A House Goes Superinsulated

Despite the Commercial/Industrial Success of Exterior Insulated Systems, Residential Application Can Produce Some Dramatic Results

Who says an exterior insulated system isn’t for residential? The high desert of Nevada was the perfect test site for a new exterior system designed to make existing houses energy super efficient. Intense sun means summer heat during every day; the 4320 ft. altitude brings winter every night.

And Harold J. McKinnon, an administrator at the Hawthorne Army Ammunition Plant in Rabbit, NV, had an idea for a home that provides an additional challenge to any system. McKinnon purchased two surplus wood frame buildings 55'6" x 27'2" (constructed to government specifications in 1943 to support the war effort), and he moved them to a residential neighborhood three miles away, Hawthorne, NV.

“They’re of full cut lumber,” he said, “and frankly, I think they are better than much new construction.” His purpose was to recycle them into one large energy self-sufficient home. The two buildings were placed parallel to one another, slightly offset. The 14'2" x 30'0" space between the two structures became an atrium which contributes to the heating of the combined structures (3417 sq. ft.)

It was essential to make the relocated buildings energy efficient and to unify their appearance so they would be an attractive asset to the community.

For the exterior he selected the RetroLite System, developed by INSUL/CRETE Co., Inc. of Madison, WI in cooperation with Dow Chemical. It offered an alternative to aluminum and other conventional sidings because of its high R value, moisture prevention, and its efficiency.

Continued on page 20
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SUPERINSULATED

Continued from page 16

in blocking air infiltration at a residential price.

Renovation has just been completed. McKinnon’s home had 2” Dow Styrofoam mechanically attached to the outside of the walls. This combined with 3½” fiberglass insulation between wall studs achieves an insulating factor of R 21. The ceiling also had 1” sheets of Dow Styrofoam (with 3½” crisscross layers of fiberglass insulation in the attic) for an R 27.

Passive solar provided by seven skylights in the atrium furnished a substantial portion of heat for the home thanks to through-the-wall fans designed to equalize temperature distribution. Radiant heating panels and a fireplace provided backup. The entry ceiling was vaulted using a 12” thickness of Styrofoam between ceiling trusses.

Outside walls bear the weight of the roof, therefore interior partitions were removed and relocated to fit the owner’s living needs.

“I planned on photovoltaic, silicon solar cell modules as a supplemental source for generating electric power,” says Mr. McKinnon, “The roofs of both structures were covered with such modules.” McKinnon also plans an evaporative cooling unit on each of the two basic structures with ducts connecting the rooms to the coolers.

The factor responsible for the dramatic change in appearance and for providing the conservation necessary to make these alternative sources of energy practical is the exterior system. It involves a two step process:

1. Mechanically anchoring rigid Styrofoam insulation to the exterior of the house and taping over joints.
2. Applying the two-in-one cementitious coating as a protection over the insulation (called two-in-one because a plasterer can immediately double back over the “scratch” coat with the final finish). An optional step is covering the result with a color sealer.

A plasterer from Reno had no trouble applying the materials under the watchful eye of Don Peterson of INSUL/CRETE. RetroLite, which duplicates any stucco finish and color and is also maintenance free, is being tested on four homes in other geographical areas of the United States and should be available to homeowners within a year.

The McKinnon residence was finished in a saddlewood beige. Neighbors who have been familiar with the Government “Rabbit” buildings most of their lives, are surprised and impressed.

Despite a temporary respite, energy costs are rising and most people cannot afford to build new. Most older houses have little or no insulation. An imaginative use of new materials may be the answer for millions of American homeowners. Harold McKinnon, who has had a burning desire to build things ever since he was a child, feels it is.