Dress Up a Garage With Insulated Carriage Doors

These custom doors add energy efficiency and style

BY THE *FINE HOMEBUILDING* STAFF

FHB's PROJECTHOUSE

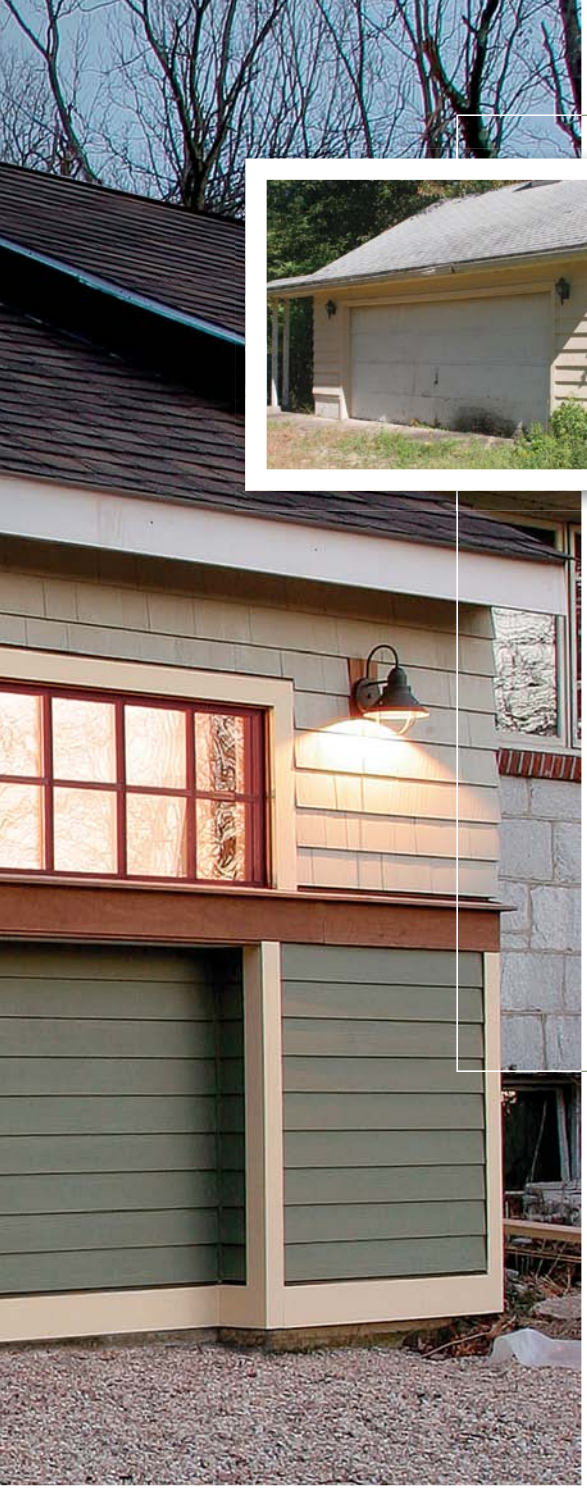
Like a lot of garages, the two-car garage at our Project House is used for storage and workshop space rather than for parking. The original overhead door was uninsulated and leaky. It was also a pain to open and close when entering or exiting the shop. Instead of installing a new overhead door, we built a set of carriage doors that improve the utility of the workshop, keep cold winter air at bay, and enhance the look of the house.

Here, we will show you how to build doors so that they won't warp, how to insulate and air-seal them, and how to finish them with attractive, low-maintenance materials.

A frame that won't warp

Wood doors are notoriously unstable. Solid-wood rails and stiles can expand and contract considerably throughout the year and push a door out of alignment. A warped door looks bad and can be difficult to operate. Just as important, though, a warped door won't seal properly against the weatherstripping along the length of each door jamb, which will lead to air leakage and energy losses.

"Before" photo and drawing facing page: Charles Miller



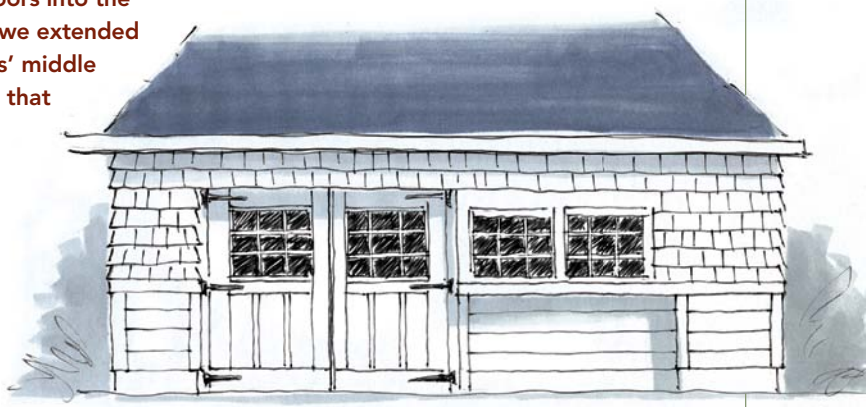
design notes

ADDRESS THE WHOLE FACADE

Replacing a garage door with carriage doors can look awkward if the rough opening isn't dealt with properly, especially if you're replacing a two-car garage door with a single pair of carriage doors. We could have built the doors simply to fit the existing rough opening where the old door stood. We would have been left with the visual imprint of the old 8-ft. by 16-ft. rough opening, and the carriage doors always would have looked like an afterthought.

To make the carriage doors look like they'd always been there, we extended the horizontal windows of the doors into a bumped-out bay to their right. Pushed to the plane of the garage walls at the corners of the house, this bay breaks up the outline of the old garage-door opening. The bay windows echo the muntin pattern of the windows in the doors and let daylight into the shop.

To integrate the doors into the new facade further, we extended the line of the doors' middle rail to a water table that will wrap around the house. The meranti water table separates the fiber-cement lap siding from the painted cedar shingles that clad the upper walls.



Senior editor Justin Fink suggested that we construct the door frames with TimberStrand LSL engineered 2x4 studs, which cost nearly twice as much as sawn lumber. However, engineered lumber is less likely to twist, bow, or shrink over time. It's also dead straight, which makes door assembly easier.

Insulated and airtight

Because we plan to use the garage workshop year-round, we're spending a lot of time insulating and air-sealing the space so that it's warm in the winter and cool in the summer. We didn't want our energy-conscious approach to fall down at the doors.

The 1½-in. void between the plywood door skins is insulated with two layers of ¾-in. polyiso rigid foam, which has an insulation value of about R-9. We covered the insulated 2x4 frames with ¼-in. birch plywood on the interior surface and ½-in. CDX plywood on the front, which will help to increase the doors' strength and stability. Before applying the plywood skins, we laid a continuous bead of construction adhesive around the frame to prevent airflow through the doors.

To minimize leaks around the doors when they're closed, we weatherstripped the new door jamb with a kerf-in, polyethlyene-covered foam product that is both durable and relatively cheap—about 18¢ a foot. The small gap between the doors is also weatherstripped, as is the threshold.

Inexpensive window options

The default window option for carriage doors like these would be single-pane, true divided lites. If custom double-glazed insulated windows weren't so expensive, we would have considered them more seriously. Editor at large Chuck Miller, a bargain-bin building junkie, came up with a much better option. For around $40 each, Chuck found insulated double-glazed units at a local home center. The 36-in. by 22-in. windows, which come in vinyl frames, are sold as replacement units for entry doors. We bought four units, peeled the glazing out of the vinyl frames, and used them in the doors and in the bump-out next to the doors.

The windows are the most inexpensive option we found that would yield the performance we were looking for. Each piece of glass is held in its wood frame with interior and exterior stops. The exterior stops have grilles to simulate divided lites.

Low-maintenance finish materials

When it came to choosing materials to finish the doors, we had two major requirements: They had to look good, and they had to last a long time. We used meranti to construct the face frames, which we assembled with pocket screws and applied to the doors with 2½-in. TimberLok screws. Meranti, also

CARRIAGE DOORS, PIECE BY PIECE

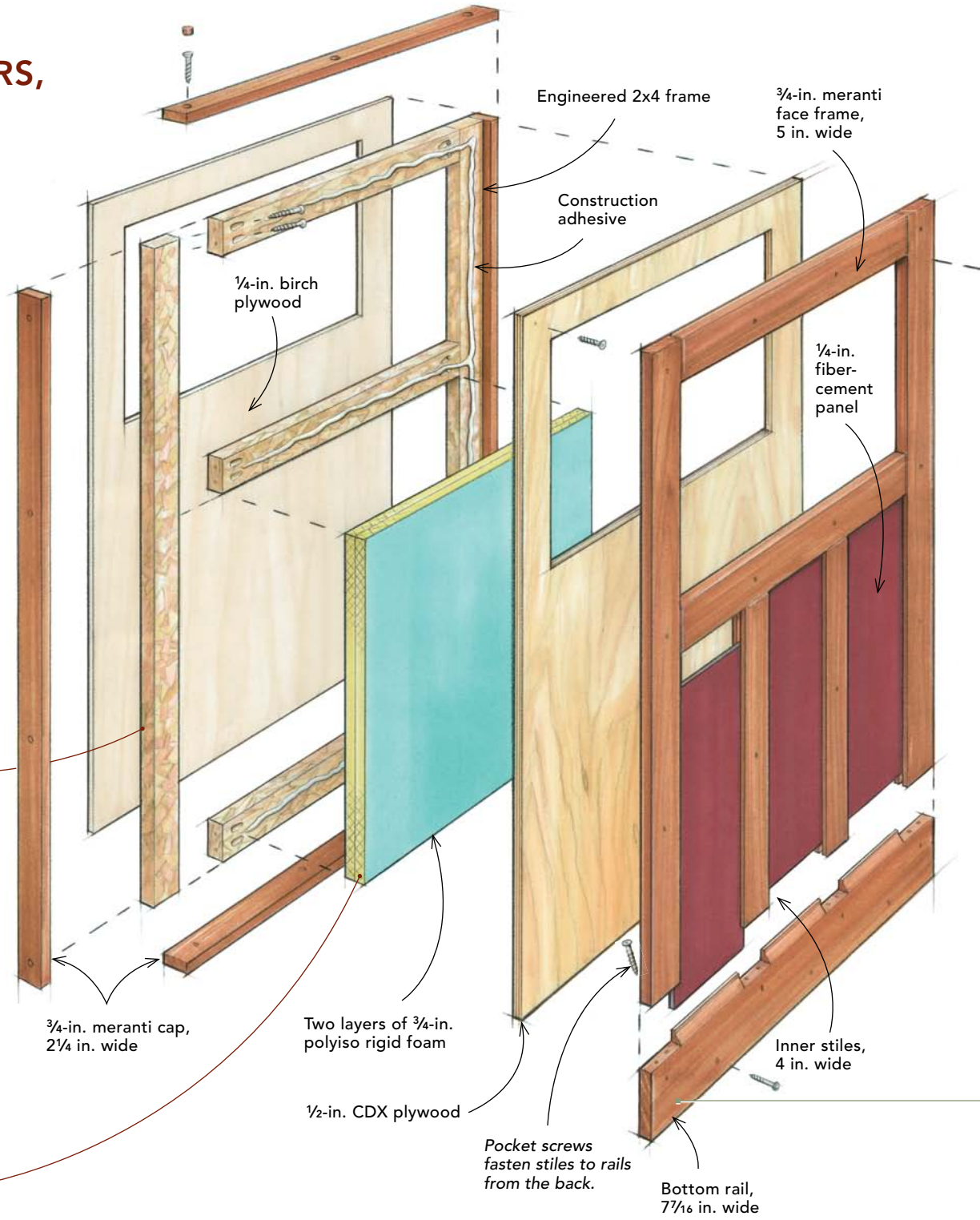
Material availability and construction simplicity are two areas of focus that informed much of the door design. These doors are built with materials commonly found at a local lumberyard and are assembled with basic carpentry tools and straightforward construction techniques.

Engineered lumber

Without the flaws of sawn lumber—such as knots, splits, and warpage—tight, accurate joinery is easily accomplished.

Rigid-foam insulation

Of the rigid-foam options, polyiso yields the highest R-value per inch. It's easily cut with a circular saw, but be sure to wear a dust mask or a respirator.



known as Philippine mahogany, is not quite as hard or as durable as true Honduras mahogany, but it's not as expensive, either. It's most often used as decking material and weathers to a silvery gray.

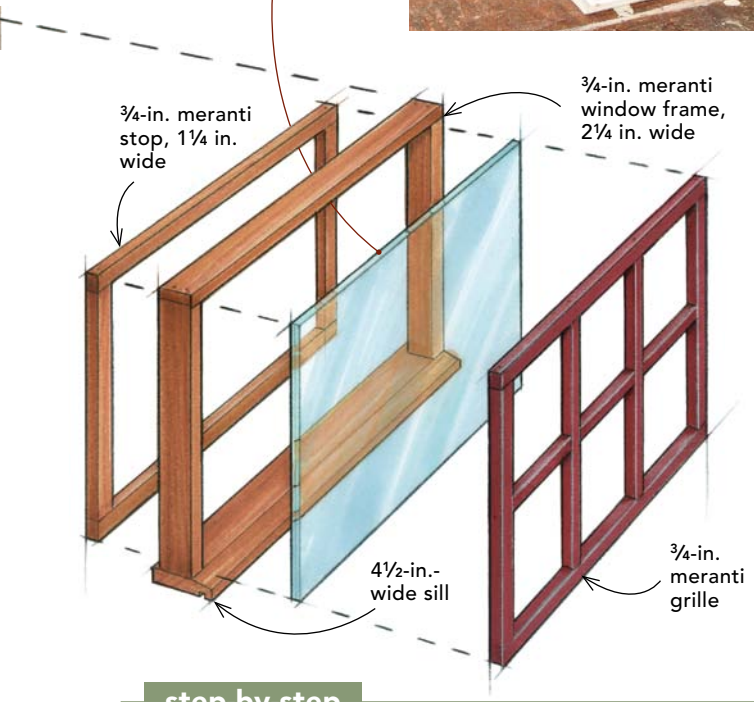
Originally, we thought about making the three panels on each door out of copper flashing stock that had its edges hemmed in a sheet-metal brake to increase its rigidity. We hoped the copper would develop a rich patina over time. However, senior editor Chuck Bickford wasn't convinced that they would stay in great shape for long. He feared that someone one day would hit the doors with a piece of material, and he didn't think the thin copper would hold up. Instead, we made the panels from ¼-in.-thick fiber-cement soffit material and painted them a deep barn red to match the window grilles. The panels float in grooves routed in the face frames and lap over the top of the bottom rail.

Durable hardware

These doors are not extremely heavy for their size, but they're not light, either. Hinge selection was critical to keep the doors plumb and level in the jamb.

Low-cost windows

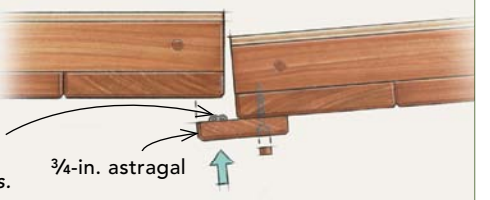
Insulated glazing is removed from its stock frame, placed in a shop-built meranti frame, and installed in the doors.



energy-smart details

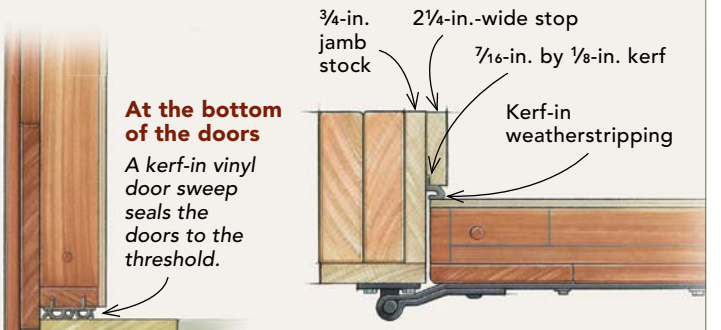
AIRTIGHT INSTALLATION

All the effort of creating airtight doors is wasted if they're not installed correctly. Three types of weatherstripping were used to keep cold air out of the shop and warm air in.



Where the doors meet

Self-adhesive rubber weatherstripping was applied to the back of an astragal that seals the gap between doors.



At the bottom of the doors

A kerf-in vinyl door sweep seals the doors to the threshold.

At the edge of the doors

Kerf-in polyethylene-covered foam weatherstripping was used along the top and sides of the door opening.

step-by-step

MILLING THE BOTTOM RAIL

Of all the door parts, the bottom rail on each door is the most involved to make. The stiles that divide the door panels are let in to the top of the bottom rail. The top of the bottom rail is also beveled along its outside edge and has a ⅛-in.-tall tongue milled into its back edge. This creates a lapped transition between rail and panel, and allows water to shed away from the door more easily.

Step 1: Cut the tongue. *With the rail placed against an auxiliary fence for stability, cut a ⅛-in.-deep groove ¼ in. from the rail's back edge.*

Step 2: Cut the bevel. *Place the rail face down on the sawtable with its bottom edge against the fence, and set the blade to 40°. Cut a bevel to the previously cut kerf.*

Step 3: Dado the stile locations. *Mark the position of each stile's outside edges along the top of each rail. Turn the rails upside down, clamp them together, and hold them against a fence attached to a miter gauge. Cut 9/16-in.-deep dadoes.*

We opted to hang our doors with strap hinges because we like the look. They're also strong and durable, and are relatively inexpensive. The 24-in. powder-coated hinges we bought from www.hardwaresource.com cost about $80 a pair. We hung the doors with three hinges to each side; they offer a combined weight rating of 225 lb. The pintle plates are lag-bolted through the door trim and into the king and jack studs. We could have through-bolted them, too.

One of our architect contributors once said that when considering materials for any building project, splurge on the items you touch and use most often. We did. We sourced a Williamsburg handle set from Baldwin that's designed for a 3-in.-thick door. The door on the left-hand side of the opening is secured from the inside with cane bolts mounted top and bottom; it remains fixed in place most of the time. On nice days or when we're moving materials and projects in and out of the shop, both doors can be swung open to create an easily navigable 8-ft.-wide doorway. □

Photos by Rob Yagid and drawings by Bob La Pointe, except where noted.