

EPS Review

Enterprising Product Solutions

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Unique Ohio timber frame project features three insulated roof panel variations; owners act as general contractors and roof installers

Project:

A 13,000 sq. ft. new timber frame home construction project in Upper Sandusky, OH. The project is unique because the homeowners are acting as the general contractors, and the husband has led a crew of two friends with construction experience to cut and place the roof panels.

Products:

Three variations of laminated roof panels all made with a thick layer of high R-value expanded polystyrene (EPS) rigid foam insulation:

Structural Insulated Panels: EPS sandwiched between two structural layers of oriented strand board (OSB)

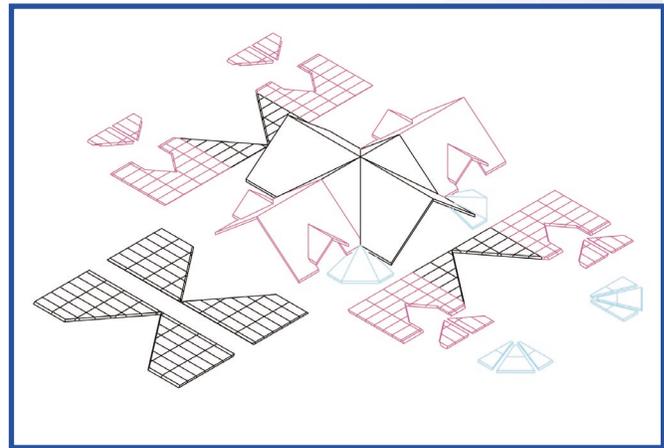
Nailbase Panels: EPS and a top layer of OSB

Stress Skin Panels: EPS sandwiched between a top structural layer of OSB and a bottom layer of moisture resistant gypsum (drywall).

Application:

The panels covered the entire 7,900 sq. ft. roof of the home. The three panel variations were used on different areas of the roof depending on the level of structural support needed and the nature of the interior aesthetics of the underlying ceiling.

It is rare that three different panel variations are used on a single project. Insulated roof panels are becoming a very popular method of roof construction based largely on the design flexibility, construction speed and energy efficiency benefits they provide.



Project Participants:

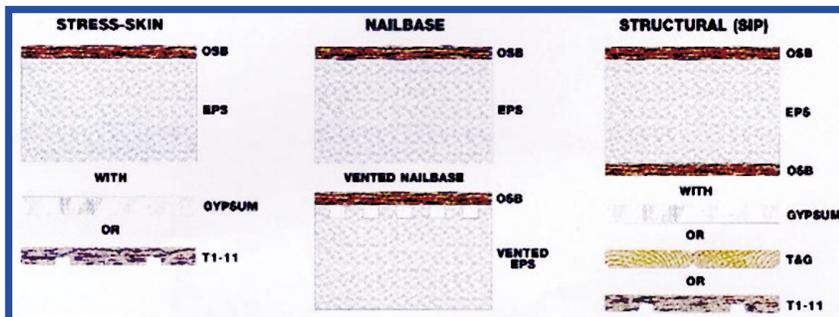
Homeowners and General Contractors Tom Osborne and Mary Fox
Upper Sandusky, OH

Timber Frame Supplier OakBridge Timber Framing
Jim Kanagy – Project Manager
Howard, OH

SIPs Manufacturer PaceMaker Building Systems
A division of Plymouth Foam, Inc.
Plymouth, WI

Timeframe:

Ground was broken in March 2004, the timber frames were erected in May and the roof panels were placed in June and July of the same year. Because Tom Osborne and Mary Fox, attorneys by trade, continue to do or coordinate much of the construction and finishing work themselves, they do not expect the home to be completed until the summer of 2006.



The Challenge:

The design for this grand timber frame home features several differing internal ceiling treatments and structural requirements. The ceiling of the center great room area is exposed wood, the ceilings of the two large wings that extend from the center are drywall, and the turrets off each wing require additional structural support because they knock out beyond the frame.



Jim Kanagy of OakBridge Timber Framing worked with Osborne and Fox on the selection and development of the roof panel variations. "In addition to the need to support the varying ceiling designs, we were looking for roofing materials that were easy to install and provided superior insulation," said Kanagy. "OakBridge has worked with PaceMaker in the past so I know of the benefits that insulated roof panels can provide."

Osborne's decision to cut and place the panels with the help of a small crew posed an additional challenge. "I've dabbled in construction in the past, but I've never worked with roof panels," said Osborne. Rather than having the panels pre-cut and identified with an alphanumeric code for easy placement as is typically the case, only the SIPs panels were pre-cut. The Nailbase and Stress Skins were delivered in 4' x 8' panels which were then cut by Osborne and crew on-site.

Performance

Using a Petty Bone extended forklift with a stage platform, Osborne and his crew cut and placed the entire roof. Though it took more than seven weeks, far longer than would be the case with an experienced construction crew, it indicates truly how easy roof panels are to work with.

"It took us awhile at the beginning, but once we got the hang of it we went much faster," said Osborne. "The first wing took three weeks and the second took only two weeks."

In the center section manageable segments of the tongue and groove interior ceiling deck were placed first, then, with a vapor barrier in between, the Nailbase was attached to the decking. This process was repeated numerous times until the whole center section was complete. Nailbase panels are not structural and require a structural decking to be in place before installation.



A standard felt layer was placed over the external OSB of the entire roof and the shingles were affixed through the felt to the OSB.

Though Osborne and Fox saved tremendously on labor, more significant long term savings will be realized on heating and cooling costs once the home is occupied. Actual results vary based on the size of the building, its location and the other materials, but it is generally been proven that insulated panels can save up to 30% on heating and cooling costs compared to standard roof construction.

Product Specs

Structural Insulated Panels (SIPs)

- 512 sq. ft. of pre-cut roof panels; 8 5/16" thick; R-value of 31
- Material makeup: 7/16" OSB | 7-7/16" Expanded Polystyrene (EPS) | 7/16" OSB

Stress Skin Panels

- 3,808 sq. ft. of standard 4'0" x 8'0" panels; 8" thick; R-value of 31
- Material makeup: 7/16" OSB (top) | 7-7/16" Expanded Polystyrene | 5/8" moisture resistant drywall (bottom).

Nailbase Panels

- 3,584 sq. ft. of standard 4'0" x 8'0" panels: 7" thick; R-value of 27
- Material makeup: 7/16" OSB | 6-9/16" Expanded Polystyrene.
- *Nailbase panels are not structural and require a structural decking to be in place before installation*

Additional Benefits of PaceMaker Insulated Roof Panels

Durability: Oriented Strand Boards, EPS cores, gypsum, T1-11 and T & G planking are standard construction materials combined into composite panels. Thousands of projects built with these materials have performed well for many years.

Cost Savings: SIPs may reduce roof framing members, and though the panels cost between 2-3% more than would standard roof materials, the easy installation provides a labor savings that typically makes up for this difference. It is also estimated, depending on the structure, that energy costs can be reduced by 30%.

Quality: Underwriters Lab (UL) and PFS/TECO quality control procedures cover all components and manufacturing operations. In-process inspection assures tight tolerances and adherence to specifications.

Environmental: Stable, high R-Value EPS cores (with no CFCs) save energy and reduce pollution. OSB wood facers are regenerable.