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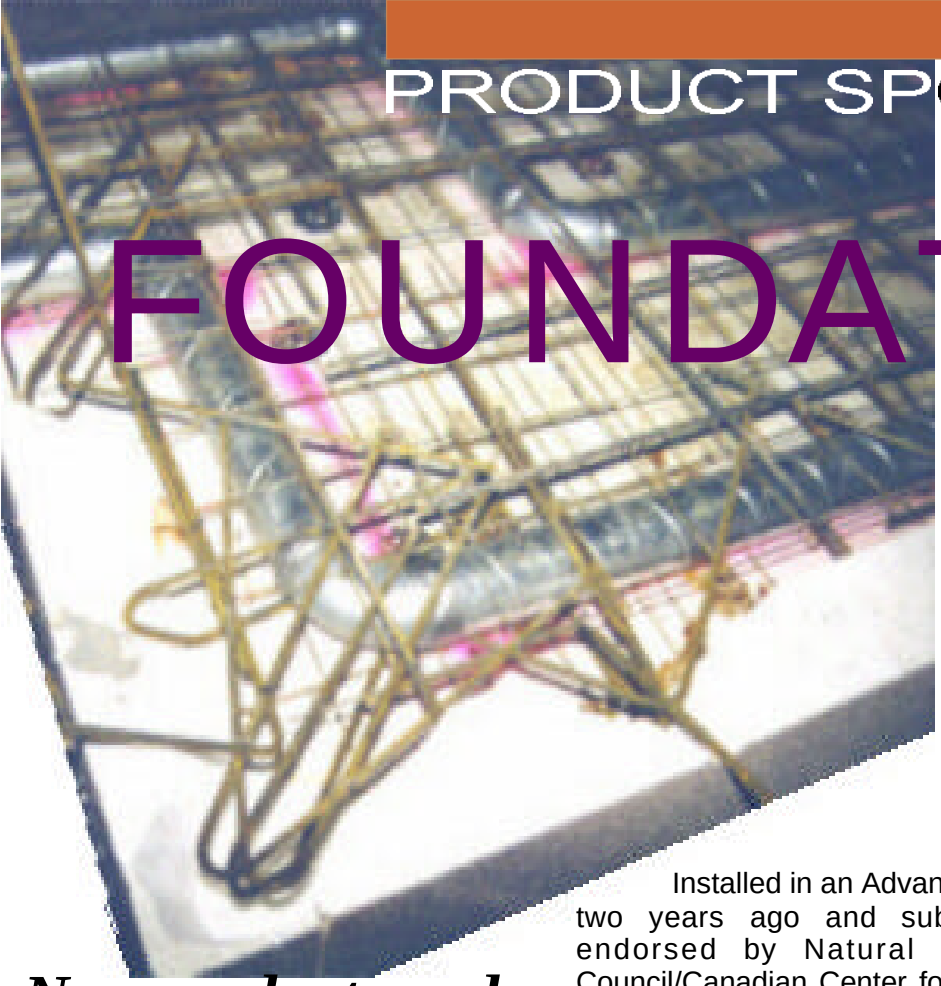

FOUNDATIONS

Think Inno-vations

New products and techniques can deliver dry, solid foundations—but a Code change is also a possibility.

When the great Ontario ice storm of 1998 cut the power in the Cornwall home of **SCOTT PERRY** it took a week for the electrically-heated home to drop from 72 degrees F to 67 degrees. The reason: the concrete slab beneath the 2,500-square-foot house was equipped with a novel air-heated foundation that has the heating source and ducts built right in.

"The system turns the concrete slab into a giant heat trap," explains Perry, vice-president of **Legalett Canada Inc.**, of Long Sault, Ontario. The Legalett system has been around for eight years, but it is only in the past 18 months that Canadian home builders have really begun to use it, Perry says.

Installed in an Advanced House two years ago and subsequently endorsed by Natural Research Council/Canadian Center for materials of Construction, the Legalett system is designed to be used in slab-on-grade construction. It incorporates a heating system that is cast right into the foundation slab, consisting of 100 mm spiral ducts, an energy source (electric, or from an oil/natural gas fired boiler/hot water tank) and a fan which distributes the heat through the floor to the house. The foundation is insulated with expanded polystyrene (EPS) insulation board with reinforcing mesh top and bottom.

According to builders who have used the system, a big advantage is it allows colder-weather concrete pours and a warm floor to work on while the house is completed. The system also helps with curing of the concrete.

Legalett is an example of the innovation that has been driving the foundation industry for the past few years—spurring new technology and techniques into the mainstream of home building.

Insulated concrete forms, for instance, once a novelty, have now grabbed a healthy share of new home foundations.

There are different types of insulated concrete pre-form methods. Some are comprised of EPS panels with metal ties that space the panels apart and act as anchors for the rebar. Filled with concrete, these systems deliver R-16 to R-20 insulation. The other system uses expanded polystyrene blocks which have an interlocking design that allows the blocks to snap and stack together and often incorporate reinforcement bars within the panels.

Polystyrene forms can be easily cut to create arched or curved walls. Most of the form systems have built-in "studs" so interior and exterior finishings, such as siding or drywall can be mounted. Installing electrical wires and outlets is easily done, either by routing or, in some systems, using pre-routed channels right in the forms.

A real advantage of the systems is that they combine insulation, framing and sheathing in one pass. The solid wall also acts as an air barrier and is fireproof. As well, since the forms are part of the finished structure, construction site waste is reduced.

Basement Framing

The use of pre-insulated, stay-in-place forms are being used by some builders to create full-height basement insulation. But **CONROY SCHELHAAS**, president

of **Wecan Construction** of Shakespeare, Ontario, says he has found success with a basement framing approach that creates full height insulation with conventional concrete walls.

What is the detail? Framing the basement walls before installing the main floor deck and before pouring the basement floor slab. The main detail used to achieve this, Schelhaas says, is a 2-inch-by-10-inch sole plate instead of a 2-inch-by-4-inch stud. "The framing layout is chalked out on the foundation as usual but, rather than installing the conventional sole plate on the sill gasket with anchor bolts, you lay out the 2x10 sole plate with the 2x4 basement wall plate, cut all basement utility studs to length, frame all the sections of wall and hang them on the foundation wall," he explains. The sill gasket is installed before hanging the sections of the wall. Anchor bolts and an exterior drainage layer are still installed as normal.

Prior to hanging the basement walls, all foundation walls are covered with tar paper from the footing to within 12 inches of the top of the wall. Two-and-a-half-inch widths of tar paper properly overlapped and fastened to the concrete with one-half-inch plywood blocks and concrete nails ensures good coverage for future water penetration, Schelhaas adds. "The basement wall cavity is able to breathe at the top and R-13 to R-20 installation may be installed between the studs." The basement walls can be blocked and fastened plumb anytime later. A 12-inch strip of poly is then stapled to the basement wall plate and you are ready for concrete.

Your basement wallplate forms your screed line, your poly barrier is in place and your floor header assembly is sealed to your basement wall assembly because you have used a 2x10 sole plate," Schelhaas explains. "When you pour your concrete floor you have already created a slip plane and expansion edge for your floor because you are pouring under the basement wall plate."

Any concrete wall will possibly crack over time, but Schelhaas says "let it crack." Just make sure you have addressed how water and moisture will get to the underside of your basement wall slab.

With this system, Schelhaas maintains, you can now go back to frame the basement walls and pour your basement floors at any time, even before framing the rest of the house".

Mandatory Mixtures?

Cracks are the focus of Building Code officials, who have traced "a large number of concrete foundation failures" to the use of excess water in concrete. On difficult sites, some contractors add extra water so the concrete can be poured in a single location and allowed to flow around the forms. The addition of water avoids the cost of superplasticizers or the use of pumps and cranes but, warns a report from Natural Resources Canada it also "produces a material off the chute that does not meet standard."

The Canadian Codes Centre of the Institute for Research in Construction is currently considering a Code change that would require the use of superplasticizers in all foundation concrete.

Admixtures such as plasticizers increase the slump of concrete and make placement easier without decreasing concrete strength. Many builders complain that mandatory admixtures would increase costs of foundations right across the board.

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A nation-wide study by the Canadian Codes Centre, however, claims the cost of adding superplasticizers would average only $290 per typical basement foundation, compared to $470 for a crane or pump. "We figure it would add at least $500 per house in our market," says **RICHARD STEWART**, communications director for **ParkLane Homes** of Burnaby, B.C. "This change makes all builders pay for the actions of a few."

The A48 Committee of industry and Code officials who are studying the proposal admit a decision is not expected for some time. "Don't hold your breath waiting for the Code change," says committee member **MICHAEL SHIRLAW** of the Canadian Portland Cement Association.

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