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CONTENTS

Fall 2012



FEATURES

18 Patching and Repairing Concrete

First?aid for Concrete Construction

30 Build an Attached Carport

Shelter your Machines

40 Garage & Workshop Roundup

Equip your Favorite Workspace with these New Tools and Supplies

DEPARTMENTS

6 Q & A

10 Do-It-Yourself

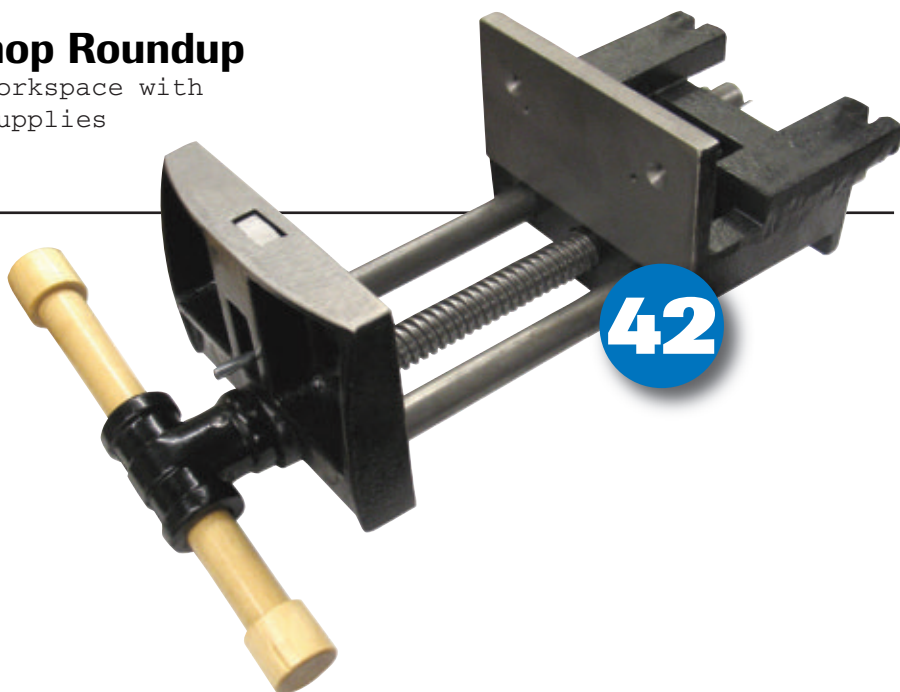
Opening Remarks

50 Everything Auto

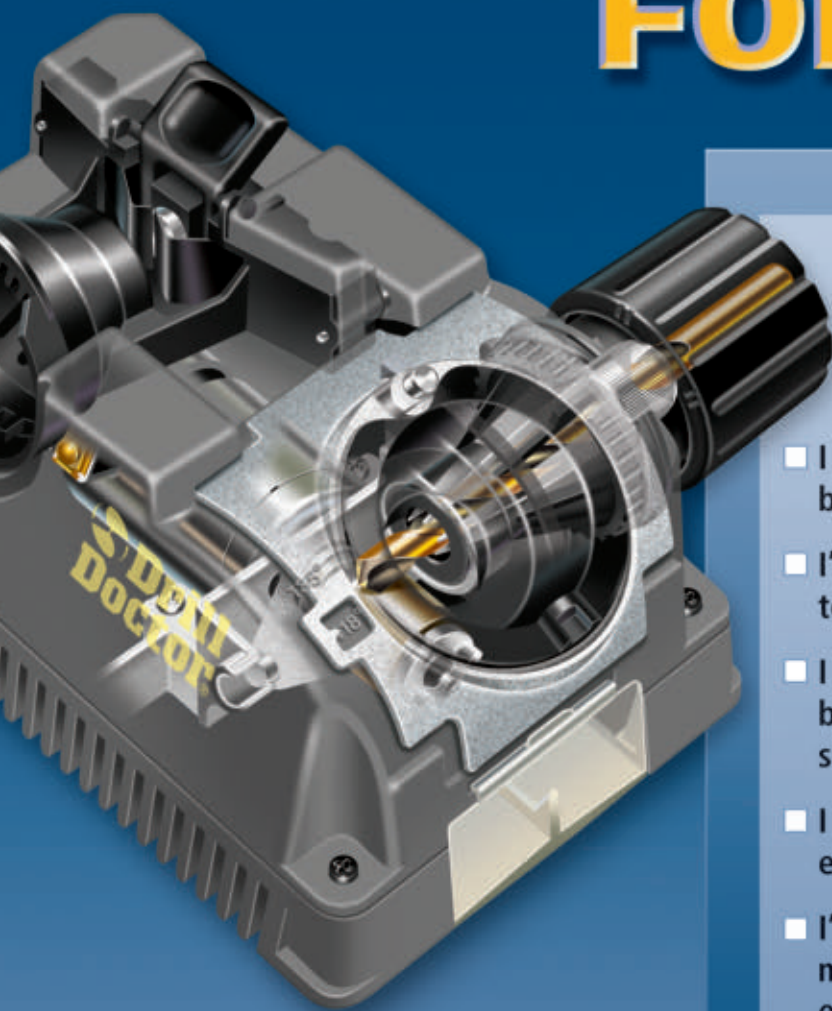
Shock and Awe

54 Skill Savvy

Making PVC Connections



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A: Try using some concrete screws. Predrill the paver and then use a hammer-drill to drive the concrete

screw solidly into the middle of the paver, but leaving about 3/4-in. of the screw protruding from the surface. Then, use vise grips to grab the screw like a handle to work the paver from side to side until you can pull it loose. Once the first paver is out, it should be easier to remove the others around it, allowing you to build up the sand and rock beneath the pavers.

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BY GALAXIE

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Q: How does straw-bale construction work?

A: This construction method uses rows of straw bales as structural wall components over a raised footing or foundation, with a moisture barrier between the bales and the foundation. Each succeeding course of bales is staggered at the joints, just like block or brick construction. The bale walls can reinforced with bamboo, rebar, wood, metal bands or wire mesh. The completed straw-bale walls are finished with several layers of stucco or plaster. Advantages of straw-bale construction over conventional building systems include the renewable nature of the material, low cost, easy availability, natural fire resistance and high insulation value. Disadvantages include susceptibility to rot and the substantial space requirements to accommodate the size of the hay bales.

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Q: I'm planning to install ceramic floor tiles in my bathroom. The tiles are glazed, so I wasn't planning to use a sealer. However, my neighbor suggested I seal the grout joints. Is this good advice?

A: Although sealing isn't required for glazed tiles, since liquids can't permeate the glaze, the grout on any floor should be sealed to provide the most water-proofing. For best results, mask the grout lines with painter's

tape and apply the sealer with a narrow brush. For such applications as mosaic tile, sealing the hundreds of tiny grout joints isn't really practical, so be sure to apply a high-quality waterproof grout in lieu of a sealer.

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Q: We purchased a fore-closure to remodel, and most of the windows seem to be painted shut. What's the easiest way to break the paint seal without damaging the wood of the window sashes?

A: There is a hand tool called a sash knife that is designed specifically for this type of job. The blade is offset from the handle to flush-cut the joint between the sash and the frame to penetrate dried paint. In a pinch, you might also try using a thin hack-saw blade, because the blade will bend. Very shallow paint lines can be cut with a utility knife, but because it won't flex or cut flush, a razor blade can't cut deeply dried paint without cutting into the frame or sash. **EHT**



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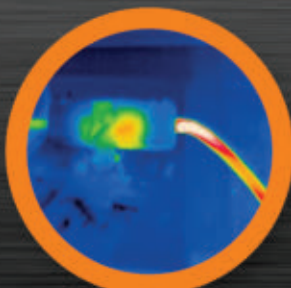
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Opening Remarks

Replace an Interior Door



By Larry Walton

No matter how much you enjoy doing home repairs and improvements, you probably have other things you'd rather do. That's why when faced with most tasks, I'm looking for how I can do a quality job in the most cost-effective and efficient manner possible.

When an interior door needs to be replaced, often a good option is to replace just the door blank rather than removing the casing and door jamb. Obviously the door jamb and trim must be in good condition to do this, but the right approach can save time and money. It also eliminates the need to find trim that matches the rest of the house.

To purchase the right door for the opening you'll need to get

some measurements. If the existing door is still in place and it fits right, you can measure it and match it. If there is no door in the opening, measure vertically from the floor to the underside of the jamb header, and horizontally between the jamb sides in front of the door stops. These measurements are usually referred to in feet and inches with the horizontal listed before the vertical. In the case of our door replacement we needed a door 2 feet by 6 feet, 8 inches. (Note: Door and window sizes are often written with the feet as an integer and the inches as an exponent. So a door that measures 2 feet 4 inches in width and 6 feet 8 inches high will be written 2'4" x 6'8".)

Unless you are very familiar with door types and wood species, a digital photo is a good way to match your door type. Before leaving the house, shoot the overall door and get a close-up shot of the wood grain as well. Take your camera with you to the home improvement store to find the door you're looking for.

Because you are using the existing door jamb with its hinge and strike locations already determined, it's best to get a door with no hardware holes or hinge mortising. These will all need to be matched to the door jamb on site.

Here's how to get that door installed and opening with ease:



Step 1: Put the door in the opening and adjust it with shims until you have even reveals (spaces) between door jamb and door blank. A shim at the floor can be about 1/4-inch thick on hard surfaces. On carpeted areas the door should just clear the top of the carpet nap

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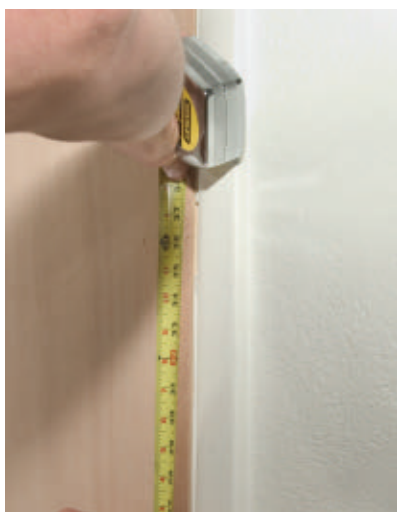
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DO IT YOURSELF



Step 2: Put a mark on the door at the top and the bottom of the strike-plate mortise, which is located on the door jamb. Find the center between the two marks. This will be the center of the door latch.



Step 3: Measure from the bottom of the door to the latch center mark, and transfer this mark over to the center of the back latch set (about 2-3/8 inches from the door edge).



Step 4: Put a cross mark at 2-3/8 inches from where the edge of the door will be after it is trimmed.

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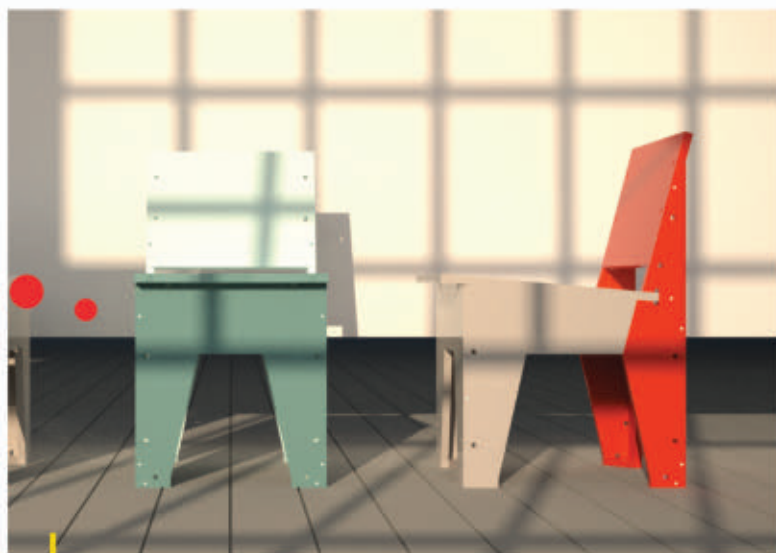
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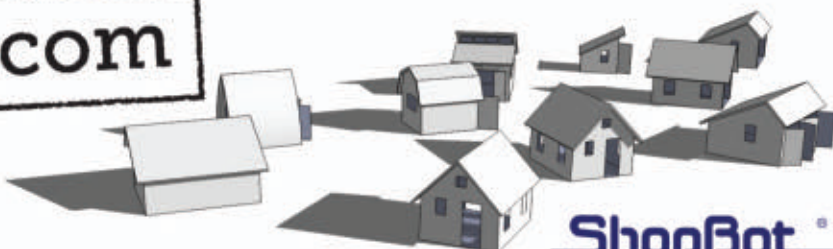
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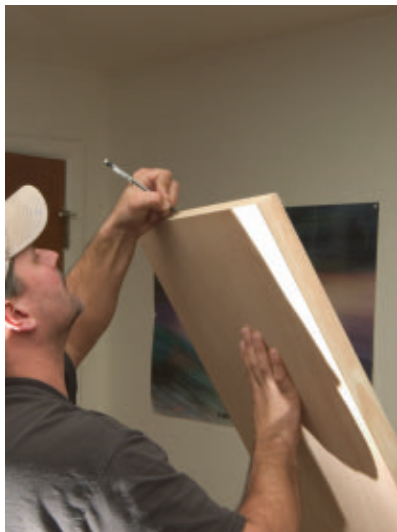


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Step 5: Mark where the door needs to be trimmed. If the jamb sides are fairly parallel but the top is not even all the way across, you may need to trim at an angle to follow the jamb.



Step 6: Remove the door from the opening and mark the top of the door indicating which surface is the outside, inside, hinge side and strike side.



Step 7: Place the door blank on sawhorses. Using a hole saw, drill a 2-1/8-inch hole through the door where the door latch set will be installed. The centering bit should start at the cross mark you made earlier. Drill until the centering bit goes through the door, turn the door over and finish cutting from the other side.



Step 8: Transfer the latch center mark down the edge of the door using a square. Then mark the center of the door (half of the door thickness).



Step 9: Use a 1-inch spade bit to bore the hole for the latch bolt from the door edge to the large hole you drilled earlier. Make sure the angle of the drill bit is square to the door in both directions.

FINISHING TOUCHES

After the door is fit and all adjustments are made, sand a slight chamfer along the edges of the door. This helps protect face veneers from being snagged and peeled off, gives finishes a place to adhere on the corners and makes the door more pleasing to the touch. Also, sand off any layout marks and scuffs, which may be on the door surfaces. Use a fine-grit paper, sand with the grain and do not sand deeply. Many of today's wood veneers are very thin, so aggressive sanding can go through the veneer and ruin the door. Wipe down the door with a clean rag. Apply wood stain to match the existing doors in the house. Thoroughly mix the stain, smear it on and wipe it off. Apply a clear coat of lacquer.



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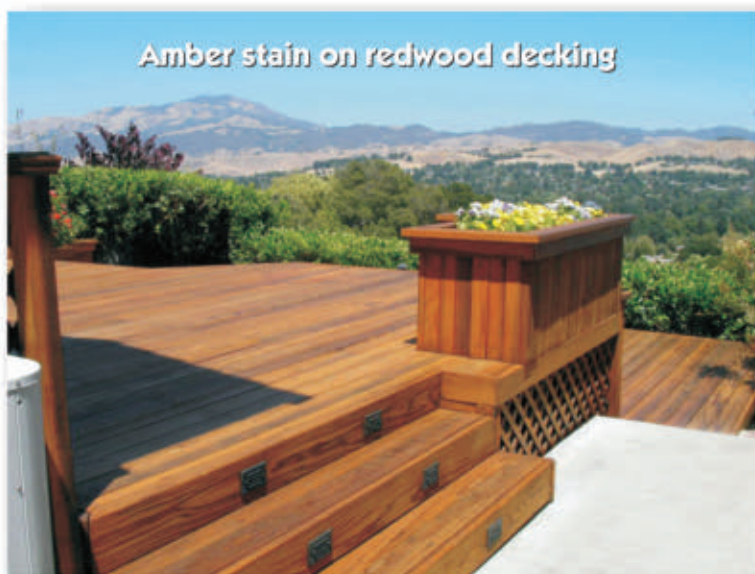
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Step 10: Use a straight-edge to mark where the door needs to be trimmed. It's not uncommon for the door jamb to be out of square requiring a tapered cut. In this case we needed to trim the top of the door about 3/16 inch on the hinge side to nothing on the strike side at the top.



Step 11: Use a power planer to trim the door ends. Note: Do not exit the door edge with the power planer. This could cause the wood to tear out. Enter the edge of the door and cut toward the middle from each end.



Step 12: You can use your finger as a depth gauge to mark what needs to be cut off the door edge. If you're not comfortable with this old-school technique, use a straight edge or combination square set to the desired depth.



Step 13: Because the strike edge of the door will be tapered, put a series of marks along the edge of the door so you know when you've cut across the entire face of the door.



Step 14: Plane the edge of the door making several passes at a slight angle until the bed of the planer rides on the new bevel and the pencil marks disappear along the door edge adjacent to the longest face.



Step 15: Lay out the hinge-plate mortise and score the lines with a knife.

MATERIALS:

- DOOR BLANK
- MEASURING TAPE
- HAMMER
- PENCIL
- COMBINATION SQUARE
- CEDAR SHIMS
- DRILL, BITS, HOLE SAW
- POWER PLANER
- ROUTER
- CHISEL
- UTILITY KNIFE



Step 16: Use a hinge plate to set the router depth for the mortise. Mortise the hinge locations with the router. Keep the router cuts within the confines of the hinge location layout lines.



Step 17: Finish the hinge mortise with a chisel and/or utility knife.



Step 18: Use a hinge plate to pre-drill for the hinge screws. Fasten the hinge plates to the doors with screws.



Step 19: Hang the door on the hinges and check the swing and reveals.



Step 20: Minor adjustments can be made by shimming behind the hinge plates to move them closer to the strike-side jamb or by adding longer hinge screws to pull the door away from the strike-side jamb.



Step 21: Shown is the completed door. See “Finishing Touches” on page 14 to learn how to enhance the door’s appearance. **EHT**

Patching & Repairing Concrete

By Monte Burch

Concrete is one of mankind's greatest inventions. Very durable, it can also be aesthetically pleasing. Concrete is also often a major building material in and around homes. Over time, however, concrete can deteriorate. Patching and repairing concrete can be easy or difficult, depending on the project and the amount of deterioration. Most repair projects are fairly simple using some of the specially formulated patch and repair products available these days.

Concrete is basically made by mixing together four ingredients, Portland cement, sand, crushed stone or gravel and water. These ingredients must be mixed in the proper proportions. You can mix the ingredients yourself, or purchase premixed products, blended for specific chores.

Specialty concretes are very user friendly, and have distinct characteristics such as fast initial or final setting times, high early or final strength, or increased resistance to cracking and chipping. It's important to choose the correct specialty concrete product for the specific job. Regardless of the product chosen, it's also extremely important to follow the instructions and safety precautions on the package.

***First-aid for
Concrete
Construction***

ete



Patching & Repairing Concrete

Many home concrete repairs are easy with today's modern materials. Filling cracks and replacing broken areas are common chores.

You'll need a few tools, including a cold chisel, ball-peen hammer or 8-pound sledge for larger areas, protective goggles and gloves. A brush and broom or hand vac is also necessary, as is a plasterer's trowel and pointing trowel. If you're resurfacing steps and slabs, you'll need an edger as well. You may also need lumber for forming some repairs. And, of course, you'll need the appropriate repair product from companies such as Sakrete or Quikrete. These include Concrete Bonding Adhesive, Acrylic Fortifier or Vinyl Concrete Patcher or packaged concrete. For interior floors you'll need a Self-Leveling Floor Resurfacer.

It's extremely important to prepare the repair area properly before applying the concrete product. Remove all cracked and crumbling areas. On small areas you can do this with the point of a heavy-duty trowel. For larger areas use a sledge and cold chisel to break away any thin or loose edges. Then sweep, vacuum or hose away all dirt and debris down to a solid base.

Minor Repairs

To patch the crack shown in this article, we used Quikrete Vinyl Concrete Patcher, a self-bonding cement mix made specifically for repairing broken, chipped or loose concrete and masonry, as well as filling medium to large cracks. The cracks shouldn't be deeper than 2 inches. The material is available in tubs or a 40-pound bag. It will adhere to all properly



1 The first step is to chip down to solid material and clean away all loose materials and debris.



2 Sweep and/or vacuum away all dust and debris.



3 Moisten the area according to the package instructions.



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Patching & Repairing Concrete

cleaned surfaces and can be troweled to a feather edge of 1/16 inch. All you need to do is add water.

Again, the first step is to properly prepare the surface. Use a chisel to remove all cracked and crumbling materials, squaring off the edges. Even better yet, undercut the edges using the chisel and hammer. Use a wire brush to remove any crumbling materials and to roughen the surface if it is finished smooth. The material should not be applied over painted surfaces. Clean away all debris and rinse with water. Mix only the amount of material that can be applied in 30 minutes, according to the manufacturer's instructions. By design, Vinyl Concrete Patcher is a "stiff mix." It

is best to keep the trowel clean and dry while applying the mix. This prevents the mix from curing on the tools.

Before application, dampen the area with clean water, but remove any standing water. Apply the mix with a trowel, using heavy trowel pressure to force the mixture into the crack. Overfill slightly and then trowel smooth to match the surrounding concrete. If cracks are deep it may be necessary to apply in 1/4-in. deep layers. Allow the material to dry for two hours between layers. Clean the tools immediately with water.

Small cracks are easy to patch with Quikrete Gray Self-Leveling Concrete Crack Seal. The product comes in a squeeze tube, and fills and seals cracks in concrete up to 1/2-in. wide. For large or deep cracks, you can use Quikrete Sand Mix or the company's Concrete Bonding Adhesive.

Major Repairs

Larger repair jobs, such as broken corners or slabs of walks, usually require reforming. First step is to remove the broken area down to the gravel fill. If the gravel fill has deteriorated, dig down a couple of inches below ground level and add a gravel base. Use 2-by-4 or other material to reform the area. The tops of the form boards should be even with the top edges of the adjoining concrete surface, as well as even with what will be



4

For this repair we used Vinyl Concrete Patcher, a fast-setting adhesive-type patch. Mix only enough to be used in 30 minutes.

DAP CONCRETE PATCH

DAP also offers a line of concrete patch products. DAP Ready-Mixed Concrete Patch can be used to patch small cracks and breaks, or spot level concrete and masonry surfaces such as basement walls, patios, steps, sidewalks and driveways. It dries to a durable, hard finish and it doesn't shrink. DAP Concrete Patch comes in a tube for a quick, easy way to repair small cracks and other minor blemishes in concrete surfaces. The ready-mixed formula dries to a durable, hard finish and is non-shrinking.

For larger repairs, DAP's concrete patch is also available in quart- or gallon-sized tubs.





5

A trowel is used to force the material into the crack or opening, leaving a slight overfill, and the surface smoothed to match existing surface.



6

A number of patching products come in easy-to-use squeeze tubes, such as a Blacktop Crack Sealer.



7

To fill a small crack, simply squeeze the self-leveling Concrete Crack Seal in place.

Patching & Repairing Concrete

the new repaired surface. Forms should be level and should follow the natural grade. Stakes should be placed every four feet and cut off even with the top edges of the forms.

Vinyl Concrete Patcher or packaged concrete can be used, the former, however, will bond more readily to the existing concrete. Mix the concrete product and trowel or shovel into the form. Roughly smooth up with a trowel, then cut around any forms with an edger. Allow the concrete to stiffen slightly, waiting until all water has evaporated from the surface. Once the surface turns dull, smooth and compact the concrete with a trowel. Keep the trowel pressed firmly down on the surface and flat. Reuse the edging tool around the edges to smooth them up. For a textured, non-skid surface, use a wood float for finishing.

Keep the concrete damp for 5 to 7 days to help the hardening or curing process. Concrete that has been moist-cured will be approximately 50 percent stronger than that exposed to dry air.



Broken corners and sidewalk slabs require a bit more work.



First step is to remove the broken pieces and clean away the debris, then reform to hold the concrete in place. Stakes must be cut flush with the form edge.

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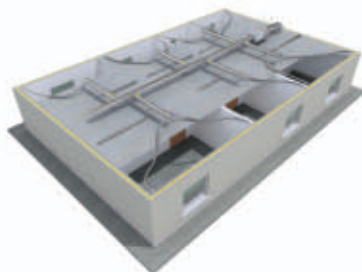
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Patching & Repairing Concrete

A similar problem is a walk that has uneven slabs. These can be reformed and repaired, again using form boards. If the area to be resurfaced is greater than one

inch, apply a coat of Concrete Bonding Adhesive to the cleaned surface using a roller or paint brush. When dry, fill the form with Sand Mix as directed by the

instructions. Level and smooth with a trowel. Wait a bit until the surface water has evaporated, then finish troweling. For a side-walk or steps, brush with a broom finish if you desire a roughened finish.

Spalled or flaked concrete surfaces can also be repaired quite easily. Apply a thin layer of Sand Mix with Acrylic Fortifier added at a ratio of one-half gallon Acrylic

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10

Vinyl Concrete Patcher or pre-mixed concrete may be used.



11

The material is shoveled or troweled into the form.

Fortifier to 80-pounds of Sand Mix and trowel smooth.

More Patching Products

Before constructing, repairing or renovating interior horizontal concrete slabs, consider MAPEI's line of concrete repair products. Mapecem 100 is a cost-efficient cementitious mortar that is ideal for a multitude of applications, including resloping floors; leveling

low areas of floors; filling trenches, voids and honeycombs; and treating concrete defects. Fast-setting Mapecem 100 is formulated with Mapei's High-Hydrated Cement

Technology (HCT), allowing traffic within 3 to 4 hours of application.

The MAPEI Planitop X product is a one-component mortar that blends with original concrete



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Patching & Repairing Concrete



12

The edges are cut around the form with an edger.



13

After the surface sheen is gone, the surface is troweled smooth.

color. It can be applied vertical, horizontal or overhead. The smooth finish product features Easy Glide Technology that makes it extremely easy to feather out.

The Sakrete company offers a complete line of crack-filling products as well as patch and repair and resurfacing products. For minor repairs of cracks and other imperfections, Sakrete mortar or stucco repair products come in convenient tubes. For larger cracks, Sakrete Concrete Crack Filler is a pourable, flexible concrete material for lasting repairs. To restore chipped, cracked and spalled driveways, walkways, slabs and steps, Sakrete Top 'N Bond Concrete Patcher and Flo-Coat Resurfacer provide easy-to-use, cost-effective alternatives to concrete replacement. And if downtime is an issue, try Sakrete Fast Set Cement Patcher for repairs that are open to foot traffic in just 20 minutes.

Repairing damaged concrete can be a pleasant Saturday afternoon chore that will not only improve the appearance, but in many cases the safety of the concrete walks, steps, patios and other areas around your home. **EHT**



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Build an Attached Carport

By Monte Burch

A carport, or lean-to shed, attached to an existing building such as a garage, barn, shed or the side of your house can provide economical shelter for vehicles, garden tractors, boats or other equipment. An attached carport is also fairly easy to construct against the side of another building, if you have enough height under the existing building's eave.

The carport/lean-to shown utilizes basic and simple pole-building construction techniques, and was added to an existing workshop. The outer end of the shed is supported by Wolmanized pressure-treated 4x4 posts. And because the outer fascia is exposed to the weather it is constructed of 1x6 pressure-treated materials as well. Lightweight, but strong, metal is used for the roofing. A somewhat different approach was used for the roof framing. Traditional pole-building, metal-roof construction consists of 2x4 purlins fastened on edge across the rafters

with the metal roofing fastened down on these. This allows a space where sparrows and other birds can get out of the weather and even a place to build their nests, with the resulting mess. Our design utilizes 2x4 blocking positioned between the rafters and located against the top edges of the rafters. This prevents birds from resting under the roof and keeps droppings off boats, cars or other equipment.

The shed shown withstood 3 inches of ice and an additional 18 inches of snow, which fell this winter. The design may, however, not be strong enough or have enough roof slope for some high-snow areas. Check with local building codes and regulations. The shed shown is 24 feet long to match the existing building length, and 15 feet deep. The latter allows for standard 16-ft. 2x6's for rafters. You may have to alter the design somewhat to suit your existing building height, length, even the width if you

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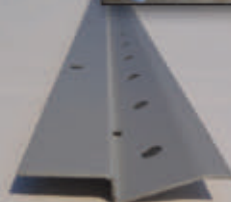
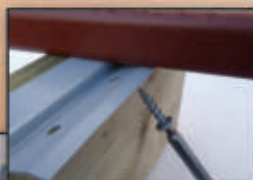
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Build an Attached Carport

desire a narrower shed. It's a good idea to make a rough sketch of the building, to determine the roof pitch, number of support posts needed and so forth.

GETTING STARTED

First step is to locate and install the support header on the existing building. The end of the header should set back from the edge of the existing building by 1-1/2 inch, plus the thickness of any siding and trim that will be added. Mark the location of one end of the header and then mark the other end. Make sure the header is level end-to-end. Fasten the header in place with lag screws through the siding and into the studs of the existing building. Drop a plumb line from each corner of the header and mark this location on the bottom of the existing building. This will give you a starting point to layout the building and determine the location of the support posts.

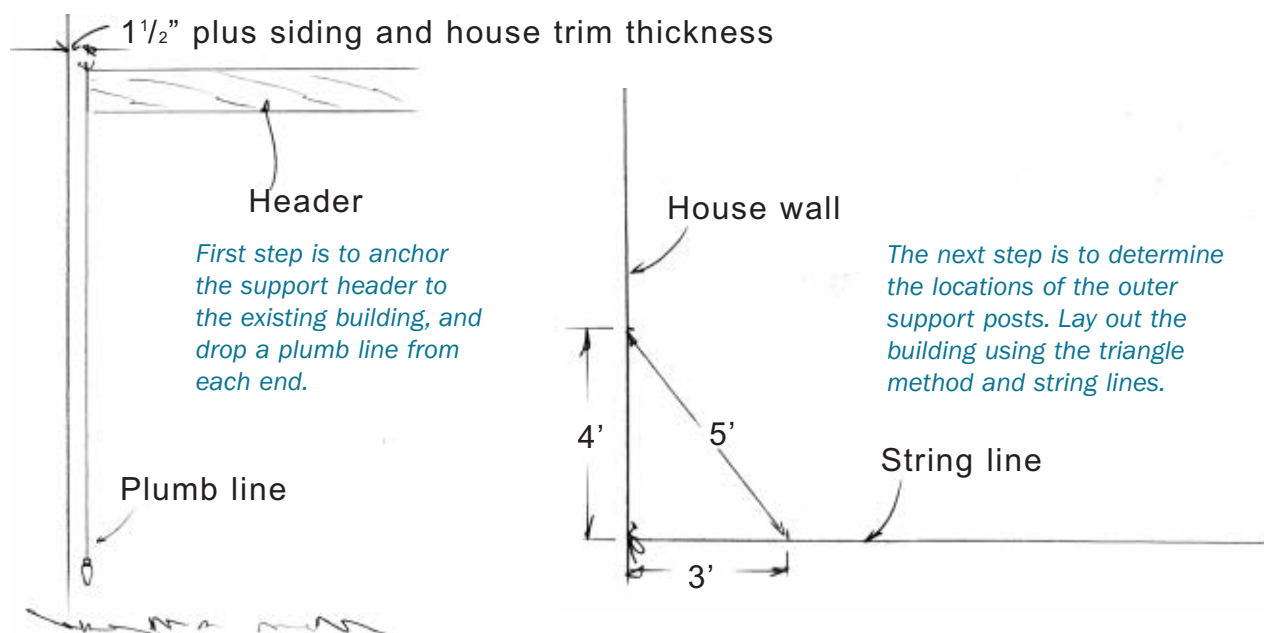
Beginning at one plumb line mark, attach a string to the building. Measure the length needed for one end, drive a stake and fasten the string in place. Beginning at the second plumb line mark, measure for the opposite end, temporarily drive a stake and add a second string line. Measure the distance between the two plumb-line marks for the length of the carport. Measure between the two stakes and adjust the stakes as needed to achieve the same distance.

Make sure the carport is laid out square with the existing building. One method of ensuring square is with right-angle string lines. Beginning at one of the plumb line marks, measure 3 feet out from the building on the string and mark this with a felt tip pen. Measure 4 feet along the building wall and mark this measurement as well. Measure diagonally between the two marks. The measurement must

be 5 feet to create a square corner. Move the string-end stake in or out to achieve the correct measurement. This creates a square corner for one end of the carport and determines the location of the corner post. Repeat for the opposite end and corner post. Then, again measure between the two stakes to make sure the length is correct. You can also check for squareness by measuring diagonally from the plumb line marks to the opposite outside corner locations. The measurements should be the same. With the corner post locations determined, run a string line from corner post to corner post and mark the locations of the other three posts.

CONSTRUCTION

The posts can be set on and anchored to concrete piers poured in holes in the ground. Or you may be able to utilize pre-cast piers. Another method is to set the posts in the concrete. In



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Build an Attached Carport



Once the post locations are determined, dig holes for the pressure-treated posts. Make sure the posts are plumb, then brace in place with temporary 2x4 braces. Pour concrete around the posts. Add water. Then tamp the dampened concrete material solidly around the posts.

this case, pressure-treated posts must be used. Again, check with local building authorities as to methods suitable for your area. Regardless of the method of erecting the posts, make sure they are positioned correctly to create a square construction, again checking with a string and the triangular method. Also make sure the posts are plumb, bracing them in two directions with temporary stakes and 2x4 braces.

With a helper, hold an end board (rafter) up against the existing house wall and against the end of the support header. Determine the location of the end rafter on the end post, as per pitch or outer roof height needed. Mark the rafter bottom edge loca-

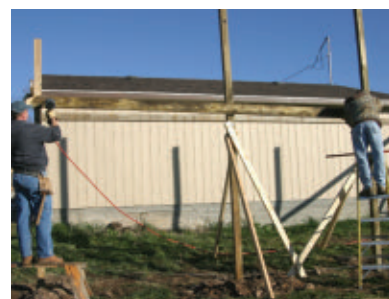


Once the posts have been allowed to set, install the two end boards, actually the outer rafters. With a helper, hold the boards up in place and determine the pitch, and/or outer roof height. Mark the outer roof height (bottom of the rafter) on the end posts. Mark the angle of the rafter end as it rests against the header and existing building wall.

Doubled front beams support the outer ends of the rafters.

tion on the end post. Also mark the angle of the end of the rafter against the existing building; it must be cut so it will fit snugly against the building wall. Measure for rafter length, allowing for overhang, and cut the angle. Cut the same angle on the outer end of the rafter as well. Repeat for the opposite end of the building. Then use one of the cut rafters as a pattern to cut the remaining rafters.

Fasten the front support beam in place to the posts, locating it below the rafter bottom edge line marked on the posts. This beam is actually made up of three 12-ft. lengths on the building shown. Make sure the beams are level. Locate the positions of the rafters

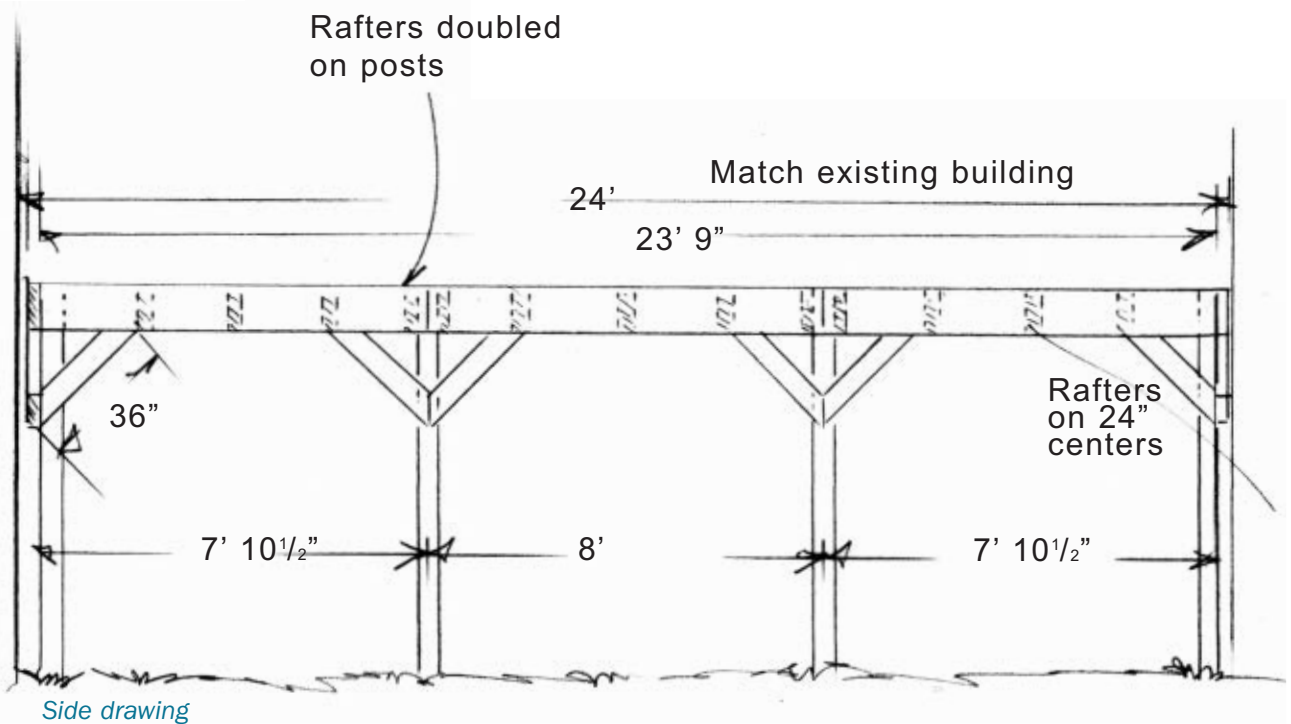
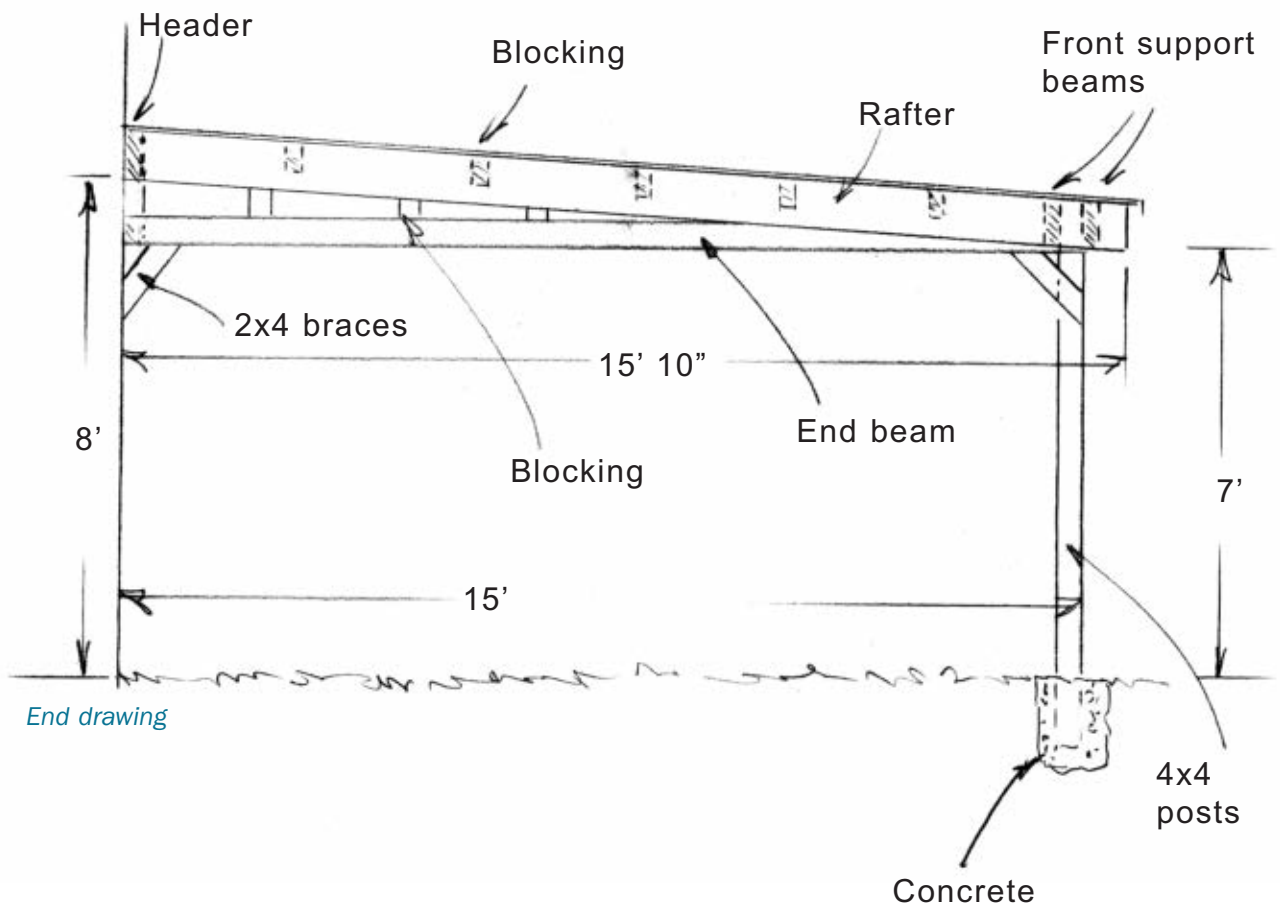


on the header and fasten joist hangers in place. Fasten the rafters in place in the joist hangers with their outer ends resting on the outer support beams.

Fasten the opposite end of the rafters to the support beams with metal hurricane bracing plates. Cut the post tops level with the rafters. Fasten a second inner support beam up against the bottom edges of the rafters and to the inside of the posts. Cut the end support beams. Note the outer end may have to be cut at an angle to fit under the rafter,

TOOLS & SUPPLIES

- Support posts, 4 x 4" x 10', 5 req'd.
- Headers, 2 x 8" x 12', 2 req'd.
- Joists, 2 x 6" x 16', 17 req'd.
- Front beams, 2 x 6" x 12', 4 req'd.
- End beams, 2 x 8" x 16', 2 req'd.
- Front braces, 2 x 6" x 3', 8 req'd.
- Side braces, 2 x 4 x 12", cut to fit, 4 req'd.
- Blocking, 2 x 4" x 16", cut to fit between rafters, 80 req'd.
- Roofing of choice, 16 x 24'



Build an Attached Carport



Position the outer front beam on the mark at the end posts and fasten in place to the next posts. Make sure the end boards are level.

depending on roof height and pitch. The existing building end must be fastened to a block anchored to the existing wall. The outer end is fastened to the post and/or rafters. Cut blocking pieces to fit between the end rafters and the end support



Attach joist hangers to the support header to hold the ends of the rafters.

beams. Fasten in place on 24-in. centers by toenailing one end, or use angle braces.

Next, cut and install the braces. The front braces have a 45-deg. angle on both ends. The end braces are best cut by first cutting the bottom 45-deg. angle,

positioning a brace in place and marking the top angle to fit the end beam. With the end braces in place, cut and install siding over the ends. You may also wish to add trim around the ends to match the existing building. A fascia board is fastened to the front



Cut the rafters to length and cut the angle on the building end to match the angle of the building support header. Cut the opposite end at the same angle and then fasten the ends into the joist hangers.

An inside header provides additional support. Blocking between the rafters provides nailing support for the metal roof.



Attach the outer ends of the rafters down on the top plate with metal hurricane braces.

of the rafter ends to finish off the outer end.

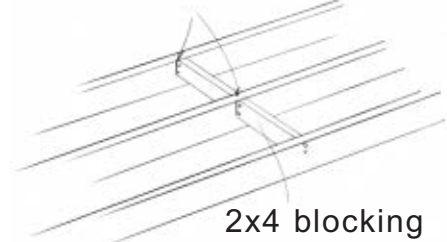
The building shown was covered with metal roofing. The roofing is brown to match the shingles on the existing building. Other choices include a variety of polycarbonate materials, such as SunTuf. A gravel, or better yet, concrete floor can add to the usefulness of the carport. **EHT**



Fasten the angle braces to the posts and underside of the outer header. Then fasten the metal roofing in place.



Toe nail



2x4 blocking

Metal roof

Fascia

Rafters

The outer fascia is added to the ends of the rafters.

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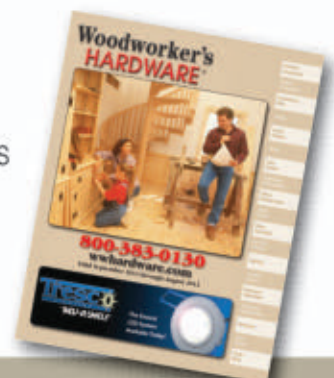
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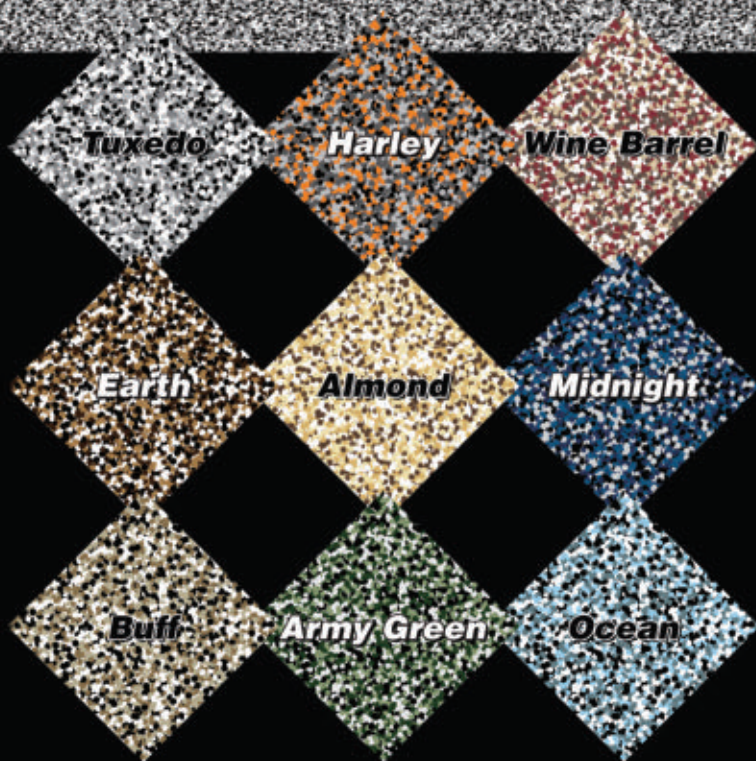
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Easily installed in metal garage doors for a more comfortable work environment in the garage, Garage Door Insulation Kits from Energy Efficient Solutions consist of foam garage-door panels that can drop garage temperatures by 15 to 20 degrees in the summer.

The expanded polystyrene panels do not sag or fall out like the fiberglass-type garage door kits, and they also come with a high-impact protective coating for a finish that is clean and aesthetically pleasing. One kit fits single-car garage doors up to 9 ft. wide, or purchase two kits for double-car garage doors up to 18 ft. wide. Visit www.energyefficientsolutions.com.



LITTLE GIANT XTREME

The Little Giant Xtreme is the latest version of the company's flagship Type 1A multi-ladder. By articulating like an A-frame and extending for greater reach, it can serve as an A-frame ladder, an extension ladder, scaffolding or a 90-degree ladder (for working near walls). And by adjusting the length of each side independently, a multipurpose ladder can also provide access over uneven ground such as a staircase. The Xtreme's redesigned Rock Lock pin system makes height adjustments quick and easy with the simple push of a couple of levers.



The rungs of the ladder are 50-percent wider for better foot support, and the new MAG4 hinge of the ladder locks four pins into place, instead of the former two, for unprecedented strength. Additionally, the new AirDeck accessory functions as a support bar and unfolds into a work surface with a magnetic tray. Visit www.littlegiantladders.com.

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MODULINE CABINETS

Originally designed for the automobile racing industry, Moduline Cabinets are high-quality modular aluminum storage and tool cabinets designed and manufactured in the United States. Featuring a sleek, modern design that will complement most any décor, they include full ball-bearing slides on the drawers, double wall door construction, and each cabinet has its own sealed and anodized frame, allowing each piece to stand alone. With almost endless configurations, Moduline cabinets are designed to adapt with your changing storage requirements. Visit www.modulinecabinets.com.

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storage weight capacity options of 450, 750 or 900 lbs. and measures from 60- to 72-in. tall. Visit www.space-trac.com.





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WERNER 3-PIECE COMPACT EXTENSION LADDER

The new Werner 3-piece Aluminum Extension Ladder is a 16-ft. extension ladder that collapses to an easy-to-manage 6 feet. When collapsed it fits around corners, through doors, in elevators and through narrow stairwells. The closed ladder

easily fits into an average pickup truck bed without the need to strap it to the roof or flag it from the rear. The ladder's travel mode also stores easily in tight spaces, providing the same reach as a standard extension ladder, but in a compact design. In the extended position, more overlapping rung locations provide a more comfortable working platform. Visit www.wernerladder.com.



GLADIATOR CHILLERATOR

The new Chillerator Garage Refrigerator from Gladiator GarageWorks has a stainless steel finish for a sleek, bold look. Engineered by appliance leader Whirlpool Corporation, this Energy Star-qualified refrigerator eliminates condensation during the summer and prevents freezing in the winter months, while using less energy than a 40-watt light bulb. Locking casters allow you to roll it wherever you want and set it in place with no hassle. With 19 cu. ft. of storage space (14 cu. ft. refrigerator, 5 cu. ft. freezer), you can grab a snack or your favorite beverage right in your garage. Visit www.gladiatorgarageworks.com.

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Shock and Awe

Installing a Performance Coilover Suspension System



By Larry Walton

Suspension systems are a classic example of how we end up with certain equipment on our stock vehicles. It's all about compromise. With suspension the compromise is often between ride and performance. Generally, a car that handles corners well with a minimum of body roll is also a rough ride. Since the average consumer would rather be comfortable than take a corner at speed, the suspension is designed to favor ride comfort.

Other suspension compromises are price related. Quality costs. Lighter and stronger materials are more expensive. Adjustable suspension components have more parts, which makes them less

cost-effective for the manufacturer.

At the same time, closer tolerances require more time and specialized equipment, which also comes with a price tag. Most car manufacturers watch costs-per-vehicle like a hawk watches a mouse ambling across a field; if a cost for a part can be reduced while keeping the average buyer happy, cost wins.

Companies like Subaru, however, are the exception to that rule. They do offer multiple levels of performance in their car models and price them accordingly. Subaru's Impreza line has a base model, a sportier WRX and a STi version. The WRX handles better than the base model, but for

another \$10k over the WRX price you can buy a WRX STi, which comes with a number of performance upgrades.

For enthusiasts who can't afford the race version, or who want more control over performance components like suspension, buying a base model and adding aftermarket parts makes a lot of sense. Subaru in particular can be a good choice because OEM components from the various model levels can be quite interchangeable, and several specialty companies make performance aftermarket parts that fit the Impreza.

Upgrading the coilover suspension is one way enthusiasts improve the handling characteristics of their cars. Coilover is short for "coil spring over shock absorber."

These aftermarket upgrades lower the ride height and reduce body roll for more precise cornering. Many allow for adjustments in height, suspension dampening, and wheel camber—handling turning areas not available with stock strut systems.

Smaller overall coil spring diameters can also make more room for wider wheels with greater offset to fit wider tires inside the fenders.

ONLY THE BEGINNING

Before ordering suspension parts for your car, make sure you understand that you will be giving up some ride characteristics that the very smart engineers put into the car originally.

Also, the old domino theory applies here; one thing tends to lead to another when modifying

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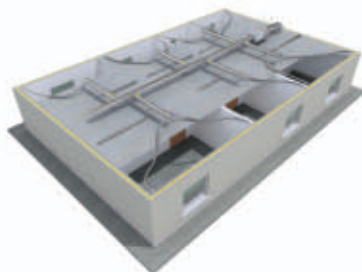
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your car. For optimal results, coilovers need a new wheel and tire combination because increased cornering speeds require a speed-rated tire with lower profile side walls. Strut tower braces and anti-sway bars also add stiffness to the setup.

Suspension changes also affect alignment, so the car will need to be taken to a shop with the proper calibrating equipment to make sure those new tires don't go south in the first month your car is back on the street.

We recently did a home-garage installation of a set of aftermarket coilovers on a 1993 Subaru Impreza wagon. This Impreza is also receiving a high-performance engine, bigger brakes and more suspension parts. Here's how we installed the initial coilover suspension:



1: We used a set of four previously raced Tein coilovers to make the suspension change.



2: Break lug nuts loose while the tires are still on the ground.



3: Chock the rear wheels and jack up the front of the car by aligning a floor jack with the jack plate just behind the oil pan in the center of the car. Place properly rated jack stands at the jacking points on the outer rails on both sides of the car.



4: Jack up the rear of the car by aligning a floor jack with the rear differential. Place jack stands on both sides of the rear of the car in the designated positions.



5: Remove the lug nuts and remove all four wheels.



6: At the front, break loose the nuts holding the stock struts to the spindle assembly.



7: Remove the nuts and bolts from the lower end of the struts.



8: Remove the nuts from the top of the strut towers inside the engine bay.



9: Locate the brake line bracket near the back at the bottom of the strut.



10: Use a hacksaw to carefully cut the bracket level with the top of the brake line.



11: Use pliers to bend the bracket back enough to allow the brake line to clear.



12: Remove the brake line from the bracket on the stock strut.



13. Remove the stock strut.



14: Check the label on the coilover components to make sure you have the correct one for each corner of the car. In this case "GC8" denotes the model of car while "FR" indicates front right.



15: Feed the coilover up through the strut tower opening and start a nut on each bolt.



16: Align the mounting holes on the coilover with those on the spindle assembly.



17: A floor jack placed under the A-arm can help in aligning the bolt holes.



18: With bolts in place, crank down the nuts with a socket while holding the bolt heads with a box-end wrench.



19: Put the brake line in position on the bracket and slide the retainers into place. Tap the retainer clip into position using a hammer.



20: Go back to the top of the strut tower and finish tightening the nuts.

21: Reinstall the wheels and tires. Remove the car from the jack stands in reverse order of how you started (back first, jack at rear dif; then front, jack at jack plate). Use a torque wrench to tighten the lug nuts to the manufacturer's recommended torque setting. Bring all of the nuts partially to spec while using a cross pattern to avoid tightening adjacent nuts without first torquing a nut across the wheel. Check for tire clearance inside the fenders. Have the alignment checked and adjusted immediately. **EHT**

Making PVC Connections

Joining the Most Popular Piping



By Matt Weber

PVC pipe is dual rated for both DWV and pressure applications.

EASY INSTALLATION

Another nice characteristic of PVC piping is that it's easy to install and well within the grasp of a do-it-yourselfer. The following steps detail the process of connecting PVC pipe joints.



Measure. The ends of PVC piping will slide inside the pipe fittings up to the shoulder of the fitting. For this reason, when measuring the pipe, always measure the distance between the shoulders of the fittings at each end, and transfer this measurement to the pipe.



Cut. Make the cut as straight and square as possible. The cuts can be made with a standard hacksaw. In the photo I'm using a pipe-cutting recip saw from Porter-Cable.

PVC is everywhere. Polyvinyl Chloride (PVC) is the most commonly used plastic piping material. It's corrosion-resistant, cost-effective and promises a long service life. It can be used underground or can even be used outdoors if the pipe contains stabilizers and UV inhibitors and is painted with a water-based latex paint. PVC materials are also resistant to ordinary chemicals such as acids, bases, salts and oxidants. PVC pipe is made to conform to various ASTM standards for both pressurized and non-pressure applications, including drain-waste-vent (DWV) applications, sewer hookups, water service, irrigation and conduit.

COLOR CODED

PVC piping system components can be manufactured in a variety of colors, which makes it easy to identify the piping for its intended application. According to the Plastic Pipe and Fittings Association, a common color scheme (although not universal) is:

- White for DWV and some low pressure applications.
- White, blue and gray for cold water piping.
- Green for sewer service.
- Dark gray for industrial pressure applications.

However, this color scheme has an exception: Much of the white

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Distributor Inquiries are also Welcome



De-burr. Use a utility knife or file to remove burrs from inside the pipe joint.



Clean. To ensure good adhesion and a strong, leak-free joint, I use a fine-grit sandpaper to lightly scuff the ends of the PVC to remove the sheen and clean away any dirt. Then I wipe with a clean rag to remove any traces of dust.



Dry-fit. Assemble the components to make sure everything is

the correct length. The orientation of certain fittings, such as elbows, is critical to the plumbing system's design. Make directional reference marks on the mating pieces for easy realignment during final assembly. Also, mark the depth of pipe that will be concealed by the fitting to guide where to apply the primer and PVC cement.



Required. Making the connections requires PVC/CPVC Primer as well as PVC cement. The cans of product usually include an applicator brush in the cap.



Prime. Apply PVC primer around the entire end of the pipe, as well as to the inside of the fitting. The primer temporarily softens a thin layer of the PVC material, which allows the PVC cement to create a strong, leak-free bond between the pipe and fitting.



Cement. Next, brush PVC cement over the pipe end and inside the fitting, completely covering the contact surfaces of the joint.



Connect. Slide the pipe into the fitting until it presses firmly against the shoulder. Give the pipe or fitting a 1/4-in. turn to spread the adhesive and make sure it completely seals the joint. Make sure your reference marks on the pipe and fitting are properly aligned. Hold the joint for at least 30 seconds as the cement cures. **EHT**

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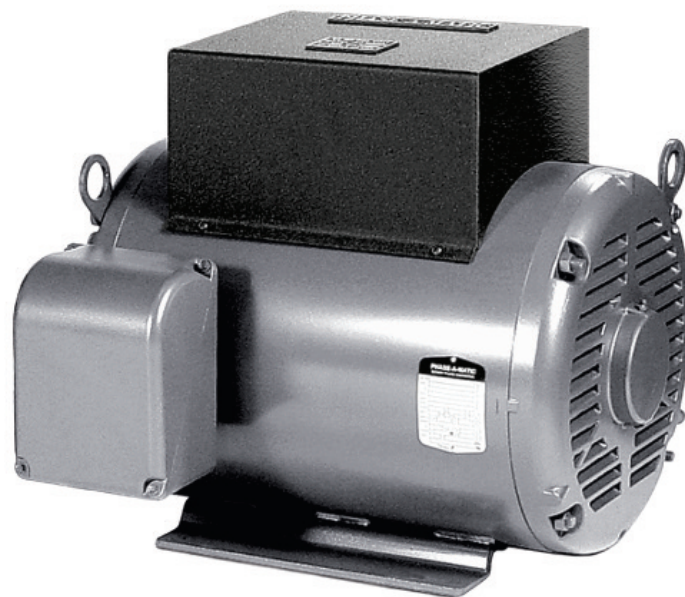
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