Field Tests Commence on the World's Most Energy-Efficient Manufactured Home

Palm Harbor Homes (Dallas, Texas), the Building America Industrialized Housing Partnership (BAIHP), and North Carolina Agricultural and Technical State University (NCATSU — Greensboro, North Carolina) have teamed up to run a performance evaluation on what may be the most energy-efficient manufactured home ever built.

As shown in Figure 2, the prototype, manufactured by Palm Harbor Homes at its Siler City, North Carolina plant, is identical in size, appearance, and floor plan to the base case house built alongside it. But the envelope, air sealing, and HVAC systems used in the prototype are truly state of the art. They include:

- Upgraded fiberglass batt insulation (ceiling: R-33; walls: R-13; floor: R-22)
- Low-e window glass
- 12 SEER heat pump
- Mastic-sealed airtight ducts
- Heliodyne solar water heater

As reported in ***EDU***, Palm Harbor was the first company in the US to qualify some of its manufactured home models for Energy Star ratings, which require a 30% energy savings compared to base case models (see ***EDU***, May 1998). But the prototype that's just been completed on the NCATSU campus is expected to deliver a whopping 50% energy savings over base case performance. "We now have instrumentation in place on the two houses and will monitor them for the next year," says BAIHP Project Director Subrato Chandra. "We plan to put the real-time data on the Web."

Chandra tells ***EDU*** that since BAIHP was formed last year, it has provided technical assistance in the production of almost 5,000 industrialized homes, a definition that includes manufactured houses, modular houses, and production site-built houses; 200 of these have been energy rated and Energy Star-certified.

Figure 2 — Palm Harbor's new prototype (left) sits next to an ordinary model on the campus of North Carolina Agricultural and Technical State University. The two manufactured houses will be monitored for a full year.

But BAIHP has also been heavily involved in addressing moisture problems in manufactured homes, which is a common ailment in the Southeast. "So far, we've analyzed about 30 homes in five southern states," Chandra says. "The symptoms include soft wallboards and buckling floors. Of course, mold and mildew are usually present." Chandra says that the diagnostic tests on these problem homes revealed six primary causes:

1. Negative pressures created by long-term exhaust fan use, leaky and/or disconnected supply ducts, and insufficient return air pathways when interior doors are kept closed
2. Oversizing of air-conditioning units allowing overcooling of vinyl-covered interior surfaces
3. Clogged condensate lines
4. Poor site drainage
5. Inadequate crawlspace ventilation
6. Air handler blower fans that run continuously

"The manufacturers who built these homes generally send a service representative in with our troubleshooting team," Chandra explains. "We typically run a battery of tests, including a blower door, Duct Blaster, moisture meters, pressure pan, and crawlspace examination. The goal isn't just to address the particular problem at that site, but to look for prospective changes in design, manufacturing, and installation that the manufacturer can adopt to keep these problems from occurring in new houses."

Chandra tells ***EDU*** that since we published our original article on the creation of BAIHP (see ***EDU***, March 2000) two new companies — Cavalier Homes and Southern Energy Homes — have joined the consortium. Both are based in Addison, Alabama. A full list of consortium members and real-time data on the Palm Harbor prototype are available on the Web at http://baihp.org.

Centex's Phoenix Division Signs Up for Engineered for Life Program

Centex Corporation's Phoenix, Arizona, division, which builds about 1,100 homes a year, has signed up with Engineered for Life (EFL — Orlando, Florida) to guarantee low utility bills to its home buyers. Centex launched the program in October at its new Wild Horse development, which is part of the Allen Ranch master planned community. Wild Horse will build up to 90 single-family homes in the $170,000-$300,000 price range.

Centex Phoenix, which is already an Energy Star builder in a few communities in the Phoenix area, spent from $200-$1,000 more per house to upgrade the