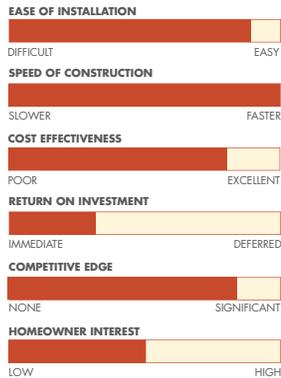


# A Winter of Content: Vermont Built Erects Home Envelope in Only Eight Days

## Builder's Experience



**Challenges:** Educating consumers.

**Would he do it again?** Yes

### PATH Attributes:

- Energy Efficiency
- Quality and Durability
- Safety and Disaster Mitigation

**Builder Tips:** "Be accurate with your measurements, and your foundation certainly has to be level and square. You can make adjustments on site, but it slows the process."

### Builder:

Paul Truax  
Vermont Built, Inc.  
Chester, Vermont

### Builder Type:

Small Custom Builder

### The Technology:

Panelized Wall and Roof System

### The Project:

Two-story, 2,400-square-foot home to serve as a model for the 25-site Chester Remington development community in Chester, Vermont.

*"We were faced with building a house in winter conditions. We had to get it enclosed before the severe weather arrived. Panelized construction made that possible."*

— Paul Truax

## PAUL TRUAX'S STORY

"There are many advantages to panelized construction, but the most obvious one is speedy on-site construction," says Paul Truax, one of the owners of Vermont Built.

That benefit was vividly clear in December 2005 when the company was racing to complete a model home in Chester, Vermont, before the worst of winter weather arrived. Once they laid the foundation, Truax and company were able to erect the building envelope of their model home in only eight days.

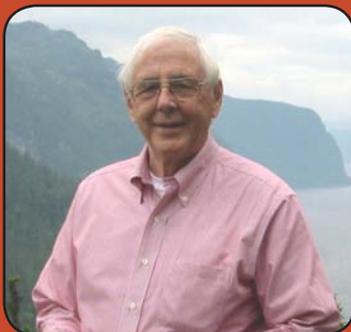
"Construction started on the two-story model on a Monday morning. By Monday afternoon, we had the first floor deck and first floor walls up, including interior walls, and temporary heat in the basement," he says. "Then by Tuesday, we had the second floor deck and the second floor



Vermont Built uses a six-man crew with a minimum of two men on the deck, one man on the truck hitching the chain, and one operating the crane. This allows the crew to set the walls for the first and second floors in two days.

walls on. Wednesday, Thursday, and Friday, we were dealing with trusses and the roof sheathing, and by Friday night, we essentially had the whole building framed. On the following Wednesday, we had the roof with all of the shingles on, plus the exterior doors and windows in place. In all, it took only eight days. We normally run from five to ten days depending on the size of the house, and particularly the size and complexity of the roof."

Speedy construction is in the interest of any project to keep down labor costs, but it



In the construction business since 1961, Paul and Colleen Truax left traditional stick building behind 13 years ago when they formed Vermont Built, Inc., a custom home building company that works solely with panelized construction. Today, with two of their five children, they build in Vermont, New Hampshire, and New York.

### Why he uses panelized construction:

"There are definite advantages to keeping part of the work in the shop, under controlled conditions and out of the weather. It substantially reduces the amount of waste, the amount of labor, and the amount of time on site."



Once the foundation was laid, the crew was able to erect the building envelope in only eight days, before harsher winter weather arrived.

was particularly important to Truax in this case, because he wanted the home built before the snow began to accumulate.

“We spent a summer putting infrastructure into the development. By the time we got that into place and were ready for homes, we were starting to get into winter weather,” he says. “However, we needed a model house for marketing purposes, so we could take advantage of the winter traffic. We are in ski country here, and that is the major marketing time for us.”

### DEVELOPMENT, DESIGN, DELIVERY

Vermont Built worked with its panel manufacturer, Barden Homes, to develop and design the home, while making sure it was ready to be delivered to the site as soon as the foundation was set.

“Barden does the structural engineering on the house and the drafting. Once the final prints are signed off, a house can usually be delivered to the site in two to three weeks, about the same amount of time it takes to get the foundation ready. That is about as far ahead as we have to schedule,” Truax says.

“Erecting a home requires at least a four-man crew, but most of the time we use a

six-man crew. To set the panels, it really requires two men on the deck, one man on the truck hitching the chain, and one operating the crane.”

“However, by using a six-man crew, we can do other things, like completing bridging, installing housewrap, and other odds and ends, while the rest of the panels are being put into place. All of this just speeds up the process even more.”

“The panels we use are all open pre-engineered panels with the studs and the sheathing on the exterior walls. There is nothing in the panel. In other words, we do all the plumbing, wiring, insulation, and sheetrock after it is erected. Only the door and window openings are cut out when the panels are delivered.”

All exterior panels are a minimum of 6-inch walls. Interior partitions are constructed using 2 x 4 studs, with the exception of plumbing walls.

“The accommodations for the subcontractors are already structured into the panels. For instance, when we are installing floor joists, if there is a toilet or a tub, special spacing is built into the deck to accommodate the plumbing,” Truax says. “We can also provide raceways, if necessary, for plumbing or fireplaces. Other features are included when the pre-engineered panels are constructed, such as 6-inch interior plumbing walls, blocking for kitchen cabinets and bathroom vanities, and other special requirements.”

“Safety on the job site is a prime concern for us. Using pre-engineered panels that are lowered into place by a crane reduces the risk associated with building a section of wall on the deck and raising it into place. The cable is not released from the panel until it is secured into place, as opposed to the risk when a wall section is raised from the deck by workers—with the worker being the only holding system until the wall section is secured. Sawing

## HOW IT WORKS

Panelized systems take many forms, from structural components, like trusses, to all-in-one panels that include framing, insulation and sheathing. For Vermont Built, the panels produce an end product similar to traditional stick-built framing. But instead of building each panel on site, all of the wall panels and trusses are constructed under controlled conditions in a production facility, and then delivered on a tractor-trailer with an attached crane to the house site. The Vermont Built crew places panels into position using the crane. Panelized homes are erected faster with less cost for labor and less material waste.

## READ THREE PATH FIELD EVALUATIONS:

- Howard Building Company: Rougemont, NC
- Hughes Construction: Lexington, NC
- Home Front Homes: Venice, FL

and nailing is reduced, which leads to additional job safety. Scrap lumber, which can become a hazard, is substantially reduced, which also reduces the cost of disposing of these waste products."

## TRUAX BELIEVER

After years of working with traditional stick-built framing, Truax became a believer in panelization when he started using pre-engineered panels. He decided there were just too many advantages for him and his clients not to focus solely on this method of construction. Beyond speed of construction, Vermont Built also gains more cost certainty in framing.

"We are not caught off guard by changes in lumber prices," Truax says. "We are able to mark the entire price for framing of a house. Sometimes we can lock in a price for up to 60 to 90 days."

Vermont Built has considered incorporating pre-cast foundations, but the distance to a pre-cast company has prevented him from testing them. However, to increase

energy savings, Vermont Built uses poured foundations and insulates on the inside of the foundation with 1-inch R-5 blue board glued to the wall with the seams taped. An air space of an inch is left between the blue board and a 2 x 4 wall that is framed on the inside of the foundation and insulated with R-14 fiberglass insulation. This removes the necessity of insulating on the outside of the foundation with blue board and the need to cover the blue board, while leaving the inside of the foundation ready for wiring, plumbing, or sheetrock.

Truax developed this method of insulating the foundation with Vermont's ENERGY STAR program as one of the ideal ways to insulate a basement to reduce heat loss and eliminate the collection of moisture caused by warm moist air being exposed to a cold cement wall.

"The Barden material package is also more efficient than many local building codes require. As a result, these homes meet or exceed ENERGY STAR requirements, which is a great selling point," Truax says.



While some of the panels are still being set, other crew members get to work on other tasks, such as completing bridging and installing housewrap. Once the structure is complete, the entire crew can focus on windows, doors and siding.

## TECHNOLOGY HIGHLIGHTS

This project included the following PATH-profiled technologies:

- Panelized Wall and Roof Systems
- Radiant Floor Heating

## PANEL EDUCATION

Some of the homebuyers who approach Vermont Built understand the company's philosophy and construction process, but many do not. In particular, Truax says uninformed homebuyers tend to confuse the panelization process with modular construction.

*"When people think factory produced, they think cheaper; we always have to explain that panelized homes are higher quality than stick built and can be constructed to meet the state's highest energy standards."*

For these homebuyers, Vermont Built has added an explanation of the benefits of panelization to its Web site.

*"We have to explain that we are essentially building a traditional stick-built house, but using a better method of putting the walls together. From a practical point of view, homeowners won't notice any difference in the structure. One is built in a shop, and one is built on site. The client benefits from precision engineering and having walls built in climate-controlled conditions. Using panelized construction not only means that the house gets built faster, but you eliminate a lot of problems in a traditional stick-built home when walls and materials are exposed to elements while the house is being framed. Once homebuyers understand that, they have a real appreciation of the value of panelized construction."*

The Partnership for Advancing Technology in Housing (PATH) brings together builders, manufacturers, researchers, government agencies, and other members of the housing industry. PATH partners work to improve the quality and affordability of new and existing homes. The program is administered by the U.S. Department of Housing and Urban Development's Office of Policy Development and Research.

To learn more about PATH, visit [www.pathnet.org](http://www.pathnet.org).  
To learn more about PATH-profiled technologies, visit [www.toolbase.org/techinv](http://www.toolbase.org/techinv).



The opinions expressed in this document represent those of the builder and do not necessarily reflect the views of PATH.



Vermont Built sometimes has to assure homeowners that the final product will be just as beautiful... just better made.