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A Plan for Perfect Placement

Building a small sustainable custom house became a lot easier using SIPs.

Structural insulated panels (SIPs) have their merits. For owners of the “ENERGY STAR SIP House,” also known as the “Mohsenin/Sackett Residence,” SIPs were the perfect lower-cost way to build a house in a difficult-to-access area.

According to builder Greg Koepp, president and CEO of Shell Building Systems, the four bedroom, four bath, 2,600-square-foot house in Berkeley, Calif.—Green Builder’s Green Home of the Year, in the Alternative Building category—was on a very difficult upslope, which made it nearly impossible to get equipment and materials to the project site.



Extra storage. Custom-made wooden cabinets and shelving are attractive, and they store carbon that would otherwise go into the atmosphere.

Crowd pleasers. Local, custom-made stone countertops, water-saving fixtures and LED lighting contribute to the owners' overall satisfaction.

From the Judges

"The use of alternative/unconventional means of delivering and installing home components is excellent."

Project Stats

NAME: ENERGY STAR SIP (Mohsenin/Sackett) Residence, Berkeley, California

BUILDER: Greg Koepf, Shell Building Systems,
www.shellbuildingsystems.com

ARCHITECT/DESIGNER: Denise Montgomery, Denise Hall Montgomery Architecture,
www.dhmarchitecture.com

MANUFACTURER: Premier Building Systems

PHOTOGRAPHER: Muffy Kibbey, Muffy Kibbey Photography, www.muffykibbey.com

**"SHOW" TIME.**

Dual-pane windows on walls and doors allow natural lighting during the day, and reduced heat loss overnight.

TOUGH PERFORMER.

Structural insulated panel (SIP) walls and roofs are praised for being about 50 percent more energy efficient than traditional timber framing.

BRANCHING OUT.

Natural plant landscaping, such as trees, shrubbery and grass, offer shade, exterior beauty, and atmospheric CO₂ filtering temperature.

BETTER THAN WOOD?

Sustainably manufactured composite decking is durable, easy to maintain and attractive to the eye.

The company was brought in by the owners and the architect, Denise Hall Montgomery Architecture, to discuss whether SIPs would be a good option.

"The owners were very cognizant of building their home using sustainable, energy efficient, green products to keep within their mode of design and exceeding Berkeley Building regulations, CALGreen and Title 24 requirements," Koepf says. "And [they wanted] to keep the cost down because of a very difficult lot to build on, which would have been extremely costly if built with conventional means."

This residential structure was built around the views of the San Francisco Bay. With many windows for outside viewing, and a lush surrounding natural landscape and fauna that helped

beautify the home, keeping as much of the area as possible intact was a necessity, according to Koepf. "Hitting all the high points with the design, it's truly a piece of artwork," he says.

CONSTRUCTION DIFFICULTIES

Getting to work—to get to work—was a challenge. The lot was a steep up-slope in Berkeley Hills; streets were extremely narrow and there was nowhere to stockpile construction materials. "The only way we could bring SIPs to the actual building area was utilizing a walking path along the property line that was above the lot," Knoepf says. "We had to actually build a 200-foot slide to push the panels to the site because we could not bring in equipment to hoist the panels into

place. We became very creative moving panels around the building site, [especially] with manpower, pulleys, hoists and other means to get the panels around, especially on the roof."

The efforts resulted in 35 percent savings in overall construction cost as builders used floor, wall and roof SIPs to construct the home. Using SIPs also allowed Title 24 to achieve a higher energy rating which enabled the architect to allow for large glazing to take advantage of the view of the Bay Area, Knoepf notes.

Also, because SIPs weigh a lot less than conventional methods, they made up only 25 percent of the project's structural cost. "The overall project remarkably made the SIP panels the absolute best choice, both cost-wise



Meeting standards. Windows throughout the house are California Building Standards Commission Title 24 compliant, which makes them 53 percent more efficient than ones manufactured in 2016.

FLOOR PLANS



COURTESY OF DENISE HALL MONTGOMERY ARCHITECTURE

and for the time in building out this project,” Knoepf says. “It would have taken months longer if done conventionally.”

OTHER POSITIVES

With the house construction now complete, the owners are enjoying a number of sustainability-related benefits. Temperature-controlling wall and roof thickness—6 inches and 10 inches, respectively—are a natural result of SIPs, as was HVAC usage. Its

use was reduced by 65 percent.

ENERGY STAR-certified appliances, LED lighting, a 99 percent energy efficient electric hot water heater, and an 8kW solar system on the roof have led to low utility bills.

And, there are cosmetic green elements, such as low-VOC paint, flooring made of recycled hardwood that was taken out of an old local mansion, and naturally designed landscaping using local and indigenous species with low-water requirements. **GB**

Key Components

BUILDING ENVELOPE: SIP: walls 6.5 inches, floors 9.5 inches, and roof 11.5 inches
CABINETS, SHELVES, MILLWORK: Custom hand built
COUNTERTOPS: Stone, custom
DECKS: Composite
DOORS AND HARDWARE: Western Window Systems
ELECTRICAL: LED, CALGreen Title 24 Compliant
EXTERIOR FINISHES: Stucco
FIRE PROTECTION: Fire suppression sprinkler throughout
FLOORING: Hardwood
GARAGE DOORS: Typical roll-up
HOME CONTROLS: Smart House – Google and NEST
HVAC/DUCTS: Radiant hydronic floors
INSULATION: SIPs EPS core
LIGHTING: LED CALGreen Compliant
PAINTS AND STAINS: Sherwin-Williams non-VOCs
PLUMBING/PLUMBING FIXTURES: Other manufacturers
RENEWABLE ENERGY SYSTEMS (SOLAR, WIND, ETC.): Solar
ROOF: 3-ply modified bitumen roof with granule cap; half-inch perlite cover board
VENTILATION: Continuous fan flow per CALGreen
WATER HEATING: Domestic hot water (DHW) system boiler for hot water and radiant floor
WINDOWS, SKYLIGHTS, PATIO DOORS: Western Window Systems windows and doors, per Title 24