

Why Doesn't BamCore Make a SIP Product?

BamCore strives to produce a wall system for all low-rise construction (residential and commercial) that provides the best thermal envelope while also being healthy and sustainable for both humans and nature. We avoid thermal solutions even if that are strong when they are not healthy for people and nature.

SIPs or Structural Insulated Panels as a wall system do have thermal and other advantages over conventional framing and insulation, but they also have significant insulation. First they provide a strong (but not perfect) thermal solution for building envelopes. Second, the wall sections install faster than conventional stud framing. Third, they have lower job site waste. Relative to pricing, the cost of a SIP wall system ranges from 5% to 20% or more greater than conventional framing and insulation. Below we review the three main disadvantages that come with SIP wall systems.

Concern About Polystyrene. Relative to thermal performance, SIPs use a core of rigid foam that comes in the SIP wall. The foam is either an expanded polystyrene (EPS) or an extruded polystyrene (XPS). XPS has better thermal values but requires a more potent ozone-depleting blowing agent. Today XPS is mostly used as an exterior continuous insulation and EPS is used most frequently as the rigid foam in the interior of a SIP panel. For its many positive properties, both polystyrenes have a low melting temperature and thus the risk of low flashover points. A highly publicized case of this occurred in the 1996 Dusseldorf Airport fire, which resulted in a shutdown of much of the airport until the renovation of one terminal and the rebuilding of a second terminal was complete.

Today, to manage the fire risk, polystyrene insulation products contain a brominated flame retardant called HBCD. Many health negatives can raise from the presence of HBCD. It can affect the liver and thyroid, it may cause neurodevelopmental problems, and might have negative effects on the reproductive system. According to Dr. Linda Birnbaum, Director of the National Institute of Environmental Health Sciences in the US, "I am concerned about the use of HBCD in consumer products, since it is escaping into the environment."

Besides the presence of the flame retardant, polystyrene has two other health related issues. First, the manufacturing of polystyrene involves benzene, which is a known human carcinogen and a developmental and reproductive toxicant, and toluene, which is a developmental toxicant. Second, polystyrene persists in the environment. All building structures are eventually decommissioned. To make healthy decisions about building, forethought needs to be given to the ultimate decommissioning and the effect on future generations. Pure polystyrene can be recycled, but it rarely is. EPS and XPS used in SIPs contain the HBCD flame retardant. Thus, recycling SIP polystyrene passes along the toxic flame retardant. HBCD also bioaccumulates in the food chain over time.

For these reasons, we are not in favor of making a panel with polystyrene rigid foam attached to it, despite the thermal benefits SIPs can have over conventional walls. BamCore prefers its hollow-wall design that allows the owner to choose from a wide variety of benign blown-in insulations, which can include fiberglass, dense pack cellulose, wool, rice hulls etc.

Faster Wall Installation. It is true that SIP wall sections are installed on a job in shorter time than conventional stud framed walls. However, this faster installation brings two important issues. First, since the SIP panelized wall runs up to 20' in length, a crane is required to position each panel during the installation. In Northern California cranes run \$100 to \$200 per hour, which is charged from yard to job and back. In some instances this cost is included in the SIP job package. The dependence on a crane to place all the perimeter walls can make tree and overhead wire interference a problem. In contrast, on a BamCore job, offloading can occur by pallet jack, forklift or crane depending on the access to the job site. When access does necessitate a crane for BamCore, the crane offloads from a single access point and the boom can remain principally over the building deck with far less tree or overhead wire interference. SIP installation usually requires specially trained framing labor. In contrast, because BamCore's panelized wall system is constructed from serially numbered 4' wide or less panels, no specialized labor is required.

An important point to add is that the speed of the wall installation is partially offset with the slower speed of the rough installation for the mechanical, electrical or plumbing ("MEP") work. Often, the MEP rough installation can take longer with a SIP wall system. With a BamCore wall system rough installation of the MEP work has shown to be the same or less than conventional rough work.

Job Site Waste. Because SIP panelized walls are factory pre-fabricated, there is a substantial reduction in job-site waste. However, like conventional framing, the rough MEP installation still has to cut out or cut away sections of the solid SIP wall system to complete the runs for pipes, conduit and wires. This is not the case with BamCore since the rough MEP work is done in a hollow cavity that is subsequently.

One of the largest components of job-site waste is the cut outs and cut offs of dry wall. SIPs interior walls can lower thickness of the drywall to 1/4", which is a substantial can lead to a waste and carbon footprint savings. With BamCore, for many common finishes, it can be possible to eliminate the sheet rock entirely and do the finish work directly on the (factory sanded) interior panel face. When sheet rock is eliminated completely, the cost, waste and carbon footprint savings become material to the job.

One ancillary point about the rough installation required with SIPs is that it usually leaves the water supply and drain lines cut into the SIP panel immediately below the surface of the interior dry wall. It is not typical to insulate the potentially noisy water supply or drain lines that are cut in. This can result in persistent noise from water and waste moving in the piping just below the drywall. In contrast, in a BamCore exterior wall, all the MEP rough installation is installed inside the wall cavity, usually by attaching it to stand-off clips that are placed on the inside face of the outside

exterior panel. When the BamCore wall is finished, the supply and drain lines are removed from the inside face by 1.25" of BamCore panel plus several inches of insulation resulting in a quieter environment for the owner.