



Structural Insulated Panel Systems

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**Date: January 24, 2018**

**To: SIPA**

**Re: Building Excellence Awards Entry – Weiting Residence, Minneapolis, MN**

**The following remarks were provided by Katy Dale of Christian Dean Architecture**

**How did SIP construction help you get this job?**

The homeowner was interested in an energy efficient, sustainable modern home. He was particularly intrigued by energy efficient technologies and building systems. Early on we explored using SIPs to achieve the sustainable goals for the home and the homeowner was intrigued and on-board with the product.

**Describe benefits of using SIPs on this project. Did SIPs help save time, labor, construction costs or energy?**

One of the major benefits of using SIPs for us, was the shop drawing review process. This enabled us to review and coordinate prior to contractors mobilizing onsite, giving us more control and confidence in the construction process. We also feel the shop fabricated wall system provides for higher quality construction. The contractor found the system to be a cost effective solution that helps eliminate possible defects of hand framing and provided more confidence that we would achieve a high quality, tight envelope. This was confirmed by our blower door test where the home measured 1.38 ACH50, indicating a very efficient envelope was achieved even with a complicated design.

**Describe any innovative design elements or structural engineering involved:**

The massing of the home and large openings did require structural engineering and complicated wall/ceiling junctions. Although not a straight-forward design, the SIP system was able to work with the complex structural layout and still perform as expected.

**Describe any other energy-saving materials used in the building envelope other than SIPs - List U-values of windows used and the U or R-value of any insulation material:**

Windows = Double paned 0.30 Case/Awn and 0.28 Fixed and Doors

Roof Insulation = R-49

Foundation Thermomass walls system = R-15

Underslab insulation = R-15

We used a HERs Analysis Matrix early in design to determine what systems were worth investing in. We found that in our home, triple-pane windows would not have made a huge impact on energy costs and therefore we opted to use more cost effective double pane windows. As a result of the analysis, we did increase the foundation and under-slab insulation from R-10 to R-15. We also increased the efficiency of the AC unit from 14 SEER to 16 SEER.

**List any energy-efficient products or design features, such as lighting, hot water heating, appliances, passive solar:**

Passive solar strategies helped drive the overall layout and design of the home. The home was sited close to the north property line to allow as much solar access on the south side as possible on the narrow urban lot. Large expanses of glazing face south to maximize daylight and heat gain in the winter and minimize need for electric lighting. A trellis over the patio was designed to shade the interior during hot summer months while allow lower winter sun to penetrate and warm the home. Fewer east/west windows were used, and a tall, narrow orientation helps manage low morning and afternoon light. Automated roller shades close to manage west light. The stairwell, centrally located in the home, helps distribute pleasant north light into all levels of the home and operable windows at the upper level encourage natural air circulation in the warmer seasons to naturally draw air through the home.

Thought was put into all equipment and fixture selections. All appliances are Energy Star rated, all lighting is LED

**Were any solar panels installed on the project? Indicate size:**

4.92 kW system

**List sustainable materials or design features not listed above, such as recycled materials, low-VOC finishes, landscaping:**

The sustainable goals of the project informed the design and selection of everything on the project. Some of the key features include:

**LANDSCAPING:** To minimize run-off, turf grass was kept to less than 25% of the landscape. The remaining area is planted with low mow fescue and prairie grasses to minimize irrigation demand and help slow rainwater for better soil infiltration. Drywells are located on the north side to collect and infiltrate rainwater from the roofs.

**EXTERIOR WOOD:** Exterior wood cladding and decking used an innovative sustainable product called Accoya. Noted for dimensional stability, UV resistance and durability on par with slow growth tropical hardwoods. Accoya is made from abundant fast growing pine from certified sustainably managed forests and goes through a process called acetylation. There are no toxic chemicals to leech into the ground and is completely bio-degradable so can be disposed of like regular wood. Accoya is Cradle to Cradle Certified – Gold

**TILE:** Mosa tiles were used throughout the home. Mosa, a Dutch company, produces beautiful porcelain products that are highly durable and environmentally responsible. Mosa is Cradle to Cradle Certified – Silver

**WOOD FLOOR:** Worthwood Douglas Fir Ply floors by Oregon Lumber are made from salvaged laminated veneer lumber. The end grain and laminated construction provide exceptional durability, strong enough for high traffic commercial environments. The floor was finished with a natural, penetrating oil, completely free of VOCs.

**PAPER COUNTERS:** Paper infused resin countertops, by Richlite, are a highly durable, easily workable, and sustainable product. Made from FSC certified or recycled paper and phenolic resin, these counters will become more beautiful as they naturally patina with use.

**THERMOMASS FOUNDATION WALLS:** in addition to the high insulation value of this foundation system, the exposed concrete serves as the finished wall surface, reducing overall material use.

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