Air-Sealed and On Piers

An up-in-the-air solution to sealing an elevated floor

BY TIM HOLTON

As a remodeling contractor, I often find myself with unique projects that take some outside-the-box thinking, and this job was no different. My customers wanted to add a 12-ft. by 16-ft. sunroom to the back of their home, and property lines, patios, gardens, and a septic system made it near impossible to get excavation equipment and concrete trucks to the location.

After some research and talking with inspectors and other respected contractors, I decided to build the addition on deck-style footings and a subframe of built-up pressure-treated beams. This is not the standard foundation for sunrooms in our area, but the pros greatly outweighed the cons in this situation. We were able to hand-dig each footing 42 in. deep and place 18-in. concrete forms in the holes, then wheel the concrete around from the driveway to fill the forms. By forgoing excavating machines and distributing the soil from the footing holes to the gardens, we minimized damage to the yard and surrounding areas.

Since the addition is a conditioned space without a crawlspace or base-

ment, we had to come up with a way to seal the floor from air and moisture. We placed a 6-mil polyethylene vapor barrier and stone on the ground under the floor system to help prevent ground moisture from wicking and diffusing up through the bottom. We kept the floor approximately 6 in. above our stone and vapor barrier to allow some airflow under the space.

That just left air-sealing. After many hours of figuring, we devised a way to build a standard floor, raise it up, sheathe and tape it, and lower it back down. We rented two manually operated material lifts, each with a 1000-lb. load capacity, from our local supplier and used them to raise up the floor frame. Once it was up at a comfortable working height, we could sheathe it from below—similar to hanging drywall on a ceiling, albeit nailed as in normal wall construction. Once the underside was sheathed and the seams were taped, we lowered the structure back into place, nailed it off, insulated it, sheathed the top side, and continued with our wall framing just as if we were building on a standard floor system. (We didn't tape the perimeter of the sheathing to the floor frame, but it wouldn't hurt to do so.)

To fully insulate the floor, we placed strips of 1½-in.-thick rigid foam in each joist bay and along the rim joists, and sealed the perimeter of the strips with spray foam. Fiberglass-batt insulation fills the remainder of the joist cavity, and ¾-in. AdvanTech subflooring caps the floor system. Wire mesh attached to the perimeter framing and buried 2 in. deep in the soil around the perimeter will help keep rodents out.

This method of construction is an unorthodox approach and presents some challenges, but on a tight site such as this, it can be a better and more cost-effective option than a traditional foundation. □

Tim Holton is a carpenter based in Cochranville, Pa. Photos by Matthew Millham.

BRACE AND LIFT

The floor system sits on a pressure-treated 2x foundation attached to concrete piers. We build a standard floor frame on top of that—but we don't nail it until we've lifted it and sheathed the bottom. This floor was small, so a couple of doubled-up 2x4 strongbacks secured with long structural screws into each joist were enough to hold its weight; for larger floors, calculate the load and size your strongbacks, screws, and lifts accordingly.

BUILD AND BRACE

Build a standard floor frame, then square it up and cross-brace with 2x material screwed to the tops of the joists. Center the lifts on both sides of the floor system to balance its weight.

PREPARE FOR LIFTOFF

Screw a pair of double 2x4 strongbacks over the lift's forks and into the floor framing. Blocking screwed to the floor frame can bridge large gaps between the strongbacks and the framing. Drill pilot holes to prevent splitting.

RAISE THE FLOOR

Crank the floor frame up to a comfortable height to sheathe it from beneath, keeping it close to level to evenly distribute the load between the lifts.

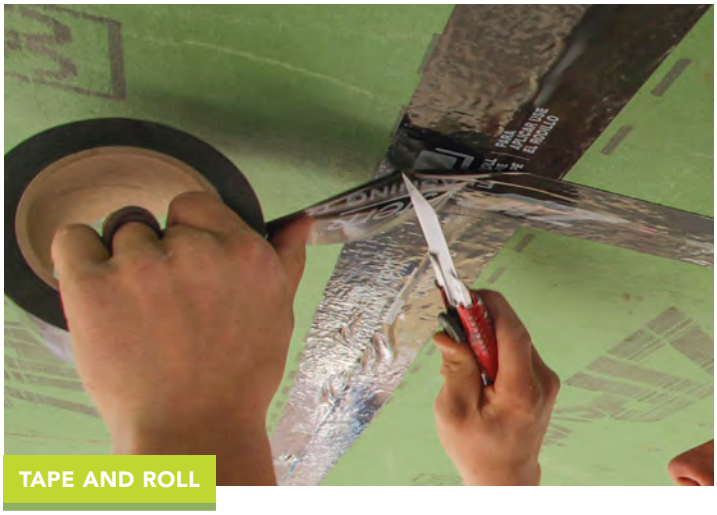
SEAL THE UNDERSIDE

STABILIZE FOR SAFETY

Nail 2x material to the four corners of the floor frame to stabilize it in place. The lifts have the weight; this adds a layer of safety and rigidity while sheathing it from below.

DOWNSIDE UP

For safety and accuracy, have at least two pairs of additional hands hold full sheets of sheathing tight to and in line with the floor framing. Fasten starting at one end of the panel and work across its length to prevent buckling.



TAPE AND ROLL

Tape the seams with high-quality flashing tape, and roll the tape with a J-roller to ensure good adhesion.

BRING 'ER DOWN

Lower the bottom-sealed floor back onto the foundation, making sure to keep it level to keep the load evenly distributed on the lifts.

NAIL IT OFF

Secure the floor frame to the foundation with 3-in. galvanized nails 12 in. o.c. and 4-in. structural screws 2 ft. o.c. Don't step on the sheathing when fastening to midspan beams below.

INSULATE AND CAP

RIP TO STRIPS

Use a track saw or tablesaw to cut rigid foam to fit in the bottom of the joist bays and up the inside faces of the rim joists.

SCORE AND SNAP

To quickly cross-cut rigid foam, use a utility knife to score it as deep as the blade will go, and snap it on a straight, hard edge.

FOAM THE GAPS

Use spray foam to fill any gaps around the perimeter of the rigid foam to close off potential thermal bypasses and bolster the air-seal.

FILL WITH BATTS

Fill the remainder of the framing cavities with additional insulation, like the R-19 kraft-faced batts used here, to maximize thermal performance.

HANG IT LONG

Install wall sheathing so it overhangs the full depth of the floor framing.

FINAL SEAL

Seal the wall sheathing to the PT foundation with flashing tape.