A Modern Modular at Home in Minneapolis

A small house on a small lot is the right choice for a growing family

BY ERIC ODOR

This project began with a good lesson in knowing how to pick your battles. Our clients, Shane and Erinn Farrell, hired our firm to remodel the bungalow they'd been living in for a number of years. After some preliminary investigation, we determined that the foundation wouldn't support the planned renovation and that upgrading the foundation would cost more than building a new house. We identified all that we could recycle, slated the rest of the house for the Dumpster, and moved on to design a new house.

A mixed palette of weather-resistant materials. *Clad with cedar on one side and fiber cement on the other, this home also has deep protective overhangs. A notch in the roof at each end of the house marks the location of a protected entry below. Photo taken at A on floor plan.*

Photo this page: Toby Thies

Life without walls. *In a small house, there's a big advantage to an open plan. Without partition walls, the natural light from all of the first-floor windows contributes to a sense of larger space. The free-flowing circulation also gives the homeowners more remodeling flexibility in the future. Photo taken at B on floor plan.*

SPECS

Bedrooms: 3 **Bathrooms:** 2½ **Size:** 2250 sq. ft.

Cost: $213 per sq. ft. of conditioned space

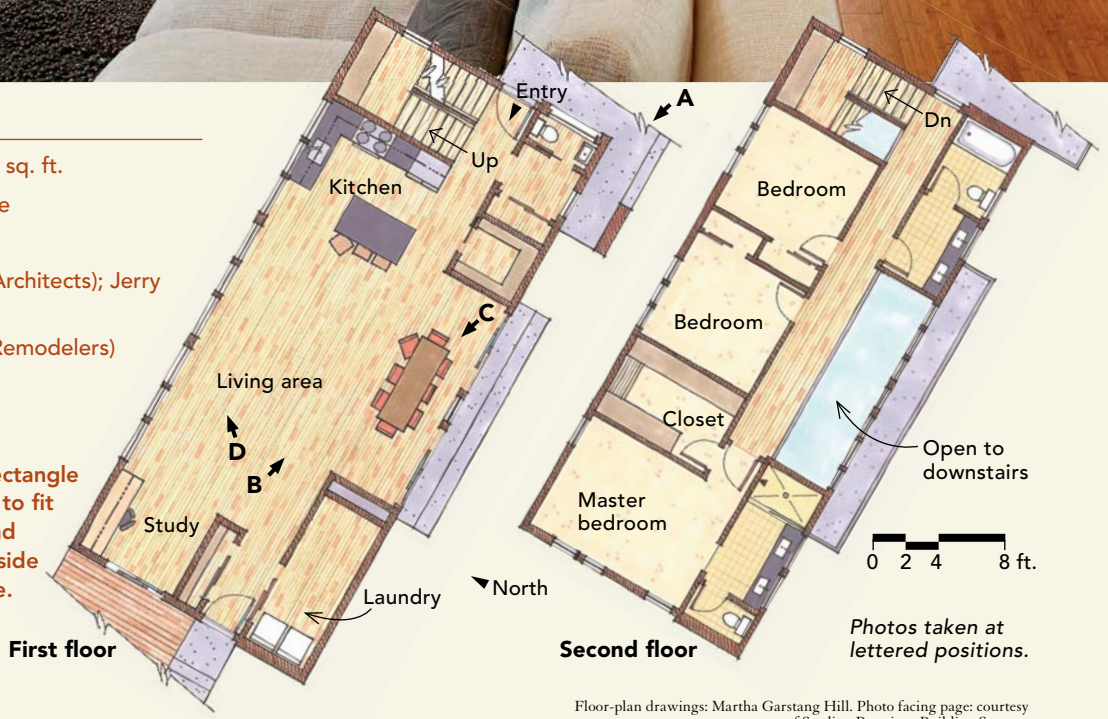
Completed: 2010 **Location:** Minneapolis

Architect: Eric Odor, Chris Meyer (SALA Architects); Jerry Palms (Architstructures)

Builder: Mike Knutson (Knutson Custom Remodelers)

Panelization company: Sterling Premium Building Systems

The house shape evolved into a narrow rectangle approximately 22 ft. wide and 52 ft. long to fit the lot. The long axis runs east to west and hugs the north setback so that the south side is exposed to as much sunlight as possible. Inside, the main living space benefits from a light-filled, open plan.



Floor-plan drawings: Martha Garstang Hill. Photo facing page: courtesy of Sterling Premium Building Systems

Panelization saves time and material

When a structure is panelized, the walls and floors are built as modules at a factory and then are trucked to the site and assembled. Truss roofs, sheathing, and subfascias are typically included in the package.

Almost any type of structure can be built this way. Standard blueprints are the only requirements. The panelization company deconstructs the design into modules that then are built in the factory. The costs to panelize are comparable to building on site, but the advantages are in time saved and in a more efficient waste stream. Efficient recycling leaves little or no waste in the factory, and there's no need for a Dumpster on site. The process makes a bit more work for the architect, who having already prepared a complete set of construction documents also has to review a large set of shop drawings.

A house in a day. *Wall panels arrive at the site with sheathing, windows, and housewrap installed. Insulation and drywall are added once the structure is dried in.*

Once the permit and contracts are in place, the panelization company starts the shop-drawing process, which is followed by construction and then assembly on site.

For this project, the crew showed up at 6:30 a.m. on construction day, just as the neighbors were leaving for work. Soon after, two flatbed trucks loaded with panels arrived, and the work began.

First, 8-ft. by 22-ft. sheathed floor panels were installed, followed by the framed and sheathed exterior-wall panels, which included windows and housewrap. The second-floor wall panels came next. By the time the neighbors got home from work, the final roof trusses were being craned into place. To find a panelization company in your area, use the panelized home directory at www.nahb.org.

From the start, the Farrells were clear that they wanted a small, sustainable, modern home with an open plan, but one with a restrained exterior that would fit respectfully amid the older, more traditional houses on the block. Although they started the design process as a childless couple, they had a newborn and plans for another child by the time they moved in. With this in mind, we designed a two-story house with three bedrooms and two bathrooms upstairs, and the cooking, dining, and living spaces downstairs.

Build the house, and truck it to the site

Fairly early on, we decided it would be a good idea to have the house panelized in a factory, transported to the site, and assembled in place. In many instances, panelized construction has better quality control than site-based construction. For this house, the small site would make it difficult to store materials, stage the construction, and maintain good relations with neighbors. The site would need a Dumpster and an area for recycling. Also, we anticipated that panelization might cut as much as two months from the construction schedule. However, after demolishing the old house and excavating and pouring the new foundation, the process took approximately seven weeks, saving only a month instead of the anticipated two.

Make sustainability part of the building process

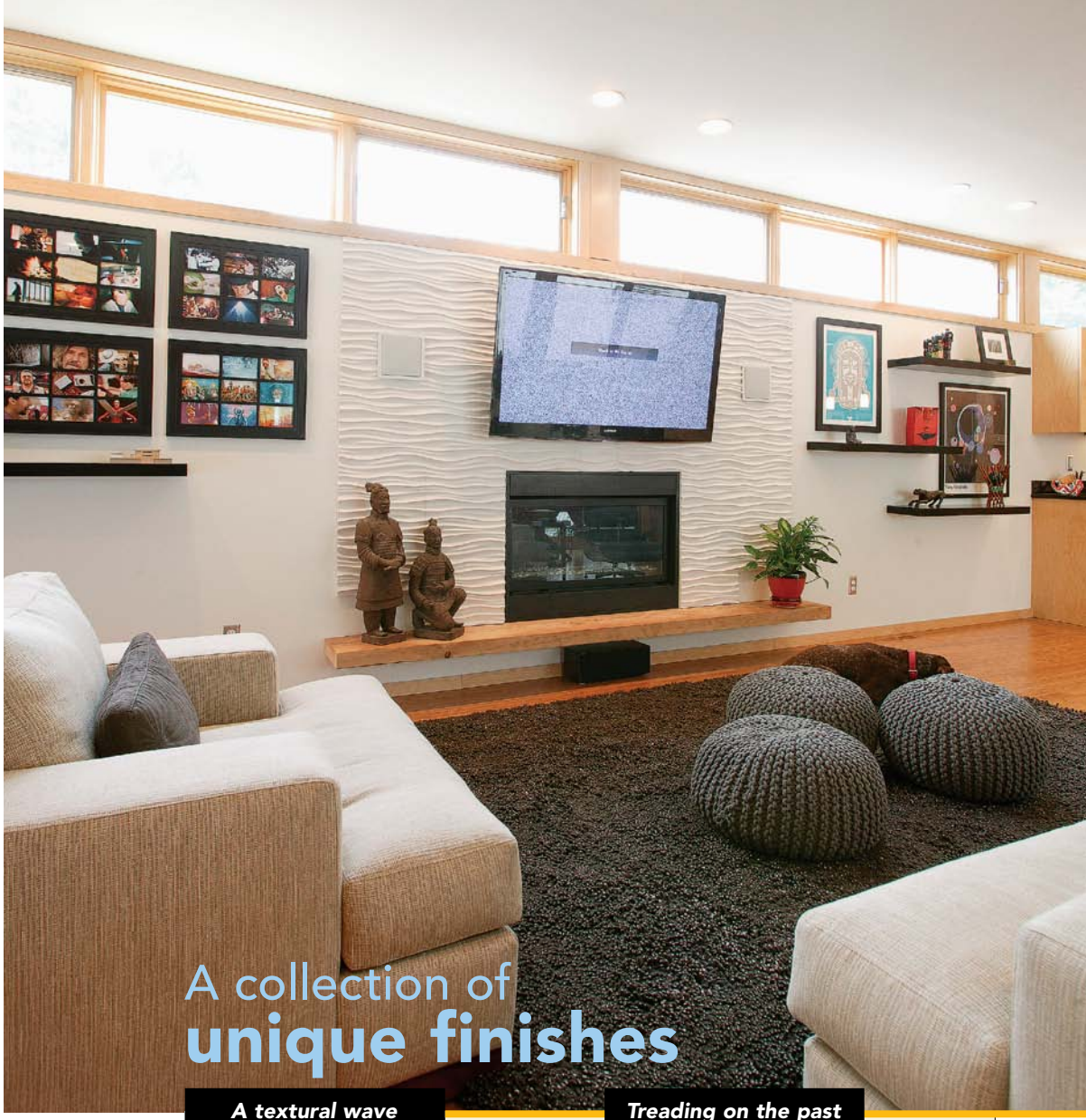
As part of my firm's overall sustainability strategy, we registered the house as a LEED for Homes project. (It's now on track to be rated LEED Gold.) As we do

more of these projects, we've been able to zero in on the two fundamental pieces of this puzzle: energy performance and material use.

The significant components of energy performance are a tight, well-insulated envelope that minimizes the energy load and high-efficiency mechanical systems designed and operated with that specific load in mind. Before the exterior is sided and the interior is drywalled, we specify a visual durability check of the envelope and a blower-door test. The best and simplest tools for optimizing energy performance within that envelope are the residential load (Manual J) and duct design (Manual D) calculations performed by an HVAC contractor. These holistic approaches help to size the mechanical systems to match the climate, the solar orientation, and the other specific details of the house.

When it comes to material selection, it's important to use the least amount of materials possible, coupled with local sourcing and sustainable content. The carbon footprint of these materials is a factor in both aspects. Local sourcing translates to less fuel consumed during shipping. Sustainable content is a bit more complicated. Renewable and recycled materials such as bamboo and fiber-cement siding can be good choices, depending on their availability to be locally sourced. Recyclable materials such as aluminum and steel can be good choices in the long term, but the carbon footprint of their initial production may take a

Defining space in an open plan. *The dining area is in a two-story location below the upstairs hall. A wall of big windows on one side lets in plenty of natural light, while the interior side of the space is marked by a row of ceiling panels made of stained plywood. Photo taken at C on floor plan.*



An invitation to sit. *The living-room area is centered on the fireplace and a television. A long row of clerestory windows maintains privacy while bringing in plenty of daylight. Photo taken at D on floor plan.*

long time to offset. Wherever possible, we used FSC-certified lumber and low-VOC or no-VOC finishes.

What makes this house energy smart?

In addition to its tight envelope, this house was built on a high fly-ash-content insulated foundation by Thermomass. In this system, a 2-in. layer of polystyrene is sandwiched between two 4-in.-thick poured layers of concrete, which yields an approximate R-value of 17. Above grade, the walls were filled with blown fiberglass. Closed-cell foam was sprayed along the rim joists and above the second-floor ceiling. The attic then was filled with blown-in cellulose. The closed-cell foam keeps the ceiling plane airtight, and it also acts as a vapor retarder.

A dual-stage furnace rated at 95% efficiency is the main heat source in the house, assisted by an air-to-air heat exchanger. Large low-e argon-filled windows on the south side provide passive-solar heating and share daylighting chores with smaller windows on the north side. We used Pella ProLine windows throughout the house.

The power demands are minimized with Energy Star appliances in the kitchen and in the laundry. Dual-flush toilets and low-flow faucets reduce the demand for water. □

Eric Odor is a LEED-accredited architect and member of SALA Architects in Minneapolis. Photos by Charles Bickford, except where noted.

A collection of **unique finishes**

In this modern house, the interior doesn't feature much in the way of traditional trim. Here, different materials become the ornament.

A textural wave

Mounted on the wall as a fireplace surround, interlocking gypsum tiles made by Modular Arts break up the flat interior walls.

Treading on the past

These stair treads were made from framing lumber reclaimed from the old house.

A study in contrasts

The exposed concrete foundation wall at the basement stairs is framed by clear-finished maple trim.

Warm and cool

Cedar tongue-and-groove boards on interior walls are trimmed with galvanized corner bead.