BY MATTHEW ANDERSON

Strapping Ceilings

When carpenters from other parts of the country come by one of our jobsites, one of the first questions they ask is, "What's that nailed to the ceiling joists?" When I answer, "Strapping," they then ask, "What is *that* for?"

The first few times I got these questions, I figured that these guys must not be real carpenters: How could they not know what strapping is? What I now know is that the Northeast is one of the few areas in the country where we strap our ceilings as a matter of course for every house we frame, regardless of the floor framing material. Strapping serves many purposes both for us as framers, as well as for many of the subs who follow.

ATTACHING THE DRYWALL

My understanding is that installing strapping originated from the need to create a flat surface for attaching the ceiling to the uneven hand-hewn timbers once used as structural framing members **(1)**. Carpenters shimmed the strapping down to the lowest point in the room and then attached the finish material. While we no longer need to shim the strapping to achieve a relatively flat ceiling, the board hangers that follow behind us appreciate a full 2 ½ inches to attach the board to rather than the 1½ inches provided by dimensional lumber. We can also easily add nailing along walls that run parallel to our strapping.

MAKING THE SUBS HAPPY

The trades that work in this area always appreciate strapping. Electricians can use the ¾-inch space to make long runs perpendicular to the floor joists without having to drill holes **(2)**. Strapping in existing ceilings also makes snaking wires much easier. Plumbers can also save labor by running their ½-inch PEX tubing below the joists; and they can use the strapping to support waste and vent pipes at the required pitch **(3)**.

If a room is being trimmed out with crown molding, we often add multiple rows of strapping along the

walls for the finish carpenters. Strapping can also provide extra nailing for coffered ceiling details.

Strapping makes it easier for us to install interior partitions **(4)**, too. Rather than adding attachment blocks between the joists above the walls, we just add a few lengths of strapping, running them one bay longer than the wall. This gives the framer and the board hanger plenty of nailing to which they can attach the walls and drywall. Instead of an upper wall plate, we use a length of strapping to make up the final ¾ inch of wall height. The thinner "top plate" also makes it easier to raise the partitions into place.

ADDING RIGIDITY TO THE FLOORS

Strapping can also add measurable strength to floor and ceiling systems. In two recent situations, engineers took our strapping into consideration to make a framing situation acceptable.

In the first, we used 11⅞-inch I-joists to frame a large 20-by-28-foot living room. The room had very little actual floor weight, a situation that often leads to unacceptable levels of floor vibration. With no finished ceiling in the basement below the living room, the long spans of joists can twist when loaded. The torsional flutter that is created increases a certain amount of perceived vibration in the floor. Strapping attached to the basement ceiling eliminated joist deflection and brought vibration to an acceptable level.

The second situation we experienced was a hip roof over an unfinished attic space. The builder didn't want to sheath the attic floor area, which raised concerns about racking for the engineer. When I told him we would be strapping the ceiling, he said that the strapping would perform the same function as the sheathing would have.

INSTALLING STRAPPING

We strap the ceilings after all ceiling and bearing-wall framing is finished. Working in teams of two, each carpenter begins by laying out an end of the room at 16 inches on-center. When the entire room is laid out, we snap chalk lines on the ceiling to ensure a straight and clean installation **(5)**.


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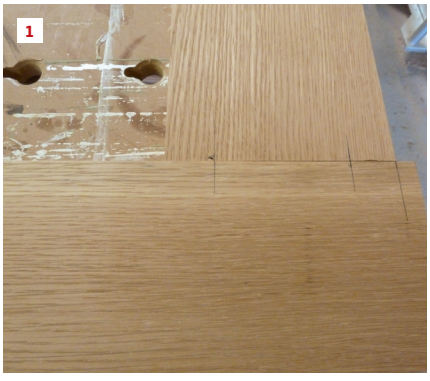
After snapping all of our lines, we lean lengths of strapping against the top plate at one end of the room. One carpenter then picks up a piece, places it on the line, and tacks it to a joist roughly in the middle of the length of strapping **(6)**. He moves across the room tacking all the strips in place, then nails the starting end of each piece **(7)**.

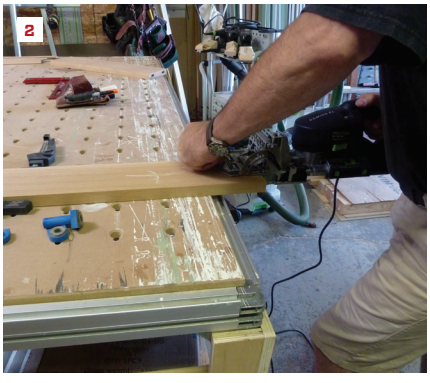
At the same time, his workmate saws the pieces to length in place, staggering the lengths between joists. For us, this method is faster than measuring and pre-cutting the pieces. After the cut ends are nailed up, the carpenters move across the room adding full lengths of strapping. Once all of the full-length pieces are tacked in place, one carpenter cuts finish pieces to length **(8)**, while his partner nails off the entire room with the nail gun **(9)**.

After the room is strapped, we nail in any additional pieces as needed at parallel walls or beams. We lay out partitions on the floor and shoot those locations on the ceiling with a laser. Then we add additional strapping at those locations.

Once you've mastered the installation process, strapping ceilings goes very quickly and easily. Because strapping is included in every framing job we do, it's tough to put an exact price on the additional material and labor, but the cost is not significant.

Matthew Anderson owns Anderson Framing & Remodeling Co., in East Sandwich, Mass.





Building a Wooden Storm Door

BY GREG BURNET

My company installs aluminum storm doors, but we also offer a more traditional alternative: fabricating and installing custom storm doors out of rot-resistant wood such as white oak or mahogany. A wooden storm door can add character to a newer home or restore character to a home that may originally have had a wooden door. Doors can be simple frames with rectangular screen panels, or they can have decorative grilles, as in the photo above, left.

BUILD THE DOOR FLAT

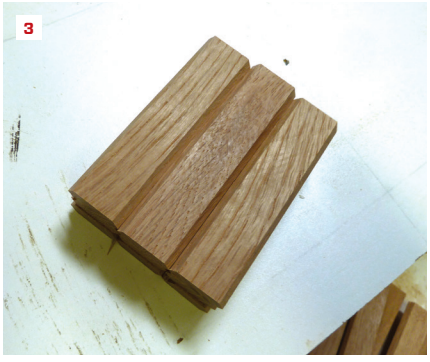
I made this door out of rift-sawn and quarter-sawn white oak, a strong, stable, and decay-resistant wood that's perfect for a door exposed to the weather. It also takes a finish well. I rough-cut the lengths I needed for the stiles and rails from rough-sawn stock and milled the stock down to a full inch thick. As I milled the lumber, I chose the best-looking faces for the exterior.

I cut the rails exactly to length using a miter saw set to 90°, but left the stiles long for the time being. I ripped a 15° bevel along the top edge of the bottom rail to help the rail shed water and to keep water from pooling in the joints between the stiles and the rails.

Doors must be constructed dead flat if they are going to fit and operate properly. This is particularly true for storm doors, which are usually made from thinner material than an exterior door and often have a simple rectangular frame that holds either a screen panel or a glazing panel. Without the structural elements of a typical door, careful joinery and assembly on a flat surface are essential for keeping everything in one plane.

My company does a lot of door work, so we designed a large, flat workbench specifically for building doors. If you don't have a flat assembly table that's big enough, you can make a torsion box for assembling the door. Many designs for one can found online—it's basically a large, flat box with an internal wooden grid that keeps the box perfectly flat. It can be placed on a table or on sawhorses to help ensure a flat glue-up.

Photos by Sue Burnet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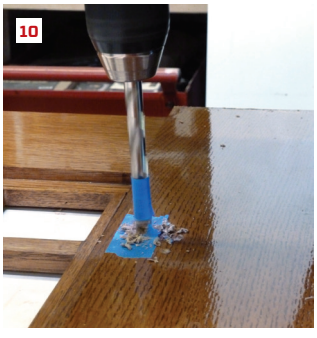
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MORTISE-&-TENON JOINTS

To reinforce the corners of the door where the stiles and rails joined, we used loose tenons that slipped into machined mortises. Mortises can be cut with a drill and chisel, a router, or a hollow-chisel mortiser, but we've found that using a Festool Domino Joiner is the fastest method. It's easy to set up, is portable, and it's simple to operate—perfect for this application.

The general rule of thumb for this type of joint is to make the tenon approximately one-third the thickness of the stock being joined. The 10mm Domino bit that I chose was slightly larger than that.

We laid the door parts flat on our bench and struck marks for the centerline of each tenon on the face of each intersecting stile and rail **(1)**. The marks also registered the Domino's fence to cut the mortise **(2)**.

In the past we've had good success with Festool's rot-resistant SIPO Domino tenons for exterior work, but it's easy and less expensive to make our own. For this door, we used left-over white-oak scraps to make tenons 10mm thick by 100mm long **(3)**. We used two tenons at each joint, which we've found to be strong enough for an average door. Machining the mortises using the Domino Joiner just took a few minutes, and then we quickly dry-fit the joints to make sure everything aligned properly.

THE GLUE-UP

Because storm doors are exterior doors, always use a waterproof glue, such as Gorilla Glue or Titebond III. We spread glue on all mating surfaces, including the tenons **(4)**, and placed the assembly on bar clamps at each end of the door. We tightened the clamps and added a second set of clamps on top of the door. Once those clamps were tight, we sighted down the length of the door to be sure that the top pair of clamps were dead parallel, which meant that the door was perfectly flat **(5)**.

We kept pressure on the joints for at least two to three hours. When we removed the clamps, we scraped off the glue squeeze-out using a stiff putty knife, and followed that with a light sanding. (Avoid wiping off the excess glue when it's still wet, which drives the glue into the wood pores and prevents that area from taking stain).

FINISHING THE DOOR

After removing the clamps, we sanded all surfaces of the door, starting with 100 grit and working up to 180.

Then we routed a ½-inch-wide rabbet around the inside of the frame **(6)**. This rabbet would receive the interchangeable screen and glazed panels, so its depth was dictated by the thickness of the aluminum channel that held the panels—about ⅜ inch in this case. To minimize chip-out along the rabbet's edges, we made the cut in several passes, taking away a small amount of stock at a time until the rabbet was complete. At that point we squared the corners with a sharp chisel **(7)**.

After a slight touch-up sanding, the frame was ready for finish. We stained the door and applied three coats of exterior varnish in the controlled environment of the

shop. We made certain to seal all surfaces of the door, knowing that we still needed to cut the door to fit after we get to the jobsite.

SCREEN & GLAZING PANELS

To facilitate easy installation and removal of the screen and storm panels, we used solid brass thumb screws and tabs to secure the panels in the rabbet **(8, 9)**. These thumb screws attached with a machined thread, so we first embedded solid brass threaded inserts in the door to accept the thumb screws.

Holes for the inserts were laid out and drilled, using tape on the drill bit to gauge a hole that would be slightly deeper than the length of the insert **(10)**. Threading the inserts into the hard white oak took a bit of patience and care, but we used a headless bolt chucked into a drill. The inserts were then threaded onto the bolt and held in place with hex nuts. With the drill on a low-speed setting, we carefully spun each insert into its hole **(11)**, taking care to drive them in perpendicular to the face of the door.

While this "combination" door was intended to mimic a traditional wood screen door, the screen and storm panels were interchangeable. The panels were made with extruded aluminum frames that hold either glass or screen. These extrusions are available from commercial glazing suppliers, as well as from some lumberyards and home centers (we used profiles from C.R. Laurence), and are easily cut using a hacksaw or miter saw fitted with a fine-tooth carbide blade. Friction-fit plastic corners from the manufacturer join the extrusions at a right angle to create the frame.

We measured and cut the lengths, then assembled the frame. The face of the screen extrusion has a groove that captures the screen with a spline that is pressed into the groove **(12)**. Because the owners of this house had a large dog, we fitted the frame with a heavier than normal fiberglass screen sold as "pet screen." The glazing extrusion is similar, except that a stepped rubber gasket inside the extrusion holds standard tempered glass securely **(13)**.

FITTING & HANGING THE DOOR

Storm door installation is generally straightforward if the door opening is fairly true and square. We measured the opening and made sure that both the width and height were uniform, then we trimmed the door to size using a track saw **(14)**. For an opening that is off, we would scribe the door to the opening and trim it to fit.

We hung the door on three butt hinges mortised into the edge of the slab and into the brick-mold door trim **(15)**; extra hinges can be added for larger doors. Because of the oak's density, we pre-drilled all screw holes. We drilled for and installed a traditional storm-door latch in the strike side of the door **(16)**, along with a heavy-duty pneumatic closer mounted on the bottom rail. Finally, we stained and varnished any bare wood that was exposed during the fitting process and inserted the screen panel to complete the installation.

Greg Burnet owns Chicago Window and Door Solutions and is a presenter at JLC Live.