Prospective homeowners tour the framing stage of ReCraft East to view the various alternative framing materials used.

In spring 1995, McStain Homes in Boulder, Colo., put the finishing touches on a 2,500-square-foot move-up house—at first glance no different from its neighbors. But throughout the house, McStain made some significant changes that distinguished the two-story contemporary home.

Before driving the first nail, the company decided to make this particular home a prototype of affordability, value and environmental responsibility for the other 200-plus houses McStain builds annually. “We wanted to find out what resource-efficient products could be used in our various production homes,” says McStain’s Karla Martin. “The house had to meet the needs of a typical family and stay in a reasonable price range, but also minimize its impact on the environment.”
Home builders nationwide are being challenged to construct quality homes with an increasing number of so-called alternative building materials yet still maintain marketability. While consumers generally support the use of resource-efficient products in their homes, cars and other consumer goods—the trick for builders is to meet that demand without raising the home’s price out of the buyer’s range. Martin estimates that the resource-efficient products built into McStain’s environmental research house prototype added an extra $30,000 to the home’s cost—too much for most buyers. So the company narrowed the list of environmentally sensitive products and is now incorporating several of them—including premium engineered lumber like the Silent Floor® system—into a new phase of starter homes priced around $120,000. “We were surprised at how many products carried over without adding significantly to the price of the homes,” Martin says.

**Strike a Balance**

Several “idea” or prototype homes like McStain’s have sought to educate and enlighten builders about how to strike a balance between quality and affordability and the environmental impact of construction.

On Martha’s Vineyard, Mass., architect Kate Warner completed a project called ReCraft East, a modest, 14,000-square-foot, Cape-style home. “I think people will see that we’ve come up with a resource-efficient home without sacrificing quality or appearance,” Warner says. “In fact, many of the products used actually perform better than some natural resources.”

Warner’s criteria for product selection included materials that are resource-efficient in terms of their natural resource content, manufacturing, waste generation and energy efficiency. Among the products selected, Warner used a flyash additive to reduce the amount of poured concrete, insulation with a recycled newsprint content, carpeting made from recycled plastic bottles and even cabinets built with reused beer barrels from a nearby brewery.

But ReCraft’s most significant environmental savings concern was the wood used in its frame construction.

“Trees are a renewable resource (unlike steel and concrete), so I wanted to use wood framing materials,” Warner says. But instead of traditional joists and beams, Warner selected resource-efficient Silent Floor® I-joists from Trus Joist MacMillan, Parallam® PSL beams, oriented strand board subflooring and finger-jointed wall studs. “These products make better use of trees and a wider variety of tree species,” she says.

**Environmental Showcase**

Across the country in Missoula, Mont., the Center for Resourceful Building Technology finished its Timber-Tech House, the center’s second resource-efficient idea home since 1990’s ReCraft project (a precursor to Kate Warner’s home). Unlike ReCraft, however, Timber-Tech was designed on a tiny, 946-square-foot scale. The goal: To showcase environmentally responsible products in a home that could be easily replicated for infill and urban
housing developments, thereby saving resources in the use of products and land.

Like McStain and Warner, the CREST chose resource-efficient and recycled materials currently available. “We wanted to show builders and home buyers that they can improve the resource-efficiency of their construction right now, using materials already on the market,” says Tracy Mumma, CRBT’s research director. “The scale of Timber-Tech introduces that concept to a different segment of the housing industry,” whose concerns are often small lots and smaller budgets.

Timber-Tech’s list of eco-friendly products includes wood salvaged from a demolished high school gym, recycled newspaper and components of the Silent Floor® system of engineered lumber. “We had no problems installing any of these materials,” says John Lentz of South Wall Builders, who constructed the house for CRBT.

Now that Timber-Tech is finished, Mumma says the center’s next project may focus on yet another segment of the housing market: multifamily. CRBT may want to keep an eye on a recent project in Upper Marlboro, Md., near Washington, D.C., where the National Association of Home Builders National Research Center recently completed a row of four attached townhomes to demonstrate various alternative building materials. (See page 41 of the January 1995 issue of Construction Dimensions for an article on the NAHB project.)

Each of the 1,800-square-foot townhomes employ a different building method—structural insulated panels, lightweight concrete, polystyrene concrete forms and steel framing—as well as other resource-efficient products. In all but the steelframed home, NAHB used structural engineered I-joists, beams and rim board from Trus Joist MacMillan.

**Performance Factors**

The common thread of these four projects—and myriad others nationwide—is their commitment to balancing resource-efficiency with quality and affordability. In their search for available, viable, eco-friendly alternative building materials, each project chose
to specify and build with engineered lumber, specifically the Silent Floor® system. The reason: Structural engineered lumber satisfies the demanding criteria of today’s building professionals and makes more efficient use of trees.

Unlike steel or concrete, engineered lumber doesn’t require a new set of tools or special training, rather, a home can be framed much the same as if the builder were using ordinary lumber. The difference is in how engineered lumber performs once the house is completed.

Upon finishing its environmental research prototype project, McStain Homes opened its doors to potential home buyers to gauge their reactions to the resource-efficient products used in its construction. The company purposely left void in the walls and kept the basement unfinished to showcase the behind-the-wall benefits of the various products and how they perform in a completed structure.

“We wanted to show people not only what we did but why we did it so they could attach a value to it,” Martin says.

For instance, the use of engineered wall studs result in straight, true walls that perform better than ordinary 2-by-4s; walls remain plumb and square for hanging cabinets, door and window openings and other finishes. Similarly, engineered I-joists in the floor and roof provide flat, smooth surfaces for drywall and other finishes, and resist nail pops and cracks that can occur with dimension lumber materials.

Pioneered by Trus Joist MacMillan in the early 1960s, today’s structural engineered lumber industry (excluding panel products like OSB and plywood) is a nearly $1 billion-per-year business. Various engineered lumber products, mainly I-joists and laminated beams, are used in an estimated 200,000 new homes annually. And with commodity lumber prices fluctuating year to year, the use of these alternative materials continues to grow.

“Engineered lumber allows people to build sustainably without taking unacceptable risks (with unknown or untested products),” Warner says. “It’s one of those products that not only reduces environmental impact but performs better than traditional materials.”