Trends in Building Products, Tools and Equipment

By Kathy B. Sedgwick

Photos by Ralph Lee Smith

What trends have emerged in building products, tools and equipment over the past five to 10 years? And what has been the driving force behind those changes? The answers may surprise you.

What Drives Development of New Products?

In the 1970s, the oil crisis made energy conservation a major concern. The primary goal was to reduce the energy to heat and cool buildings. A secondary goal was to reduce the energy required to manufacture, deliver and install materials. Today, energy conservation equals a cost consideration reflected in the price of the material.

Production labor costs also come into play. A relatively cheap, lightweight raw material may require much labor or energy to form into a useable product, thus making it less competitive. The rise of plastic use as a material for construction and other products is due, in part, to the ease with which it is formed into products.

When commercial construction started its downturn in the late 1980s, product innovators focused on three areas:

- Creating new market opportunities for contractors by showing them how their current operations could be expanded to include related services.
- Helping contractors save money by streamlining operations, becoming more efficient.
- Helping contractors take advantage of new or growing market sectors, such as renovation to meet new requirements of the Americans with Disabilities Act.

Changing building codes, safety re-

The NAHB Resource Conservation Research House was designed by Orville Lee. The Builder was Peter Breck, president of Paragon Properties, Inc., Leonardtown, Md.
Above: Dow Chemical insulating board was installed over oriented strandboard sheathing provided by Louisiana-Pacific Corp.

Below: The earth-coupled heat pump is installed.

requirements, and problems with existing materials all stimulate development of new products and technologies.

But, of course, every new product or technology that comes along doesn’t make it. Remember that piece of equipment you saw at a trade show seven or eight years ago? Are you and/or your competition using it, or has it disappeared? What about those wonder products you heard so much about in the late 1980s. Did they ever materialize? What makes some innovations gain widespread acceptance while others seem to fade into obscurity?

ACCEPTANCE OF INNOVATIVE BUILDING MATERIALS: WHAT WORKS?

The experts say the success of an innovation is determined by cost, aesthetics (if the material is prominent), durability and fitness for its intended purpose. Even if an innovative product meets these criteria, the process of gaining wide acceptance in the construction industry is very slow.

A study conducted by the NAHB Research Center in Upper Marlboro, Md., concluded that innovative technologies “can take 15 to 20 years before being adopted by the majority of builders.” The study found that “economic advantage and simplicity appear to be the two most important characteristics favoring rapid ... adoption of innovative technologies.”

The report names several other important influences on an innovation’s rate of adoption, including these:

- Advantages over predecessor products, materials or systems.
- Compatibility with previously held (traditional) values.
- Capacity to allow for testing and experimentation.
- Visibility to the potential adopter (architect, specifier, builder, owner).

Manufacturers are happy to point out the many obvious advantages of their new product. “It’s faster.” “It’s cheaper.” “It’s prettier.” “It’s ‘green.’” If the advantages are simple to understand and observe, the going is easy. Complexity is a real stumbling block to the acceptance of innovations in construction. If the advantages of a new product or system are hard to understand or difficult to quantify, they are less likely to be adopted.

The product must be compatible with what the user has already come to value. It must not go to far from traditionally held concepts of beauty or utility.

In their book, The Science and Technology of Building Materials, Henry J. Cowan and Peter R. Smith state: “Once a tradition has been established, it becomes difficult to sell houses that do not conform to it. ... Traditional attitudes were at least partly responsible for the failure of a number of innovative building systems that were factory-produced in the 1940s and 1950s. Many of the system building ... failed to find acceptance because they were too different from traditional houses.”

“The tendency to use new materials and new methods for existing materials is strongest in the design of commercial buildings and homes for the wealthy. This factor gradually influences the design of more traditional houses.”

According to Tom Levin, a researcher in the Economics & Policy Analysis Division of the NAHB Research Center, “Contractors say homeowners won’t accept products that look different. Owners say they will, depending on economic factors.
"Building products will change, but they won’t look different. In a way, the change will be invisible." Levin asserts that the successful new building products or technologies will be those that aren’t immediately visible to the consumer. That is, products that are structural or hidden inside walls or under floors will gain faster acceptance by the building community if they cost less, are easier to use, and/or can be substituted one-for-one for a product with which they are already familiar.

Those products that are out in the open must look enough like familiar products and provide some important, preferably quantifiable advantage, such as cost or energy saving.

What about “green” products? Levin maintains that "warm and fuzzy" is not enough for most consumers, although there is a small niche market of people who will pay a little more for "green" products. "Most people buy with cost per square foot in mind."

For a new product to succeed, demand for it must come from the architectural and contractor communities, and that demand must be met without a lot of hassles. An undeveloped distribution network impedes adoption of a new technology. The problem is made even more frustrating for product innovators because of its “chicken-and-egg” quality. Demand for the product must be created before the distribution network will grow; on the other hand, until that distribution network is established, the product may be hard to acquire, which could reduce the demand for it.

"THE ONLY THING A PIONEER GETS IS AN ARROW IN THE BACK." — UNKNOWN.

No contractor wants to be first to try a new product. There are too many unanswered questions. “If there are problems, and there always seem to be, will there be solutions? Will their technical support be there when I need them? How hard will it be for my workforce to learn how to use it and adapt?”

One of the hottest selling points for many new products is the claim that a lower level of skill is required. When the NAHB Resource Conservation Research House was constructed, time and motion studies were performed on the roof and foundation installations. In both cases, the new products required a lower level of skill, a big selling point since lower skilled labor is a cost-saver.

To test the level of skill required, researcher Tom Levin actually built the foundation, with help from the product manufacturer. “I had absolutely no hands-on construction experience,” said Levin. “Yet I was able to successfully put together the components, which proved the product requires a very low skill level.”

**WHAT’S NEW?**

Plenty! The “15th Annual 1994Specifier’s Guide to New Construction Products,” published by the Construction Specifications Institute, listed more than 430 products and services that were introduced to the commercial construction industry during 1993.

The listing included more than 80 new products in Division Nine alone, including tile, special wall systems, elastomeric and other protective coatings, gypsum board and gypsum systems, as well as lath and plaster. Division Seven listing numbered over 60, with shingles and roofing tiles having the most new products introduced, followed closely by water repellents, membrane and other types of roofing materials, and siding products.

A tour of the exhibit hall at the 77th Annual Convention and Exposition of the Association of the Wall and Ceiling Industries-International, which was held in Las Vegas this past March, revealed some interesting trends.

New and improved tools and equipment were displayed in more booths than ever before. Tool manufacturers are focusing on how to make laborers more efficient by making their tools easier to use and more portable. With these tools, workers can do their jobs better and faster, and when less skill is required, labor rates may be lower.

Construction tool sales are certainly good. According to Raymond Ott, a Premier Drywall Tool Company factory representative, “In 1992, we had a sales in-
crease of 50 percent over 1991; in 1993, sales increased 45 percent over 1992. That’s almost a 100 percent increase over a two-year period.

Fireproofing and firestopping products also took a large share of floor space at the AWCI exposition. Changing building code requirements and the complexity of related standards has stimulated the development of new products to meet the challenge.

Metal framing products were also prominently displayed. According to Betty Whitaker, AWCI’s director of meetings and expositions, “More and more steel product manufacturers are entering our market because they see our contractor members as good prospects for light-gage steel framing. Other steel companies that were already marketing to our members are putting greater emphasis on light steel framing, particularly as it is gaining popularity in residential construction.”

Whitaker, who has participated in the management of eight AWCI shows, noted that a lot of foreign players are entering the U.S. market. “Most of them are promoting new tools, and they seem to be looking for someone in the states to manufacture and distribute their products locally.”

The AWCI show revealed another interesting trend: long-standing wall and ceiling manufacturers expanding into other product markets. For example, a company long associated with gypsum board and related products premiered its own exterior insulation finish system. Others displayed new products specifically designed to be used as part of an EIFS system.

**WHAT’S COMING?**

*Plastic.* By 1990, the construction industry was already consuming more than 11 billion pounds of plastic per year. Plastic appears as fibers mixed in wood and concrete and other materials to create new composite materials. Tyvek house wrap has almost completely displaced roofing felt. What’s next? How about plastic facings over wood studs and rafters to provide fireproofing and strength? Plastic frames are already being used for industrial construction in chemical plants where more traditional framing materials cannot stand up to the corrosion.

*Microfibers.* Reinforced Powder Concrete is concrete with microfibers (fine steel wires). It has 20 times the compressive and tensile strength of regular concrete without the need for reinforcement has. Because of its increased strength one-third to one-quarter as much concrete is needed. The product was developed by Bouygues, a French construction company.

**Research Houses Test New Products**

As we develop new products and new ideas about what new construction products should do or be, several industry groups are already testing the performance of new building materials technologies. Two projects, the Re-Craft House and the National Association of Home Builders’ Resource Conservation Research House, epitomize these efforts.

*Re-Craft House.* Steve Loken, president of the Center for Resourceful Building Technology, Missoula, Mont., built a resource-efficient Re-Craft house that incorporated recycled products and others...
made from “secondary” materials (by-products of manufacturing processes).

Materials selected for Re-Craft house had to have high quality, durability and help ease pollution. These included engineered wood products made from wood chips and veneer, which required as little as half the wood fiber of solid lumber while providing superior performance.

The Re-Craft project materials list included the following

- **Paving Materials:** FlexTech paving, made from rubber from discarded sports equipment.
- **Insulation:** Insul-Cot, a kraft-faced insulation made of recycled cotton with an R value equal to fiberglass batts. Insul-Tray, cardboard panels made from wastepaper, phone books and cereal boxes are stapled to studs. Cellulose insulation made from shredded waste newspaper that has been treated with a fire retardant and can be wet-sprayed into open wall cavities and joist bays is sprayed into the cavities.
- **Panels:** Amofoam RCY panels made from recycled polystyrene cups and food trays.
- **Countertops:** Syndecrete cement from Syndesis of Santa Monica, Calif., has wood, stone or plastic shavings in the aggregate.
- **Siding:** Fire Resistant Fibercem siding (a paper and fiber reinforced cement) made by Etermit of Reading, Pa.

According to Loken, overall the products used in Re-Craft House cost more money and were harder to find than traditional products because they were new or produced by small companies with undeveloped distribution networks.

NAHB Resource Conservation Research Park The NAHB Research Home Park was established in 1986 to evaluate innovative home building technologies. Part of a Bowie, Md., housing development, the Park today includes four completed homes:

- The Home Systems Research House, which tests gas technologies.
- The Lifestyle 2000 House, which features concrete masonry.
- The Adaptable, Fire-Safe House, built to accommodate the elderly or disabled.
- The Resource Conservation Research House, which utilizes materials and systems that conserve material and energy resources.

To the casual observer, the Resource Conservation Research House appears to be a typical colonial, in keeping with other houses in the community. However, its “insides” are far from typical: recycled materials like steel Gaming, copper piping and energy-conscious products such as insulated framed windows, an earth-coupled heat pump, and supplementary energy supplied by solar and photovoltaic power.

The following products and systems were used at the Research House:

- **Foundation:** Cast-in-place concrete foundation forming system by Lite-Form, Inc. of Sioux City, Iowa. The forms are 10 percent recycled polystyrene insulation by Dow Chemical, U.S.A., Granville, Ohio, held together by forming ties made of re-processed polypropylene (from plastic milk jugs).
- **Framing/Doors/Appliances:** Steel provided by members of the American Iron & Steel Institute.
- **Sheathing:** Oriented strandboard sheathing by Louisiana-Pacific Corp. of Portland, Ore.
- **Siding:** Hardboard molded siding by Abitibi-Price Corp. of Roaring River, N.C., composed of 8.5 percent recovered wood fiber and roundwood, sawmill waste products.
- **Roofing:** Nailite “Noryl” plastic roofing panels from GE Plastics of Pittsfield, Mass., made from Digital Equipment Corp’s reclaimed computer housings. Although they cost more per panel than asphalt, they are equal in cost to cedar or lightweight masonry shakes.
- **Insulation:** Spray-applied wall insulation and loose-fill attic insulation from the Celullose Insulation Manufacturers Association of Dayton, Ohio, made from shredded newspapers treated with fire retardant.
- **Interior Walls:** FiberBond™ wallboard by Louisiana-Pacific Corp., made of 70 percent gypsum and 30 percent shredded newspapers, which reduces panel weight, adds strength.
- **Ceilings:** Fiber panels from Armstrong World Industries of Lancaster, Pa., containing 22 percent recycled newspaper and up to 25 percent recovered mineral wool.
- **Deck and walkway pavers:** Timbrex™ “lumber” made from plastic bags and sawdust by Mobil Chemical Co. of Norwalk, Conn., weatherproof and impervious to ultraviolet light.

**Products of the Future**

According to Levin, building products introduced in the future will focus on energy efficiency (primarily as a cost factor with environmental concern as a secondary feature) and lumber substitutes (again primarily because of cost considerations). The next NAHB Research Center test house will feature alternatives to lumber and plywood and energy efficiency. Groundbreaking is scheduled for May 1994.

Wide acceptance of computer and communications-related innovations will help home automation-such as the “Smart House”-gain faster acceptance. NAHB’s “Smart House” project involves over 100 North American manufacturers of housing components in the design of a system for housewide distribution of energy and communication via a single cable. Since the “Smart House” cable and other hardware will be inconspicuous, homeowners won’t be put off by something that appears futuristic rather than traditional.

For further information about these and other new building products, tools and equipment, contact the John H. Hampshire Memorial Research & Reference Library at 703-534-1703.

**About the Author**

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