off the ground and 3/4 to 2 inches off roofs to prevent moisture from wicking into the end grain.



The walls were then sided with pre-primed Western Red Cedar clapboard.

THE FINAL PRODUCT

This project took two carpenters 1-1/2 days to complete. The half day, Day 1, was for gathering materials and digging and pouring the concrete footing. Day 2 was a full day of construction from frame to finish. The cost of the materials was approximately \$1,200.00.

The result was a simple and effective open wood storage shed that is easily accessible and keeps everything out but the wind-driven rain. The open floor plan and the fact that these folks do not lean the wood against the back wall allows 360-deg. air flow to keep the firewood dry and ready to use at a minute's notice—with not a piece of tarp in sight! **EHT**

Editor's Note: Robert Robillard is a remodeling contractor based in Concord, MA. He is also the editor of www.AConcordCarpenter.com.



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INSTALL A “DISAP WATER FOUNTAIN

By Rob Robillard

Statues, vases, disappearing fountains and rock fountains are becoming popular backyard focal points. Just go to any garden shop and you'll see dozens of options for Koi ponds, waterfalls and basin fountains.

Installing a disappearing or hidden-basin water fountain doesn't take up as much space as a waterfall or Koi pond but still gives you the sound of bubbling water and a great looking focal point for your landscape.

With a disappearing fountain, water is pumped through a fountain standpipe from a hidden reservoir buried in the ground. The water then overflows the basin rim and seems to disappear into the ground.

Installing a hidden or disappearing water fountain is a great DIY project and a way to add the soothing sound of moving water to a patio, pool or flower garden area.



A large, blue, rounded ceramic water feature sits on a bed of grey pebbles. A small, clear fountain of water sprays upwards from the center of the feature. Behind it is a rustic stone wall made of grey and brown stones, some covered in moss. To the right of the water feature are green hosta plants with white variegated leaves. In the foreground, a concrete pool deck with a blue mosaic tile border is visible. The water in the pool is blue and rippled.

PEARING”

INSTALL A “DISAPPEARING” WATER FOUNTAIN



An anniversary gift of a large glazed pot served as the inspiration for the water fountain. I chose my location based on the fountain's best setting in the pool area and its access to power.



INSPIRATION & LOCATION

Recently a friend gave my wife and me a beautiful blue glazed pot for our wedding anniversary. The blue glaze matched the tiles surrounding our pool. My wife has always wanted a water feature by the pool and asked me to make this glazed pot into a water fountain. I recall her saying, “That shouldn’t take you too long, it seems pretty easy.”

So my “honey-do list” on that weekend was to learn how to build a hidden water feature using the glazed pot. After some research I learned that a glazed pot is suitable for a fountain and has a life expectancy of 20+ years. I was happy with that.

I chose my location based first on the fountain’s best setting in the pool area and second on its access to power. The spot I chose was at the end of the pool near a table, chairs and umbrella. This

location was also suitable to run electrical conduit by following the stone wall.

DESIGNING THE FOUNTAIN

My vision was to have a 3/4-in. copper pipe protruding approximately one inch above the waterline at the glazed pot’s rim. The water plume will cause the water in the pot to overflow and run over the pot’s side, disappearing into river rock stones around the pot’s base.

I needed a method to collect the overflow water and recirculate it back to the fountain. After visiting my garden center I learned that they sell plastic basins with a grill specifically designed for what I needed. The basin is called a “disappearing fountain basin.”

I bought the basin and a pump suitable for recirculating the water. Next stop was the hardware store where I purchased some

copper pipe, a quick-disconnect coupler, copper elbows, a few stainless steel clamps, a shutoff valve and some marine epoxy.

At this point my idea was a theory. I was still unsure how I was going to configure the fountain pipe and secure it to the pot.

I wanted to achieve several things with this project:

1. I wanted to install a shutoff valve to control the flow of water.
2. I wanted to be able to disconnect the pump from the bowl for winter storage.
3. I wanted to be able to hear the splash of the water as it overflows from the pot.
4. I wanted to be able to easily drain the basin to service the pump if needed.
5. I wanted to control the

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INSTALL A “DISAPPEARING” WATER FOUNTAIN

pump with a timer.

The Hidden Reservoir Basin.

I purchased my pump and basin from a local nursery. The basin is 36" x 36" x 14" deep and is made of reinforced plastic. The grating is reinforced PVC with a mesh netting covering the grate. The mesh netting helps keep debris and small stones from falling into the reservoir. Cost for the basin was \$200.00.

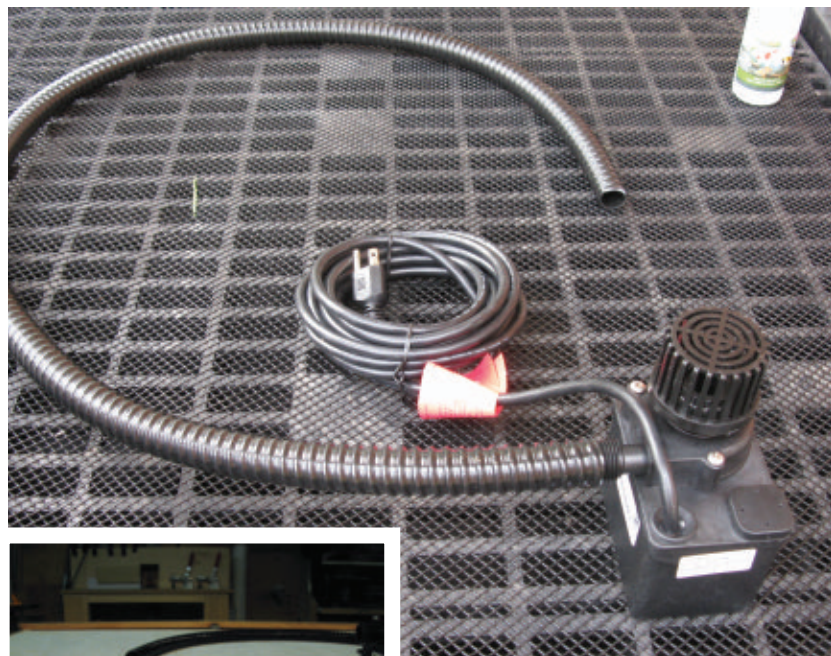
The basin will house the reservoir water pump, some pipe and other connections and will be filled with water.

This basin is designed to be installed at ground level and covered with decorative stones. I planned on using Mexican beach pebbles, which are black and smooth.

Water Pump. With help from the nursery's water fountain expert, I chose a Little Giant submersible



The basin is covered with reinforced PVC grating and a mesh netting that would eventually be covered with pebbles. Shown here are the basic components.



A submersible pump is used to recirculate the water. I experimented with the fountain components before deciding on a system.

pump which is designed for continuous circulation. This pump can handle up to 400 gallons and pumps 475 gallons per hour. The pump cost \$100.00.

I plan on running this pump only 16 hours a day and controlling it with a timer.

MAKING THE FOUNTAIN CONNECTIONS

To keep my options open, I chose a pump powerful enough to push the water above the waterline. If it proved to be too powerful I would restrict the water flow with the shut-off valve I purchased. (It's important NOT to put anything that restricts the flow of the water ahead of the pump intake.)

I played around with different pipe configurations, swapping elbows and hoses until I came up with a design I liked. Remember, my plan was to make the pump easy to disconnect. I finally decided to connect the shut-off valve with a pair of 3/4-by-3/4-in.

nylon barb adapters and stainless steel clamps. I wrapped Teflon tape to the nylon threads before screwing them into the shut-off valve. The hose that came with the pump screws onto the pump and stays in place without connectors. This allows for quick-disconnect to clean or store the pump.



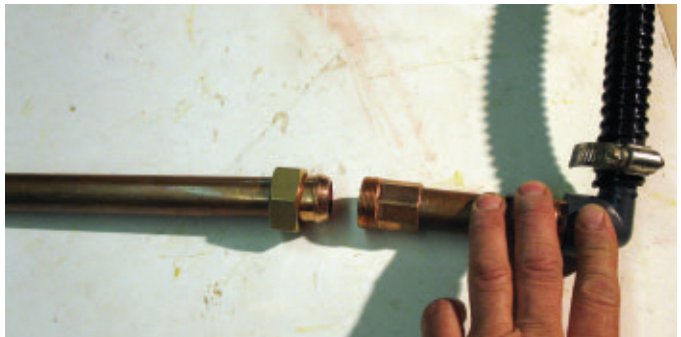
To make the transition from pump hose to main fountain, I used a 90-degree PVC irrigation elbow insert (1x3/4") to connect the copper pipe.

To make the transition from pump hose to main fountain, I chose a 90-degree PVC irrigation elbow insert (1-by-3/4-in.) to connect the copper pipe. The PVC elbow connects to a 3/4-in. copper threaded "X" male adapter fitting.

A short piece of 3/4-in. pipe separates the male adapter

from my disconnect fitting. The disconnect fitting will allow me to drain the pot and remove it for winter storage.

Attached to the disconnect fitting is a long piece of 3/4-in. copper pipe, which makes up the main fountain pipe that will run up and through the basin.



A short piece of 3/4" pipe separates the male adapter from my disconnect fitting. The disconnect fitting will allow me to drain the pot and remove it for winter storage.



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INSTALL A “DISAPPEARING” WATER FOUNTAIN

INSTALLING THE HIDDEN RESERVOIR

The glazed pot will be installed on the basin. Installing this hidden reservoir required my digging a hole 3-by-3-ft. square and about 14 in. deep.

We lucked out and were able to get our hole in without having to move an irrigation pipe that we discovered in the bottom of the

hole. When I saw this pipe, it gave me an idea that I might want to add an auto-refill to the basin so I wouldn't have to refill it once a week due to evaporation.

When preparing the reservoir basin hole, use care to make sure the bottom of the hole is flat and level in both directions. If not, the reservoir will be out of level and you will not be able fill it to capacity.



Installing the basin required digging a hole 3x3' square and about 14" deep. Tamp the bottom of the hole, place the basin and check for level. Shim the hole as necessary back-fill around the basin.



I used a masonry bit to drill the hole in the pot for the fountain standpipe. I had to ream the hole for a tight fit.



Once the hole was excavated and leveled we installed the reservoir, checked again for level, back-filled and tamped.

I chose to leave the reservoir basin approximately 1- to 2-in. higher than ground level to help keep mulch and dirt out of the water in the basin.

Because the ground slopes away, the reservoir sticks out of the ground higher in the rear. Since this area can't be seen from the patio, I decided not to slope the ground up to the basin.

INSTALLING THE COPPER FOUNTAIN HEAD

Part of my plan was to install a 3/4-in. copper “standpipe” up through the pot's bottom to deliver a plume of water at the top edge of the pot's rim. The basin will hold water and the standpipe will prevent water from flowing out of the pot when the pump is operating.

To do this I used a 3/4-in. masonry bit to drill a hole through the center of the pot. This hole will allow the standpipe to reach the pump in the hidden reservoir below. Drilling this hole was nerve-racking because I did not want to damage the pot. I knew the replacement value was approximately \$200.00.

While drilling I had to ream the hole a bit for the pipe to fit. I wanted a tight fit. Test all the components for a sure fit before final assembly.

I then placed the pot onto the reservoir basin and checked for level. The pot can be shimmed a bit if needed.

Next step was to drill a hole through the reservoir basin grate for the copper standpipe to reach the reservoir and pump. I used a 1-in. Forstner bit for this, but a spade bit would work too. I later ended up enlarging this hole so I could remove the pot,



Check the pot for level and looks.



Next, I drilled a hole in the grate for the standpipe. Test-fit the standpipe.

if necessary, without removing the standpipe and quick-disconnect fitting.

The existing glazed pot came with two drainage holes that I filled in with Marine epoxy.

Cut an Access Hole. Using a reciprocating saw and a metal cutting blade, I cut a 1-by-2-ft. access panel into one corner of the grating. This panel allowed me to access the pump and shut-off valve to control the water flow, as well as the copper standpipe in order to disconnect for winter storage. This

panel provides quick access without having to remove the glazed pot.

Soldering the Copper Standpipe Connections. After dry-fitting everything, I soldered all of the copper pipe fittings. This job required basic soldering tools and materials—copper solder, flux, pipe tool and a propane torch.

Test the Components before Installing. Testing the pump and fittings is important to work out any problems or issues. When I tested my fountain assembly, the

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INSTALL A “DISAPPEARING” WATER FOUNTAIN



I used marine epoxy to seal the other drain holes (already in the pot). I later used the same epoxy to seal the standpipe into the bottom of the pot. I used a recip saw to cut an access panel into the grating to allow access to the pump and shutoff valve.



After testing for fit, I soldered together all the copper joints. Once all the joints were connected, I tested the performance of the fountain. I added cinder blocks directly under the grate where the pot sits. The blocks will take the weight and stress off the PVC grate and transfer it to the ground. Place the pot in its final position over the standpipe, shimming as necessary. Seal the joint between the pipe and pot with marine epoxy.



flow of water from the pump was strong. I was glad I installed the ball valve to control the flow. When the standpipe was held vertical, the pump pushed out a 5- to 6-in. plume of water.

FINAL ASSEMBLY

The glazed pot was heavy when empty, and adding water to it at approximately 8 lbs. per gallon increases this weight dramatically, so I added cinder blocks directly under the grate where the pot sits. The blocks will take the weight and stress off the PVC grate and transfer it to the ground.

I then routed my copper fountain standoff pipe through the grate and attached it to my pump and hose assembly. I lowered the basin pot over the standoff pipe and used my level to hold it plumb. I then used marine epoxy to secure the pipe to the pot so it could hold water. The copper standpipe protrudes 2-in. above the basin rim.

Once the epoxy dried I checked again for level, shimmed as necessary, and then filled the basin with water. Test again.

I finished the top of the PVC grate with 1- to 2-in. Mexican pebble rock to hide the PVC basin grate.

When activated, the pump pushed a 6-in. plume and the basin held water. As the pot

I finished the top of the PVC grate with 1 to 2" Mexican pebble rock. The rocks will hide the PVC grate.

overflows, the water follows the contour of the basin and drains back into the hidden reservoir where it “disappears” and is recycled by the pump. Finally, I added more rocks to hide the square edge of the reservoir and to overlap to the mulch. **EHT**

Editor's Note: Robert Robillard is editor of the blog AConcordCarpenter.com and principal of a carpentry and renovation business located in Concord, Massachusetts (www.RobertRobillardCarpentry.com). Rob also hosts the “Concord Carpenter” Cable TV Show, offering the DIY audience in Boston's Metro West region expert advice on home repairs and maintenance.



This electrical supply line for the pump was installed in PVC pipe in an 18" deep trench from the house. The electrical line plugged into an outdoor GFCI rated outlet, which I hid behind a rock.



The fountain is activated with an outdoor timer that plugs into the GFI outlet. The electrical line comes out of the ground and goes into the rear of the reservoir basin, along with an irrigation pipe I added to refill the fountain.



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The Hole Truth

Digging the Perfect Post-Hole



By Mark Clement

A post-hole is more than just a hole in the earth. It is a shaft cut straight down into the ground to particular size in a particular place, despite all the root and rock obstacles between your shovel point and the bottom. It is also a heck of a lot of work, so I want to do it right the first time whenever possible.

“Right?” you might ask. “Dude, it’s a hole. Taking yourself a little too seriously? Grab your post-hole digger and get to it.”

This reply might fly, say for a mailbox post (but even those must comply with mailbox placement regulations—see sidebar). However, for a deck, fence or pergola, post holes need to be right or something goes seriously wrong with carpentry layout,

profitability and/or inspection. If they’re not the right shape and correct depth, they won’t fly.

I’ve dug (and re-dug) hundreds of post holes, both alone and with other people, who swear they know how to do it. The key to digging post holes correctly is to understand what you’re digging and to throw away old assumptions about the tools everyone has in their shed or garage.

WHAT IT IS

It’s best to think about post holes as shafts. They descend straight (plumb) down from where you start digging them. The sides of the shaft are straight and the bottom of the hole is flat (or at least flat-ish). In other words, if your hole looks like a

cup or a bowl, well, it’s not a post-hole.

This concept is pretty easy to get your head around. In reality, however, it is more difficult to execute because it requires us to use the most basic tools we own (shovels, digging bars, etc.) that we’ve all used a zillion times for shoveling projects—mulch/snow, leveling the yard, turning over the garden—in a different way. Digging a proper posthole is all about getting started in the right place and going the right direction. And that is harder than it sounds.

GETTING STARTED

Different people lay out post-hole locations differently, usually by running strings or pulling layout from an existing structure. However you get there, the first thing to do is mark the whole hole.

Center. The first thing I mark is the center of the hole. I then take a screw or nail, shove it through a hunk of caution tape or red duct tape, and plug it into the ground. Next, I grab a can of spray paint and paint a 24-in. “X” across the center of the hole. (I learned this trick in Joplin, Missouri, building the Boomtown playground with the crew of *Extreme Makeover: Home Edition*.) This cross mark helps keep me on target. The first step is to dig out the screw marking the hole’s center.

GET THE SHAPE, CUT THE SOD

Like many projects, starting on the right foot is an indicator of things to come. For post holes, I like to slice the earth at the top of the hole in a square, and

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PROJECT NEXT

there's hardly a better tool for that than a garden spade. You can measure your hole width (decks with 6-by-6 posts or 12-in. builder's tube usually require a hole that is 16-by-16-in. square or diameter or larger).



Start digging with a garden spade to cut through the turf.

Keep the blade plumb and jump straight down on the spade to cut the walls of the shaft-shaped hole.



The other critical job the spade does is help get the sides of the hole going down straight from the get-go—which is the first hardest part of the job and the thing that'll chase you right down to the bottom of the hole. Lean the handle away from you to get the blade plumb, then jump on that bad boy like you mean it to sink the blade below the sod.

EARTHWORK

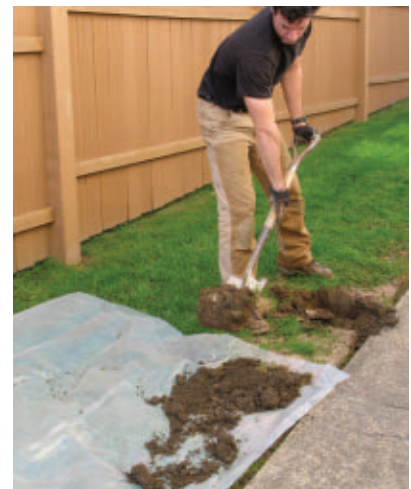
I like the spade to get started, but after getting under the sod, I need to scoop out the loose dirt that's in the hole, and for that I switch to the long-handled shovel.

To cut the earth straight off the sides of the shaft, you have to lean the shovel handle outward in a way that might seem uncomfortably far away from your body. However, you know that when you're reaching for the handle, the blade of the shovel is cutting straight down. It is usually around this point in the hole where things go wrong with a rookie because they try to scoop instead of cut. Once you've sheared off the sides of the hole into the bottom, then you scoop out the loose fill.

That's pretty much the mojo, although root, rock, clay and other obstructions will conspire to nudge you off course. Nudge them back.



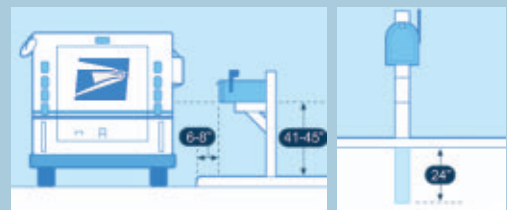
Check local building codes for post-hole size requirements. Deck posts often require a 16" square hole.



Store the excavated dirt on plastic or plywood to keep the surrounding lawn and landscape clean.

MAILBOX GUIDELINES

According to the US Postal service, your local postmaster must approve the location of your mailbox. This typically means that a roadside mailbox must be located where a carrier can reach inside without leaving the truck. That means positioning it about 41 to 45 in. off the ground and back about 6 to 8 in. from the curb. Visit www.usps.com for more information.



OBSTACLES

Digging a shaft is harder than most people think, and it takes almost nothing to get off track. It's kind of like swimming in a straight line under water—there's nothing to gauge your progress against. A root or rocks can knock even a skid-steer powered auger off line. To help keep the shaft plunging straight down, I employ a whole battery of tools.

Digging Bar. My primary go-to for layers of rock-hard clay, small-ish rocks and roots is my digging bar. It can pierce and puncture clay layers. I slam it down the edges of the shaft, then I use it to chew up the center of the hole. I then return it to the edge of the hole and pry against the rim until I'm through the clay. Rinse and repeat. And, unless you've got calluses on your calluses, wear gloves; this steel likes skin.

There's also nothing more brutal on small roots than the digging bar blade. Kind of like

Digging the hole involves more cutting than scooping. After cutting the straight walls of the hole, scoop out the loose fill from the bottom.

a shear, I plunge the bar down into them. Sometimes I start at the edge of the root to get it cut, then take subsequent blows to get it out.

The bar can also pry rocks out from the edge of the shaft. And, if there is an old footing down there, such as the edge of a sidewalk or rock that'll fracture, you can use the digging bar to delete those obstacles with lead-pipe brutality.

However, when pounding down into the hole, make sure to try and keep the rim intact. No matter what happens inside the hole, this is the control point.

Recip Saw. Some roots are simply too big for a digging bar to cut through—and too deep for a mattock (awesome root cutter) or axe—to get at. For those, I clear as much dirt from around them as I can and cut them out using my recip saw. Expect dirt to blow up in your face from the saw's exhaust, and for typical demo blades to gum up because the wood is so green. Skil's Ugly blade, with its massive gullets and super sharp teeth, really evens the odds.

With the turf removed, a long-handled shovel does a good job of removing the dirt. Dig with the blade plumb and the handle pushed forward to keep the walls of the hole straight up and down.



Jackhammer or Rotary Hammer. I've encountered dirt so hard that there is simply no other way through it than to go hardcore muscle. For those instances, an electric jackhammer can save the day. I've also found my way through uber soil using my rotary hammer and a "spade" type bit. It breaks the soil up just like a jackhammer will, but with less power and more maneuverability. You can rent either tool easily.

DEPTH

To meet structural requirements for inspections, whether you're building a deck or dropping piers for an addition, the inspector not only wants to see the bottom of the hole, but that the bottom is far enough away from the top. An easy way to get a measurement is to bridge the hole with something straight like your shovel or hunk of 2-by so you can sink your tape and get a decent reading.

The Bottom. Getting every fleck of dirt out of the hole isn't

really possible, so once I'm deep enough and have made the bottom relatively flat, I jump in and tamp it down with my feet. Trust me when I tell you that a hole bottom that is flat and free of debris makes positioning a post or tube significantly easier. And every inspector I've met likes to see nice, neat work. Once they start seeing sloppy stuff, they're extra vigilant. In other words, if you can't get the hole right, what else is a mess?

EXTRA DIRT AND THE REFILL

In a landscaped yard, dirt can co-mingle with the grass and be a mess to clean up, especially on extended projects and/or if it rains. A sheet of plywood is a great bond-break between grass and dirt congealing around it. Sheet plastic works too, as long as you're re-filling in 24 hours or so. And, on longer projects, it makes sense to cover the dirt pile with plastic to keep it dry so it is easier to work when refilling.

You will have more dirt left over after the fact. The post, tube, concrete etc., all take up space—plus the dirt is entrained with air. There are a number of techniques to refill the hole, all



An easy way to get a depth measurement is to bridge the hole with something straight, like your shovel, so you can sink your tape and get a decent reading.



Once the hole is deep enough and relatively flat, I jump in and tamp it down with my feet. Every inspector I've met likes to see nice, neat work.

of which work with varying degrees of success.

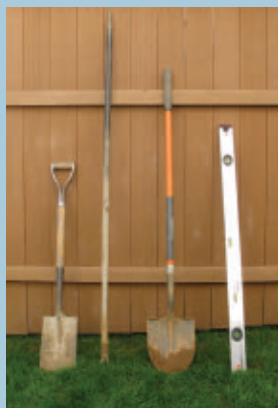
You can tamp down the dirt as you refill it (with a tamper, the back of a digging bar or the head of a

sledgehammer), but you have to be careful not to move the post as you pack dirt around it. You can also overfill the hole, which will then sink down as water and gravity take effect. The top of the hole may stay proud of the ground or sink below, so this one can be tricky.

The bottom line is that in order to build up, you have to dig in and dig down first. **EHT**

POST-HOLE TOOLS

My main post-hole tools are a spade, long-handled shovel, a digging bar and a tape measure and/or level (for layout and depth measurement). You might notice there is no post-hole digger. Not only are they brutal to use (I have rarely been as sore after a day behind a post-hole digger), but they either don't cut a big enough hole, won't cut through tough soil, or they don't scoop out as much dirt as I can get with my shovel. I'm not saying they don't work, but when you're staring down a dozen 40-in. deep holes for a fence, any move you can save is a good move.



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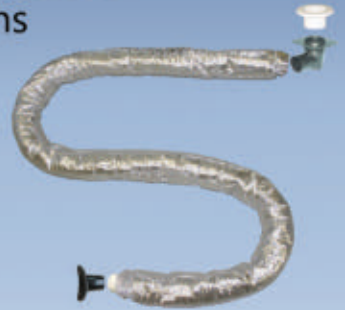
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