SNAP-TOGETHER "DISCOVERY HOUSE" NEARS COMPLETION

Construction Process Yields Valuable Findings for Future of Building Industry

As construction draws to a close on the experimental Susquehanna House I at Armstrong World Industries' Innovation Center (see the February issue of Construction Dimensions, page 28), the benefits and lessons of this research project to improve residential home construction are beginning to be realized.

Susquehanna House I is the first of a series of experimental houses designed and built by a consortium of building and research organizations, whose primary goal has been to evaluate and improve the efficiency of the building process by using innovative materials and processes. During the construction phase, the group has been reviewing materials and processes, and how they interface, to find more efficient and cost-effective practices for the building industry and, ultimately, for the customer.

Panelization More Efficient

Among the key discoveries made during construction is that the use of a

panelized basement process consisting of pre-manufactured concrete panels offers greater efficiency, says Richard Fantazier, Ph.D., who heads the consortium and is general manager of Strategic Technologies at Armstrong World Industries. The process streamlined construction of the basement so that workers were able to dig the foundation and set the basement walls in a single day

This streamlining allowed subsequent steps in the building process, such as installing the first floor deck and pouring the basement floor and back filling, to take place in a shorter period of time, without a delay for concrete to cure. Another advantage to this system, Fantazier points out, is its relative imperviousness to freezing weather, which may extend opportunities for building this

kind of structure further into the winter season, when concrete work normally would be curtailed.

"The construction process itself has been a learning exercise," Fantazier says. "When it's completed, the house will become a development laboratory through which we hope to discover further ways to improve the design/build process. Our plan is to evaluate the performance of this building through at least one heating and cooling season, and then make appropriate modifications to further this performance evaluation into the years ahead. At the same time, the house will become for all the members of the consortium an opportunity to learn about products, performance and customer acceptance of some of the concepts we've applied."

Outer Walls Snap Together

The 1,900-square-foot, two-and-one-half-story, detached, single-family Susquehanna House features panelized construc-

tion and flexible living space. Other innovative features of the house include constructing the external walls using B-inch-thick urethane structural foam panels that "snap" together. The panels are the structural equivalent of 2-inch by 6-inch stud walls, with an insulation value of R26 and a foil vapor barrier. The house is expected to offer unique energy efficiencies because the roof is insulated with a new cotton fiber insulation. Power and communications are distributed through surface-mounted raceways to help facilitate easy reconfiguration after installation.

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One unusual feature of the house that will be evaluated throughout the coming year is the presence of relocatable internal walls, made possible through a design where all the building's weight is carried by the exterior walls. This offers great flexibility in locating the internal walls, both during construction and after the house has been occupied. The concept of relocatable walls is further supported by a unique air distribution system that uses the floor/ceiling plenum to function as the distribution channel for both heated and cooled air. Heating/cooling registers can be located-at will-where required.

Fantazier points out that, in one very important sense, Susquehanna House is not a "House of the Future." "The fact is, all the products we've used to construct this house are available to builders today," he says. "What we hope to learn as a consequence of this study are improved ways of putting a house together and planning its design. Through applying this systems approach to construction, we hope to be able to show

that home building can be simpler, more efficient and more cost-effective."

The Susquehanna House consortium has worked for more than two and a half years to bring Susquehanna House 1 to reality. As evaluation of Susquehanna House I proceeds, the second experimental house in the series is in its planning stage, with a spring 1997 construction target. Both houses will be maintained as dynamic research tools, allowing systems to be modified and resulting changes in performance to be measured.

About the Author

This article was prepared on behalf of Armstrong World Industries, Inc., a participating consortium member.