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8 DISADVANTAGES AND PROBLEMS WITH STRUCTURAL INSULATED PANELS



Structural insulated panels (SIPs) first gained attention in the 1970s for their high level of insulation, air tightness, and strength over wood framing. However, over time, disadvantages with structural insulated panels have caused builders and architects to evaluate the trade offs between benefits and problems with SIP. An excellent alternative wall system which solves many of the problems of SIP is the <u>Bautex Block Wall System</u>

Bautex Blocks are insulated concrete

blocks that are moisture-, fire-, mold-, rot-, and termite-resistant. Also, Bautex Blocks offer design flexibility.

What are Structural Insulated Panels (SIPs)?

Structural insulated panels (SIPS) are building panels used in walls, floors, and roofs of light com-Structural insulated panels (SIPS) are 4- and 8-inch thick rigid foam panels, sandwiched between THE BAUTEX WALL SYSTEM (HTIRE://WWW.BAUTEXSYSTEMS:GOM/BAUTEXCYALL/SYSTEM)(ESHINGAL SUPPORT (HTES://WWW.BAUTEXSYSTEMS.COM/TECHNIC

polyurethane (PUR) or polyisocyanurate (PIR) is used to make the foam. With EPS and XPS foam, the foam and sheathing is pressure laminated together. With PUR and PIR, the liquid foam is injected and cured under high pressure. The most common sheathing boards are $\frac{7}{16}$ inch thick oriented strand boards (OSB). Other sheathing materials include sheet metal, plywood, fibercement siding, magnesium-oxide board, fiberglass mat, gypsum sheathing, and composite structural siding panels. The SIPs are also known as structural foam panels, foam-core panels, stress-skin panels, and sandwich panels.

SIPs are made under controlled conditions in a factory. One advantage of SIP construction is it produces straight walls. SIP construction can provide higher levels of insulation, air tightness, and strength than traditional framing. However, there are disadvantages and problems with SIP construction.

1. Fire Safety Problems of Structural Insulated Panels

Some SIPs, particularly those constructed with OSB, plywood, and composite structural siding panels, do not have sufficient fire performance ratings. Buildings constructed with SIP may put occupants at a high risk of burns and smoke inhalation, particularly if the surrounding drywall is faulty.

2. Moisture, Mold, and Rot Problems of Structural Insulated Panels

Moisture problems with SIPs panels can occur, especially if using facing made of OSB or plywood. OSB and plywood sheathing are subject to mold and rot. Mold is unhealthy to the occupants and rot reduces the structural capacity of a building. Panels with waterproof surfaces, like fiber cement siding, will resist the growth of mold and rot.

3. Insects, Rodent, and Termite Problems of Structural Insulated Panels

Insects and rodents can be a problem for SIP panels because the foam provides a good environment for the pests to live. Manufacturer guidelines for preventing these problems suggest applying an insecticide, like boric acid to the panels. It is also essential when using OSB and plywood facing, to treat for termites.

4. Durability Problems of Structural Insulated Panels

Long-term durability of structural insulated panels may be a problem with those constructed with OSB or plywood. If OSB or plywood gets wet, the walls may deteriorate and rot.

5. Structural Insulated Panels Lack Thermal Mass

SIPs typically have a high insulation rating. However, a disadvantage of SIPs is they have low thermal mass compared to insulated concrete products, like Bautex Blocks. High thermal mass is important because it helps stabilize the temperature within a structure and decrease energy consumption. For example, in hot climates, a concrete structure absorbs cool air in the evening and stores it within its mass. During the warm day, the structure will stay cool and so will the interior of the building.

6. Structural Insulated Panels are Expensive

According to a study (https://scholar.colorado.edu/cgi/viewcontent.cgi? referer=https://r.search.yahoo.com/

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<u>&httpsredir=1&article=2109&context=honr_theses</u>) by the University of Colorado Departments of Environmental Design And Economics, the cost to frame a small scale residential house with SIPs is approximately 10 percent greater than stick framing.

7. Modification to Structural Insulated Panels are Pricey

It is crucial for maintaining the budget during SIP construction to get the order to the factory correct. Modifications to the design, once completed by the factory, are possible, but can be quite expensive and not easily achieved.

8. Structural Insulated Panels Construction Considerations

Because SIPs are panels, the building design of a SIP structure is best planned to coordinate with the panel's dimensions, without excessive jogs, non-90 degree angles, or bump-outs. A non-panel friendly design will increase waste, escalate costs, and diminish the performance of the structure.

A Better Wall Choice Over Structural Insulated Panels

The Bautex Block Wall Assembly is an excellent wall system over SIPs because Bautex is a highmass material that is moisture-resistant. Therefore, Bautex is energy-efficient and mold- and rotresistant. Also, the Bautex Block Wall System is termite- and fire-resistant. A further advantage of Bautex Block Wall System over SIP construction is Bautex has more design flexibility and can easily add complex architectural contours and curves.

While the Bautex Blocks create an excellent wall system, they are not applicable to roofs. Utilizing structural insulated panels on the roof of a Bautex Block building would further create an energy-efficient, air-tight structure. The pre-insulated, pre-engineered SIPs are perfect for large spans of roofing and will contribute to an energy-efficient, air-tight structure.

