

FAST PRECAST Foundations

What would you think if a foundation contractor told you that he could install your foundation in less than two hours? You'd probably chalk it up to walking around too many job sites without a hard hat.

But sometimes, seeing is believing. This certainly was the case when I went down to southeastern Pennsylvania to watch the installation of a Superior Wall foundation system. Superior Walls of America, Ltd. (P.O. Box 427, Ephrata, PA 17522; 800/452-9255), manufactures a prefabricated foundation system consisting of steel-reinforced insulated concrete panels that are trucked to the site and set in place with a crane.

I was trained as a mason, and I've laid tens of thousands of concrete blocks in conventional foundations. When I first heard of the system, I have to admit I was a bit skeptical. But after watching a Superior Wall foundation go in, I'm convinced the company has a first-rate foundation system.

What's in a Wall?

The panels consist of 2x8 concrete studs, sheathed with a 1-inch layer of extruded polystyrene insulation board and covered with an exterior face shell of 2-inch concrete. At the top and bottom of the panels, the concrete studs and face shell are connected by concrete "wall plates" that serve as bond beams.

The panels are factory-cast using a 5,000-psi fiber-reinforced concrete, and are available in standard heights of 4, 8, and 10 feet in lengths up to 12 feet. The concrete studs are reinforced with a 3/8-inch ver-

This cost-competitive foundation system can be installed in less than a day





Figure 1. In areas where the panels will sit, the gravel is compacted with a vibratory plate compactor, then accurately leveled using a magnesium straightedge.



Figure 2. Half-inch bolts, inserted through cast recesses, fasten the panels together at the top and bottom plates (left). A bead of urethane sealant is applied to the butt joints, and after the panels are drawn up tight, the joint is caulked again on the interior and exterior (above).

tical bar on the interior (tension) side of the wall, and each bond beam is reinforced with two $\frac{3}{8}$ -inch bars.

Site Preparation

A perimeter drain is placed a foot or so outside the foundation footprint, and 6 inches of $\frac{1}{2}$ -inch crushed stone is spread over the entire basement area and leveled.

In the areas where the wall panels will sit, the gravel is compacted with a vibratory plate compactor and leveled to plus or minus $\frac{1}{4}$ inch. Using a transit, temporary wooden screed blocks are set in the gravel, and a magnesium straightedge is “sawn” back and forth to level the crushed stone (see Figure 1).

No Footing

Unlike conventional foundations, Superior Wall panels do not require concrete footings. Many builders flinch at the thought, but when typical residential wall loads are compared with average soil bearing capacities (2,500 pounds per square foot or higher), standard spread footings are generally oversized.

A poured concrete foundation often represents half of the total design weight of a house. Since an 8-foot-tall prefabricated panel weighs in at about 285 pounds per linear foot (less than a third of the weight of a 10-inch poured-in-place concrete wall), total house loads can be reduced by as much as 30%.

The panels are designed to support more than 4,000 pounds per linear foot, and point loads of up to $7\frac{1}{2}$ tons can be supported by tripled concrete studs. Beam pockets capable of supporting 10,000 pounds can be cast into the wall. The company reviews the builder's plans, and designs the panels to support the project's particular loading requirements.

Superior Wall panels have been approved for use in areas under the BOCA code. According to the company, over 15,000 foundations have been installed, and there has been no structural failure attributed to the design or manufacture of the system.

Assembling the Panels

Lifting pockets are cast into each panel, and specially designed nylon straps are looped over the crane's spreader bar to pick up each panel. Panels are bolted together at the top and bottom with $\frac{1}{2}$ -inch galvanized machine bolts inserted through precast recesses in the top and bottom plates (Figure 2).

To seal the joint, a bead of high-quality urethane caulk is applied to the panels just before they're butted together. After the panel bolts are drawn up tight, two additional beads of caulk are run on the exterior and interior of the joint. Outside corners are cast as miter joints, and bolted together and sealed in the same manner as butt joints.

In most cases, the concrete slab is poured before backfilling. The slab acts as a brace, preventing the bottom of the panels from kicking in as the foundation is backfilled. In areas where there will be no slab (a crawlspace, for example), 2x6 diagonal bracing is fastened to the bottom of the foundation panel and tied into the floor joist system above.

The company claims that no additional waterproofing treatment is needed. By preparing the site so groundwater is readily diverted from the foundation, moisture problems are avoided. If I were building in an area with a high water table, I'd still apply a foundation coating or membrane, and use a granular backfill material.

Interior Finish

If the house plans include a finished basement, these precast panels offer a number of advantages over poured or block foundations. The rigid foam that is built into the panels is rated at R-5, and when 5½-inch-thick fiberglass batts are installed in the stud cavities, the R-value climbs to around 25. The interior edge of the concrete studs is fitted with a treated 1x2 that serves as a nail base for interior wall finishes. The studs are also cast with a series of 1-inch holes for routing electrical wiring.

Unusual Conditions

Window openings are framed with treated lumber at the manufacturing plant. A full concrete stud is positioned at each jamb, and a 2x8 treated box forms the rough opening for the window (Figure 3). Doorways are framed in the same manner. To preserve panel strength, the lower bond beam is never cut at a door opening. This is not a problem, since the floor slab finishes out higher than the bond beam.

To accommodate masonry veneers, haunches projecting up to 6 inches are cast into the panels. Stone veneers up to 8 inches thick can easily be supported. These haunches are also used to support precast frost walls (an intersecting garage wall, for example) that tie into a full-height foundation (Figure 4).

Cost-Competitive System

The cost of the precast panels compares favorably to conventional foundations. According to David



Figure 3. Window openings are framed with treated 2x8s. Sizes and location must be specified when the panels are ordered.



Figure 4. Precast haunches support frost walls that tie into full-height foundation walls. Continuous haunches can support masonry veneers.

Weaver, who installs Superior Wall panels, the average installed cost for 8-foot-high wall panels is \$36 per linear foot within 20 miles of the plant. An 8-foot poured wall costs about \$38 per linear foot in my area (not including footings).

Compared with poured concrete or block foundations, interior finishing costs are also much lower for the Superior precast panels. Dave Stoltzfus, of Elverson, Pa., has built over 200 homes using the panels, and realizes savings of up to 15% when finishing costs are factored into the cost equation.

Freight on Board

Trucking costs for the precast panels start to become prohibitive when the job site is located more than 200 miles from the plant. Currently, there are 14 plants manufacturing Superior Wall panels in New York, Iowa, Pennsylvania, Minnesota, and South Carolina. Manufacturers must be licensed; direct inquiries to Superior Walls of America at 800/452-9255.

Seeing is believing. The foundation I watched being installed took about 90 minutes to set in place. Had the framers been there, they could have started setting sill plates before the crane pulled out.



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