NOTEBOOK

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EDITED BY JON VARA

Lumber Prices Hit Bottom

The winter just past was a painful time for U.S. lumber producers, who watched wholesale prices for framing lumber decline steadily since the first weeks of 2000. By late January of 2001, the forest-products industry newsletter *Random Lengths* reported that its composite framing lumber price had fallen to its lowest level since 1992, with some items posting their lowest prices since the early 1980s.

"It's hard for me to imagine prices going any lower," says NAHB economist Michael Carliner, who sees two main causes for the price decline. First, he notes, housing construction has slowed since last summer, leading to a softening of demand. "A fairly small drop in demand can have a much larger effect on prices," he says.

A second, closely related factor has been the industry's response to declining price. Many mills — especially those that had invested heavily in equipment to increase production during the boom of the late 1990s — have continued to churn out lumber to pay off loans, leading to a supply glut. *Random Lengths* associate editor Jeff Redd expects prices to stabilize and begin to rise slowly as small, marginal lumber producers close their doors, bringing supply back into line with demand.

With all that lumber going begging, why aren't builders seeing fire-sale prices at the lumberyard? Jeff Redd cites a tendency for suppliers to delay passing on price changes in both up and down markets. "When lumber prices spike upward, suppliers try to keep their customers happy by holding prices down," he says. "They make up those losses by taking a little extra profit when prices are low."

Deconstruction Comes of Age

by Kathleen O'Brien

As available landfill space continues to shrink and the cost of disposing of construction debris heads skyward, increasing numbers of builders are looking to a process known as *deconstruction* for a partial answer to their waste-management needs. While there's no single, universally recognized definition of the term, the California Integrated Waste Management Board defines deconstruction as "the reverse of construction ... a process to carefully dismantle or remove usable materials from structures, as an alternative to demolition. It maximizes the recovery of valuable building materials ... and minimizes ... waste."

In one sense, deconstruction is simply a new name for something that often happens informally anyway, as when a neighbor decides he'd like the cabinets you're removing from a client's home during a kitchen remodel and arranges to pay you for them and take them away. But compared to such hit-or-miss efforts, professional deconstruction is both more cost-effective and offers far higher recovery rates.

Get Ready to Recycle

According to the Environmental Protection Agency, about three-fourths of the material from construction and demolition projects now ends up in landfills. Most of the 20% to 30% that is recovered is currently recycled, rather than reused. But upcoming local, state, and federal regulations may soon change those figures.

Starting in 2003, for example, the Commonwealth of Massachusetts expects to forbid most waste-disposal facilities from accepting unprocessed construction waste.

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"We're working with an advisory group of builders and waste handlers to define what 'unprocessed' means," says Massachusetts Department of Environmental Protection spokesman Peter Allison. "It will probably involve removing all clean wood, metal, asphalt, brick, and concrete from the waste stream." The City of San Jose, Calif., plans to begin charging a lower waste-disposal fee to contractors who can prove they have recycled at least 50% of their debris. Washington State, faced with the possible closure of half of its municipal solid-waste landfills within the next ten years, is considering similar incentives.

Federally funded projects may give the deconstruction industry a boost as well. With thousands of residential units slated for removal in the next decade, agencies such as the Department of Housing and Urban Development (HUD) and the Department of Defense are reportedly looking at alternatives to conventional demolition.

Who's Doing It?

One result of that trend is the emergence of a new breed of deconstruction specialists, who specialize in dismantling buildings and reselling the salvaged materials. Although there are only an estimated 100 companies doing this work nationwide at present, it could become a growth area in the near future

Bill Turley, executive director of the Construction Materials Recycling Association, calculates that if entrepreneurs were to fully use the large share of construction and demolition waste so far passed over, somewhere on the order of $1 billion of building materials would be returned to use for a second life.

Time is money. Because it relies heavily on hand labor, deconstruction generally takes longer than straight demolition. That can play havoc with a project schedule, leaving many builders reluctant to make the switch.

To address this problem, R.W. Rhine, Inc. of Tacoma, Wash. — a well-established firm that does a large volume of both demolition and deconstruction — has customized its salvage equipment for greater speed and efficiency. According to company operations manager Chris Cristich, many buildings can be "depanelized" into sections that are then transported to the salvage yard where they are disassembled. Where depanelization is not an option, Rhine uses specialized equipment to "pick" building elements apart on the ground at the job site. In addition to easing the time crunch, Cristich says, his company's methods also improve worker safety and transportation efficiency. The required investment in specialized equipment, he concludes, has been well worth it.

How Much Does It Cost?

If deconstruction is to compete with conventional demolition, its higher labor and warehousing costs must be offset by revenues from resold building materials and by avoided disposal fees. And as in all sectors of the construction industry, a project's profitability ultimately depends on the crew's experience and the nature of the project.

Kurt Petrauskas, owner of Earthwise Demolition, another Seattle-area demolition and deconstruction firm, notes that his company has learned to be selective about undertaking deconstruction projects. The company will consider complete removal of a structure only if sufficient time is available and if the building type and design permits. In other cases, it focuses on "gut and strip" deconstruction, in which flooring, cabinetry, trim, and wall surfaces are removed from a structure that will be left standing, usually in preparation for an extensive remodeling project.

But when the situation is right, deconstruction can be a very cost-effective alternative to conventional demolition. Petrauskas recalls one recent project where he was able to bid $7,000 less than a contractor proposing mechanical demolition because limited, steep site access impeded the heavy equipment typically used for straight demolition.

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OFFCUTS

The so-called "migratory bird test" for establishing jurisdiction over wetlands has been struck down by the U.S. Supreme Court. The new ruling means that the provisions of the federal Clean Water Act cannot be applied to isolated wetlands — wetlands that do not drain into an interstate waterway — simply because they might be used by migrating birds.

OSHA regulations can be fun, at least for those not on the receiving end. In a recent interview with the American Industrial Hygiene Association's publication *The Synergist*, OSHA Director of Safety Standards Programs Marthe Kent spoke frankly of her love for her job. "I was born to regulate," she was quoted as saying. "I don't know why, but that's very true. So long as I'm regulating, I'm happy."

Road names can have a major effect on home prices, according to a survey by a British research firm. The study of more than 1,000 homes across the U.K. found that homes with addresses ending in "Lane" sold for up to 13% more than the national average. Addresses ending in "Way" had the next highest value, followed by "Road," "Avenue," "Close," "Street," and "Drive."

Green builders in Scottsdale, Ariz., can cut to the head of the line for building permits, under the city's green building program. According to the city, permit requests for green building projects receive fast-track plan review, and typically receive building permits in half the time of conventional projects. Beginning this spring, the city is also expected to enact a 6% reduction in permit fees for green building projects.

New Concrete Admixture Could Revolutionize Cold-Weather Pours

A cold-weather researcher at the U.S. Army Engineer Research and Development Center in Hanover, N.H., has developed a new approach to pouring concrete in subfreezing weather, which could cut costs by reducing the need for tenting and supplementary heat. The key, says researcher Charles Korhonen, is a chemical admixture that acts as an antifreeze to actively prevent the formation of ice crystals.

Cold-weather researchers in Hanover, N.H., finish a reinforced slab that incorporates a prototype low-temperature admixture.

PETER KEENE, CRREL

Conventional cold-weather chemical admixtures, such as calcium chloride, help prevent freezing by accelerating the hydration process, Korhonen explains. That helps in two ways: First, the speeded-up chemical reaction means that the concrete is more likely to finish setting and curing before it cools to the freezing point. Second, the accelerated reaction gives off its heat more rapidly, which further helps to prevent freezing. "The air temperature doesn't matter if you can keep the concrete itself warm," he says. "But if the concrete does cool to the freezing point while it still contains liquid water, it loses a lot of strength and durability." The new process, by contrast, makes it possible to pour and cure high-quality concrete even when the material itself is allowed to cool far below the normal freezing point.

Such "antifreeze concrete" or "low-temperature concrete" — the process is so new that it doesn't yet have an accepted name — has already passed an important field trial. In 1997, a team spearheaded by Korhonen poured, finished, and cured a new concrete floor in a huge ice-storage room at a nuclear plant near Chattanooga, Tenn. The space, which is part of the plant's emergency cooling system, couldn't be heated since that would mean temporarily shutting down the plant at enormous cost. No freezing occurred, even though the concrete was allowed to cool to the ambient temperature of about 18°F.

Remarkably, the successful pour didn't require any unusual chemicals. It was achieved with a carefully formulated "cocktail" of readily available concrete admixtures. "The trick is in reformulating and combining them in such a way that you get the results you need," Korhonen says. Although he prefers not to go into detail about the formulation used, Korhonen is now working with the Departments of Transportation of several northern states to develop the process further. Last October, the process was also discussed by a panel of the Civil Engineering Research Foundation, which has the goal of bringing emerging products and processes into commercial use.

Canadian Studies Focus on Straw-Bale Construction

Straw-bale construction — consisting of straw walls finished with stucco on the exterior and stucco or plaster on the interior — is emerging as a popular green-building technique across much of North America. Proponents like to point out that straw-bale homes provide excellent sound and thermal insulation, are naturally fire-resistant, and don't offgas potentially toxic materials into the living space.

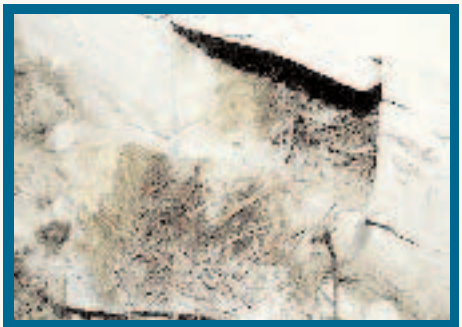
But while straw-bale structures have proven surprisingly durable in dry climates — a number of century-old straw bale houses in Nebraska are still in good condition today — it's far from clear that modern buildings in wetter regions will fare as well. To answer questions about the method's long-term durability, the Canada Mortgage and Housing Corporation (CMHC) has conducted several recent studies of straw-bale homes across Canada, most of them built during the 1980s and early '90s. Among their findings:

Concerns that alkaline stucco might break down the cellulose fibers in straw seem to be unfounded. Test holes in straw-bale walls found that cement-rich stucco actually seems to preserve encased straw fibers.

The bottom-most courses of straw-bale walls show a tendency to absorb water from the ground when in direct contact with unprotected foundation slabs — a condition sometimes known as "rising damp" — which can lead to internal rot.

To discourage biological activity such as mold growth, straw bales are sometimes treated with powdered lime. However, the presence of lime seems to inhibit a good bond between the stucco and underlying straw.

Slab floors that incorporated straw-bale insulation were found to work poorly. The two driest samples examined of these "waffle-slab" floors were in the range of 20% to 30% moisture (rot typically begins at a moisture content of 25% to 30%). The ten remaining samples exceeded 45% moisture, with some containing visible liquid water.



Although straw-bale construction is becoming a popular alternative building technique, recent studies by the Canada Housing and Mortgage Corporation underscore the importance of proper design, construction, and maintenance. This test hole near the base of a 6-year-old straw-bale wall revealed moldy, saturated straw in an advanced state of decay.

Since stucco is ordinarily applied directly to the straw, with no intervening moisture barrier, the water-resistance of the stucco itself is critical. In cold climates, cement-rich stucco may be too impermeable to water vapor, leading to the accumulation of moisture originating from indoors. Lime-rich mixtures, on the other hand, are more "breatheable," but they may not provide adequate resistance to driving rain.

What are the chances that an improperly constructed straw-bale home will eventually devolve into a stucco-clad compost pile? There's no clear answer to that yet, although one CMHC study notes that "we would not be confident building stuccoed straw bale [structures] in all regions."

Ultimately, CMHC researcher Don Fugler hopes, the sorts of moisture-related problems so far discovered can be prevented by proper design and detailing. But even then, he says, owners of straw-bale structures must keep the potential for moisture damage in mind. "If the owner isn't serious about long-term maintenance, there's likely to be trouble," he says. "Straw-bale construction is definitely not for the vinyl siding crowd." For details on the ongoing CMHC straw-bale studies, visit the organization's Web site at www.cmhc-schl.gc.ca.

USG Discontinues EIFS

On April 1st of this year, the USG Corporation discontinued manufacturing, promoting, and selling its entire line of finish products used in water-managed EIFS (exterior insulation and finish system) and DEFS (direct-applied exterior finish system). Water-managed EIFS uses features designed to allow any water that penetrates the building envelope to drain to the exterior. Proponents of water-managed systems present them as a way to reduce or eliminate the costly water-damage problems associated with improperly constructed barrier EIFS, which makes no provision for drainage (see "Making EIFS Watertight," 2/01).

USG spokesman Marty Duffy attributed the decision to the failure of water-managed EIFS to gain a solid foothold in the industry. "There are other water-managed systems out there, but USG was the only manufacturer to go solely to water-managed EIFS," he says "We tried to change the market. It worked a little bit, but it didn't work enough."

"I'm surprised some manufacturers have hung in this long," says Nashville architect Harrison McCampbell, who has investigated numerous EIFS failures. He believes that the industry as a whole must address the sealant issue in order to prosper. "Whether they're producing a water-managed system or a barrier system, manufacturers have got to include sealants," he says. "Without sealants, you don't have a system at all."

Heating People with Microwaves

Since microwaves can heat up your lunch, why can't they be used to keep people warm, substituting for a residential heating system? According to Dr. Eleanor Adair, a senior scientist at the Air Force Research Laboratory at Brooks Air Force Base in Texas, there is no valid scientific reason not to use microwave radiation to warm people. Dr. Adair, who was the subject of a recent profile in the *New York Times,* asserts that residential microwave generators would allow people to turn down their thermostats.

The idea of heating people with microwaves was first proposed in the early 1980s by Robert Pound, a Harvard physics professor, and is known as the Pound proposal. "You could use the same type of magnetron used in a microwave oven — on the order of 700 watts," says Pound. "You wouldn't need to provide more than 60 to 100 watts per person. Magnetrons are very cheap — they cost about $11 apiece to make — because they are made by the thousands in Japan."

Pound tried to patent his idea. "We had a lot of trouble with the patent examiner, who said the idea is too obvious. At that point, I didn't want to go on investing more money for the patent application. It kind of died on the vine."

According to Pound, one advantage to heating people with microwaves is the possibility of leaving the windows open. "You wouldn't have to worry about getting the house too tight," says Pound. "The ability to heat yourself this way has nothing to do with how much fresh air is being introduced into the room."

Dr. Adair has continued, over the years, to promote the Pound proposal. "I have never abandoned it," she says. "If you hold your house at 45 degrees, with radio frequency introduced on demand to individual rooms, the energy savings would be really exceptional."

A few problems remain. "You have to get rid of metallic furniture," says Dr. Adair. "And I think kitchens would be a problem, because there are so many metallic devices in the kitchen. With metal objects, you can get arcing."

After Dr. Adair gave a talk on the Pound proposal at a conference in Copenhagen, a Danish home building company expressed serious interest in the idea. Their development plans were finally scuttled because of health concerns. "The police-radar issue, the testicular cancer flap, hit Denmark," says Dr. Adair, "and the people sent me a letter of regret."

U.S. AIR FORCE

Dr. Eleanor Adair (seated at left) discusses her microwave research with two collaborators at Brooks Air Force Base. Behind the doors in the photo is Dr. Adair's 100-megahertz microwave test chamber, where human volunteers have been warmed up.

According to Dr. Adair, the concerns expressed by the Danish home builders are not borne out by her research into the effects of controlled microwave exposure on experimental subjects. "I have never found any deleterious effects from exposing rats, monkeys, or human volunteers to these fields," says Dr. Adair. "The only effect you see is warming of the tissues."

The main problem with implementing the Pound proposal, Adair and Pound assert, is ill-informed public resistance. "There is a lack of knowledge of scientific matters in the general population," says Dr. Adair. "People are told there is some energy out there — they can't see it or smell it, and they don't know what it is. Someone tells them it is radiation, and then you've lost the ballgame."