

NOTEBOOK

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Battery Wars

by Dave Crosby

NiMH battery technology is improving, but not all toolmakers are abandoning NiCads

Two years ago, it looked as if NiMH (nickel metal hydride) batteries, with their increased power and longer runtimes, were about to replace NiCad (nickel cadmium) batteries and revolutionize the cordless tool industry. Today, however, NiMH batteries are still relatively scarce. While two manufacturers are going full speed ahead with NiMH technology, many are taking a more cautious approach and some have backed away completely (see "Who's Using NiMH Batteries?" next page).

NiMH vs. NiCad

Battery size and weight limit cord-

less tool designs, where smaller and lighter means "better." Typically, the higher Amp-hour (Ah) ratings of NiMH batteries provide between 15% and 40% more runtime when compared with the same tool running on a NiCad of the same physical size and weight. And while performance varies in different applications, under light loads — say, in a cordless drill — NiMH batteries have consistently delivered more runtime.

On the downside, the chemistry of early NiMH batteries limited the number of charges to about half that of a NiCad, so if you looked only at total



While NiMH batteries are here to stay, so far only Makita and Hitachi are fully committed to the new technology.

runtime over the life of the battery, the NiCad still came out ahead. And while all batteries discharge rapidly under a heavy load, early NiMH batteries would overheat, which further reduced runtime and shortened cycle

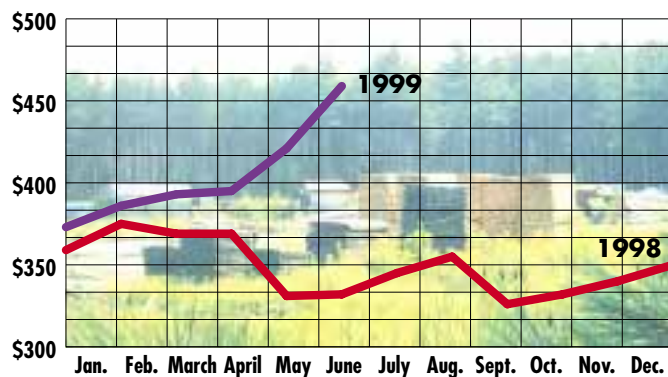
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Lumber Prices May Have Peaked

A 40% rise in framing lumber prices over the first six months of the year almost toppled record highs set back at the end of 1993. But framing lumber prices appear to have peaked just shy of the record highs, according to industry newsletter *Random Lengths*' "framing lumber composite price." The broad pricing indicator tracks 15 common framing items, representing different wood species from the West Coast, the South, and Canada.

The fall in weekly framing lumber composite prices during late July was the first downturn this year. At press time, it was not yet clear whether this new downward trend means lumber production has outstripped demand or whether lumber wholesalers are buying cautiously due to the near record-high prices. With nationwide residential construction continuing at a building-boom pace, it's hard to imagine that demand will be falling off anytime soon.

Framing Lumber Composite Prices
1998 - 1999
(per 1,000 board feet)



Source: Random Lengths Publications (www.randomlengths.com).

What Makes a Building Green?

Fannie Mae, the nation's largest home mortgage lender, has committed \$100 million to test-market special mortgages for resource-efficient homes in six cities. "We envision something like an energy mortgage, but taking the concept further to encompass resource-efficiency issues," says Cynthia Adcock, senior communications manager at Fannie Mae. "We want to see if it is true that houses like this can save consumers money over the long term." If the six-city experiment is successful and Fannie Mae becomes a green lender, builders all over the country may soon be learning how to build green.

One obstacle the program must overcome, however, is



AUSTIN GREEN BUILDING PROGRAM

Although resource-efficient buildings like this one in Austin, Texas, are being built all over the country, advocates don't always agree on what makes a building "green."

the lack of a consensus on what makes a building "green." Most advocacy groups agree that a green building is energy-efficient, conserves water, and uses materials manufactured in a way that is resource-efficient and less polluting than average. There is little agreement, however, on the following aims, which are promoted by some — but not all — green building advocates:

A green building should minimize the use of lumber, employing alternatives to dimensional lumber when available. "There is no consensus agreement that it is necessary to find alternatives to lumber," says Alex Wilson, executive editor of *Environmental Building News*. "Properly managed, timber is a superb green product. The challenge is at the forestry management end."

The issue of sawn lumber versus engineered lumber is also

a thorny one. "A few years ago, you could make the argument that engineered wood products were green *per se*," says Wilson, "but we are no longer accepting them into our product directory unless they have some additional green features."

A green building should provide above-average indoor air quality. Of all of the green concepts, this one has the most tenuous connection to the idea of resource-efficient building. "All of the programs see indoor air quality as part of green building," says Peter Yost, program manager for environmental systems at the NAHB Research Center, "but it really doesn't fit."

A green building should be more durable than the average building. But durability can make houses harder to remodel and recycle, a virtue proponents call *dismantleability*. "Buildings these days are less dismantlable than they used to be," says Yost. "It's going to be a hard trend to change."

A green building should be as small as possible. This principle is inconvenient for some green advocates who de-emphasize principles that are hard to reconcile with the business of developing, building, and selling houses. "I would never envision us closing the door on large homes," says Kim Calamino, administrator of the Green Builder Program of Colorado. "We decided it had to be a pretty big umbrella so the widest range of builders could find a way to participate."

This flexibility, however, also creates credibility risks. "I'm very much concerned when green building is used as a marketing gimmick," says Tracy Mumma, research director at the National Center for Appropriate Technology. "When a builder says that their building is green because it has energy-efficient windows or carpeting with recycled content, then the label is misapplied."

OFFCUTS

Small businesses are getting more loans. *HVAC Magazine* reports SBA data showing that the number of loans under \$100,000 to small businesses increased 26.8% from 1996 to 1997. Two reasons mentioned are the increased use of business credit cards, which establish credit histories, and "credit scoring," a practice whereby banks recognize good personal credit when considering small business loan applications.

Was Goodyear's hose defective or not? That's all a federal court wants to know, according to a recent ruling that narrows Heatway's lawsuit against Goodyear for supplying allegedly defective Entran 2 radiant-heating hose (see *Notebook*, 2/99). The ruling forestalls Goodyear's tactic of focusing on contractual issues, and may take installers off the hook for liability in numerous failures of radiant heating systems.

The kitchen, the warranty, and good customer service are the most important factors for Californians choosing a new home, according to a survey released in June by National Survey Systems and reported in *Arizona Republic*. Other selling points were big yards and wiring for high-speed modems. Availability of upgrades was also important, with the average buyer willing to spend \$13,000 on custom options.

Twenty-one unlicensed contractors were fined and had their vehicles seized in a New York undercover operation aimed at nabbing fraudulent home improvement contractors. To retrieve their vehicles, the contractors had to settle all outstanding consumer complaints, pay fines, and secure a legitimate contracting license.

Looking for used and reconditioned tools? As many as 14 ReTool franchise stores are slated to open in the U.S. and Canada by the end of this year, according to a *National Home Center News* report on Grow Biz International (www.re-tool.com), a Minneapolis-based franchise developer.

The Contractors Showroom is a 23,000-square-foot mall that puts more than 50 residential construction businesses all under one roof. The *Construction News Alert* reports that the Avon, Ind., mall covers all sub-trades and a range of building materials from windows to appliances.

Asian Long-Horned Beetle Threatens Hardwoods

The U.S. Department of Agriculture is working with several states to prevent an infestation of Asian long-horned beetles from threatening North American hardwood trees. Accidentally imported in packing material from China, the beetles have so far been spotted in warehouses in 14 states. Hoping to eradicate the species before it spreads to other areas, officials have ordered the removal of 400 trees in Chicago and 2,000 in New York.

An infestation begins with eggs laid in oval-shaped pits that female beetles chew into a tree's bark. Larvae then bore further into the inner wood, where they pupate over the winter. In spring, adult beetles emerge by boring additional tunnels, which can be spotted as exit holes on tree exteriors. After a few years of infestation, the crown dies back, even-



USDA/APHIS



USDA/APHIS

To prevent a major outbreak of Asian long-horned beetles, officials are destroying infested hardwood trees in Chicago and New York. The wood-boring bugs were accidentally imported into 14 states in packing material.

tually killing the tree.

Although several hardwood species are affected, maple trees have been the most common infested trees to date. With no known treatments, the only solution tree experts have been able to offer is prompt removal of infested trees, which are cut down and chipped in winter when the beetles are immobile.

Eradication efforts depend on early detection by the general public. Telltale signs of an infestation are exit holes and egg pits in the bark or sawdust at the base of a tree. Anyone spotting Asian long-horned beetle activity should call their city tree official or state department of agriculture.

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life. Other technological problems, such as poor low-temperature performance, plagued early NiMH prototypes. NiMH batteries have also been noticeably more expensive than NiCads.

Fortunately, refinements in NiMH chemistry and production have solved most of these problems. But NiMH technology is not yet the clear winner many expected it to be because NiCad technology has also improved in the last 10 years. Where 1.0 Ah or 1.3 Ah NiCad batteries were once commonplace, we now routinely see 2.0 Ah models — there is even a 2.4 Ah 18-volt NiCad on the market now — making the comparison a little complicated. For example, replacing a 9-volt 1.3 Ah NiCad with a 9-volt 2.2 Ah NiMH will significantly increase runtime; but the difference between an 18-volt 2.0 Ah NiCad and an 18-volt 2.2 Ah NiMH is not as noticeable.

Even more difficult is evaluating the increase in price and runtime of NiMH batteries with respect to the decrease in cycle life. When NiMH batteries achieve the same cycle life as NiCads, we'll be able to get a good comparison in terms of overall value for the user. Until then, it's going to be a guess.

NiMH Still Coming On Strong

While NiCad technology appears to be approaching its maximum potential, NiMH technology is still being developed. Soon, 3.0 Ah NiMH batteries, which are already available for other applications, will find their way into power tools. According to Blake Frye, power tool product manager for Energizer Power Systems, a major NiMH manufacturer, "Metal hydride has become the preferred power source for professional high-drain applications."

Overall, given the advantages of NiMH, it seems certain that this technology will advance, especially if prices come down to a more affordable level. Backing up this prediction is word that major car manufacturers are looking

closely at NiMH batteries for electric cars. One thing is for sure: Tool manufacturers who haven't introduced NiMH technology yet will be watching these developments closely.

Who's Using NiMH Batteries?

DeWalt: Stepped back from NiMH technology only one year after announcing its arrival at the 1998 National Hardware Show. Company has no plans to introduce NiMH in the immediate future.

Hitachi Power Tools: Delayed introduction of NiMH batteries until a corresponding universal charger could be developed. Company plans to have 9.6-, 12-, and 14.4-volt NiMH batteries available for its cordless tools by late this year.

Makita: Has NiMH batteries on the market now. Says Ken Hefley, vice president of marketing: "Makita is fully committed to NiMH and is positioning the technology to be the future in high performance cordless power tools."

Milwaukee: Currently sees NiCad as the preferred battery.

Porter-Cable: Appears to be approaching NiMH technology cautiously.

Ryobi: Has no plans to introduce NiMH in the U.S. in the immediate future.

S-B Power Tools: Has adopted a conservative posture. Bosch has introduced NiMH with its new Blue Rage cordless drills.



O Silo Mio

Sollenberger Silos, a Chambersburg, Pa., builder of agricultural silos, recently finished pouring the concrete roof on the tallest residence in Vermont. The 80-foot-tall cylindrical house, which is located on a high ridge with 270-degree views, is made of reinforced 4,000-psi concrete, and took two workers only three weeks to form and pour. When finished, it will include an elevator, a spiral staircase, and a rooftop deck accessed by a hatch.

"It's an unusual job," says Bob Francis, sales manager for Sollenberger, whose customer is an owner-builder with an engineering background. "We've been in business since 1908, but this is the first residence we've ever built."

OFFCUTS

Seniors are relocating to Nevada, Florida, Arizona, New Mexico, and Wyoming at the highest rate proportionate to each state's total population, according to a report in the *Nation's Building News* based on U.S. Census Bureau data. Minnesota, Illinois, Massachusetts, Michigan, and New York had the lowest proportions of seniors moving in.

Japanese builders face 10 years of call-backs, now that a new law has been passed in response to increasing consumer complaints of defects in new construction. The law requires home builders to provide a decade of free warranty work for major building components, including walls, floors, and roofs.

Average hourly U.S. construction wages were \$17.11 in June 1999, a 3.9% increase over last year's average of \$16.47.

Consumption of Portland cement is at record levels in the U.S. this year. Through April 1999, consumption is up 10.5% compared with the same period last year, according to the Portland Cement Association. With U.S. cement plants producing at almost 100% capacity, imports from Canada, China, and several European countries are filling the gap.

Block telemarketing calls by either ordering individual callers to place you on their "no-call" list or by registering with the Telephone Preference Service, which maintains a "no-call" database. Enroll for free by sending a request to TPS, P.O. Box 9014, Farmingdale, NY 11735; include your name, address, telephone number, and signature.

Residential construction is really booming in California. In the first six months of this year, permits in California metropolitan areas were up 25% for new homes, and 23% for alterations and additions, compared with the first half of 1998, according to the Construction Industry Research Board in Burbank.

Geothermal Rebates Eliminated

Despite a broad consensus among energy experts that geothermal heat pumps can provide significant energy savings, fewer than 1% of new homes in New England use the technology. The weak market is one reason four electric utilities in the Northeast are backing away from a program that provided rebates to homeowners who chose to install ground-source heat pumps.

New England Electric, Boston Edison, Eastern Edison, and Commonwealth Electric have decided that after the end of 1999, they will no longer sign any new contracts for the geothermal rebate program, which contributed a subsidy of \$2.25 per square foot of conditioned space. "There was a hope that the rebate program would encourage the geothermal section of the market to go up dramatically," says Mike Guerard, who is program manager at Conservation Services Group, the nonprofit that runs the rebate program on behalf of the utilities. "We don't feel that has happened. Fewer than 50 homes have participated in the program. Even if the number of homes were to double, it would still be a negligible percentage of the market." The utilities have decided to invest their energy-conservation dollars in the Energy Star Homes program. "It's a broader, more fuel-neutral approach," says Guerard.

Garth Gibson, the northeast representative for Water Furnace International, a manufacturer of ground-source heat pumps, does not lament the end of the rebate program. "It's more important for contractors to learn how to install equipment than how to sell rebates," says Gibson. "We're ready to show that geothermal makes sense on its own terms."



ERNEST DUCK

Underuse of a geothermal heat pump rebate program has prompted utilities serving parts of Massachusetts, Connecticut, Rhode Island, and New Hampshire to stop providing the subsidy.

Job-Site Theft On Increase

Theft on construction sites has increased as residential building has boomed, according to several reports from around the country. A recent *Houston Chronicle* story tells of a theft ring bust in which police recovered a backhoe, loaders, and trailers worth \$400,000. The report cites an estimate that theft adds around \$1,000 to the cost of a new home in the Houston area. And the *Detroit News* reports that in Canton Township, Mich., there have been around 25 construction-related thefts each month this year. One builder lost \$10,000 in equipment and building materials over the course of five weeks.



BILL ROBINSON

The rise in theft appears to be due to shortages of material and labor, and the delays these shortages cause. A scarcity of drywall, for example, has led to theft not just of drywall itself, but of the copper pipes and electrical wiring left exposed while jobs wait for drywall.

The extent of the problem is difficult to evaluate because police departments do not separate construction losses from other types of theft. The *Detroit News*, however, cites some telling trends identified by the Construction Association of Michigan:

- Construction theft supplies the black market sale of tools, equipment, and materials to unscrupulous contractors.
- Most thieves are themselves contractors or construction workers.
- Only half of the construction equipment stolen is ever recovered.
- Recovered equipment usually turns up within 65 miles of where it was stolen.

Security measures such as fencing, lighting, boarded-up windows, and alarm systems can help protect job sites. Prevention-minded business owners should also perform reference checks for all workers allowed on site, and should establish good relationships with neighboring residents and businesses that can be on the lookout for suspicious activity. For a more extensive list of the protective steps that builders can take to reduce theft, try the Eugene, Oregon, Police Department's Web site at www.ci.eugene.or.us/DPS/police/const.htm.

Airborne Fibers Safety Guidelines

The North American Insulation Manufacturers Association (NAIMA) has launched a voluntary worker safety program that establishes exposure ratings and recommends protective measures for working with synthetic vitreous fiber (SVF) insulations, including fiberglass, slag wool, and rock wool insulation products. The basis of the new Health and Safety Partnership Program (HSPP) is a recommended permissible exposure level of one fiber per cubic centimeter (1 f/cc), which is the same level proscribed by OSHA.

To make the program practical for real-world construction job sites, HSPP flyers (available at www.naima.org or by calling 703/684-0084) list typical job-site tasks along with their associated exposure levels and recommended protective measures. For example, respiratory protection is advised when working with blown loose-fill insulation, when removing fiberglass batts, or when installing batts in a poorly ventilated space. The guidelines also recommend using local exhaust ventilation whenever working with SVFs to keep exposure levels as low as possible.

Hunkering Down in Tornado Alley

Ever since 76 tornadoes ripped through parts of Kansas and Oklahoma on May 3, 1999, residents in the area have shown a surge of interest in the construction of “safe

rooms” — small in-home shelters that offer protection from wind-driven projectiles.

The product of 25 years of research at Texas Tech University’s Wind Engineering Research Center, safe rooms can be built out of wood, concrete blocks, or cast-in-place concrete. “These safe rooms can withstand a 250-mile-per-hour storm,” says Research Associate Larry Tanner. “They are designed to protect people from a flying 2x4 traveling at 100 miles per hour.” The wood-framed design specifies studs and ceiling joists sheathed with

14-gauge steel, followed by two layers of 3/4-inch plywood.

Homeowner interest in safe rooms, which can be built above or below grade in new or existing houses, has been rising rapidly. “After the May 3 tornadoes, the number of calls shot up to 50 a day,” says Bill Bishop, marketing salesman for CPI Industries in Collinsville, Okla., a builder of safe rooms. “Our business is now going at twice the rate of last year.”

The specification booklet for safe-room construction, “Taking Shelter from the Storm,” is available at no charge from the Federal Emergency Management Agency (FEMA, 888/565-3896), or can be downloaded from the Web at www.fema.gov/mit/tsfs01.htm.



Poured concrete safe room under construction in Oklahoma.

Algae-Resistant Shingles

Dark stains on asphalt shingle roofs — often misidentified as soot, moss, fungus, mildew, or tree droppings — are usually caused by algae. Most such roofs, however, have a clean, stain-free area below the chimney. It turns out that algae growth is inhibited by the metal ions leached from copper, zinc, or lead flashing. Jeff Jacobs, senior product development engineer at 3M, says, “It appears that these metals work by poisoning enzymes in the structure of the algae cell.”

Algae stains can be temporarily removed by washing the roof using a commercial roof cleaner or a homemade solution containing TSP, bleach, or copper sulfate. Once the roof has been cleaned, the algae can be kept at bay with pure zinc flashing strips installed near the ridge with 3 inches of metal exposed to the weather. Two brands of zinc strips sold for their algae-inhibiting effects are Shingle Shields (Chicago Metallic Co., 800/638-5192), and Z-Stop (Wespac, 800/845-5863).

For new roofs, the answer may be algae-resistant shingles, in which about 10% of the mineral granules have been replaced with granules made of copper oxide. Copper granules have been



Rain flowing over lead, galvanized, or copper flashing releases metal ions that inhibit the growth of unattractive roof algae. Manufacturers claim copper granules in new asphalt shingles offer the same resistance to algae staining for the rest of the roof.

available for about eight years, and are being sold to at least seven shingle manufacturers by two suppliers, 3M and ISP Mineral Products.

Algae-resistance warranties are prorated, and the jury is still out on whether the copper granules will remain effective for the entire life of the shingles. According to Ingo Joedicke, chief scientist at ISP Mineral Products, “Ten years would be a reasonable expectation” for the algae resistance of his company’s granules.

UNIVERSAL STEEL FRAMING LABELS

A new labeling system for all light-gauge framing steel was recently unveiled by the North American Steel Framing Alliance (NASFA). “The Right STUF” is a system that classifies products as either Studs or joists, Track sections, U-shaped channel studs, or Furring channels.

Labels also include basic information on overall depth and flange width, which are given in $\frac{1}{100}$ -inch increments, and base metal thickness, given in mils. For example, a 6-inch, 16-gauge steel stud would be labeled 600S162-54, where 600 is the 6-inch depth, S stands for Stud, 162 is the decimal equivalent of a $1\frac{5}{8}$ -inch flange width, and 54 mils is the thickness of the 16-gauge steel.

NASFA launched the new universal labels to give users the necessary information for determining section properties and calculating load-carrying abilities. Aside from making steel framing easier to use, the universal labels may simplify plan checking, code approval, and the development of CAD software.



NASFA AND SCHULER HOMES

NASFA’s “The Right STUF” labeling system for light-gauge steel framing gives the overall depth and flange width dimensions as well as metal thickness for steel framing pieces.