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# Built on Styrofoam

An Ottawa builder imports innovative Swedish technology that slashes costs and energy bills, writes **Kathryn Young**.

**T**he Bible recommends building your house on rock, rather than sand, but there's not one word in the good book about constructing on Styrofoam.

Nevertheless, that's what Kathleen Pickard and Arthur Ham are doing. Their two-storey, 2,600-square-foot custom home, weighing Lord knows how many tonnes, will rest on an engineered base of

expanded polystyrene — known commonly by the trade name Styrofoam, although in this case it's Plasti-Fab brand.

Won't it rot? Won't it chip away? Won't it compress?

"No," says builder Michael Martin, owner of Terridar Builders Inc., who recommended the Legalett slab foundation to the Pickard-Hams. The dense polystyrene gets covered by a thick pad of concrete, which

protects it from damage and spreads the weight of the house over a large area. "The compression is very, very minimal."

Legalett was invented in Sweden 27 years ago. Nearly half of all home construction there is on Legalett foundations, including some near the Arctic circle.

Legalett Canada began in 1994 and there are about 70 Legalett foundations here now, including the two that Mr. Martin built — a home in Kanata and the Sam Jakes Inn conference centre in Merrickville. The Pickard-Ham home is his third Legalett project since becoming certified to build them.

Married for 16 years with two

boys, 12-year-old Galen and 10-year-old Garnet, Ms. Pickard and Mr. Ham have slowly been planning their dream home through the experience of renovating their 101-year-old house. After buying property on the Ottawa River in the former West Carleton township, they began turning that dream home into reality during the past two years with architect Linda Chapman.

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**Powerful insulation:**  
Jeff Pappone looks at the latest technology, **I3**.



Kathleen Pickard and Arthur Ham's Ottawa River home will rest on an innovative Legalett slab foundation made of Styrofoam.

# Styrofoam: Building on slab cheaper than blasting rock

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When they received the initial building cost estimates however, they gulped in disbelief at the bottom line. Mr. Martin, who had submitted one of the estimates, had ideas for reducing the cost. Legalett was one of them.

Building a slab foundation — even an engineered slab that also incorporates radiant-floor heating, like Legalett — is much cheaper than blasting a basement through rock. And that's why the Pickard-Hams went for it. They're saving \$15,000 with the Legalett construction over a regular basement — \$12,000 in the basement construction and about \$3,000 for the oak staircase that would have led to the lower level.

The first stage in laying a Legalett foundation is a thick layer of compacted stone. Then Mr. Martin and his building team laid out the perimeter of the house in pieces of dense Plasti-Fab-brand polystyrene set on edge.

"Essentially, it was like a puzzle — they did the outside edge first," explains Ms. Pickard.

Then they filled in the middle with 15-centimetre-thick pieces of polystyrene laid flat, forming the base of the house. Over the polystyrene, they laid a grid of welded wire mesh and then began the laborious task of laying down every pipe and conduit for the entire house, checking and rechecking that everything was exactly right, because there's no second chance with this kind of base. After another layer of wire mesh was laid over top and reinforcing rods around the perimeter, the cement trucks rolled in and covered everything with a 20-centimetre layer of concrete that will form the main floor of the house.

"If you forget it, it's not going in," says Mr. Ham. "You can't make a mistake. Everybody's been scrutinizing this very carefully because it is set in stone."

There were 10-centimetre-diameter silver ducts to circulate warm air in a closed-loop system to heat the floor, hot water pipes (with cold water pipes running under the polystyrene so the water doesn't get heated), a cleanout for the septic system, central vacuum pipes, electrical conduits and propane conduits. Around the raised polystyrene edge were



BRIGITTE BOUVIER, THE OTTAWA CITIZEN

**Arthur Ham trusts that his foundation is solid, but gets funny looks when he explains it's built from Styrofoam.**

triangular cuts fitted with rebar. The concrete filled in the gaps, and will support the weight of the exterior stone facing and the windows and doors.

"The plans are extremely detailed," says Mr. Martin.

Once the house is finished, the polystyrene edging will have two layers of cement-based parging over it to protect it from ultraviolet rays.

The furnace is a small box about 61-centimetre square that sits flush with the foundation and contains a water/air heat exchanger and fan to circulate the warm air through the ducts in the foundation. The Pickard-Hams opted for the hot water heating system, and will have a boiler to produce hot water, but electric heat is also a choice with Legalett. The second storey will also have radiant-floor heat, with the ducts strapped to the underside of the floor.

People question the system because there seems to be no frost protection, but there is an engineered heat loss, that is, they purposely leave gaps between the sheets of polystyrene

to let a controlled amount of heat leak out into the surrounding soil, preventing the soil underneath the house from freezing and heaving. The soil just around the edge of the house will not freeze either — the snow will melt out about five centimetres.

"It's very, very precise in the amount of heat loss," says Mr. Martin.

"We don't want to heat the city of Ottawa," adds Mr. Ham.

Mr. Martin says the building inspectors weren't quite sure what to make of this construction and even wanted to hold up the concrete pour while they satisfied themselves that all was in order, but they backed down. "This is a new construction technique. They were looking at it with dubious eyes."

While the Pickard-Hams trust that their foundation is solid, they get funny looks when they explain its construction.

"Our house is built on Styrofoam," says Ms. Pickard. "It still kind of freaks me out."

For more technical details, visit [www.legalett.ca](http://www.legalett.ca)