EIGHT-PENNY NEWS

VOLUME 12 • NUMBER 7 APRIL 1994

Earthquake Aftermath: On-Site Report

by Dan Friedman

Editor's note: *When home inspector Dan Friedman flew to San Diego for the annual conference of the American Society of Home Inspectors (ASHI), he didn't know he would be arriving in California on the heels of a killer earthquake. Along with dozens of his ASHI colleagues, Dan wound up donating a week of his time to the Red Cross-led disaster effort in the Los Angeles area. Here's a brief account of what he saw.*

In the days after the quake, ASHI volunteers took on the job of driving the streets of L.A., helping to locate damaged structures. It was different from our usual work, which calls for detailed inspections. Here we were just looking to see if the houses were still standing.

Damage in the huge city varied widely depending on many factors, including distance from the epicenter, soil conditions, construction methods, and luck. We were still finding unreported pockets of destruction a week after the quake.The first sign that we were approaching a bad area was often a row of fallen brick

continued

PHOTOS BY AUTHOR

Parking areas and ground-floor apartments were crushed when the quake collapsed sections of this apartment building.

Harvesting the Old-Growth In NYC

Even before the recent logging restrictions in the Northwest, old-growth wood was becoming a scarce commodity. For years, big timbers and clear, close-grained wood have grown scarcer and more expensive. But huge, old-growth timbers are still being harvested on the East Coast — in places like Brooklyn, N.Y. It's called "antique lumber," and it's some of the finest wood around.

M. Fine Lumber in New York City specializes in antique Georgia longleaf pine. Merritt Fine explains that the factories and warehouses built in America's industrial revolution in the late 1800s and early 1900s were mostly framed with heart pine timbers sawn from these huge old trees, until the trees were placed off-limits to loggers. Now, when these old mills are demolished to make way for progress, the Fines are right there to pick up the pieces. It's a family tradition, says Fine: "When they built the World Trade Center, my grandfather bought all the wood from the buildings they tore down." Eventually the heart pine will all be gone, he said, but for now, the harvest is still good. "We get it from all over — Chicago, Pittsburgh, you name it."

CHRIS TYREE

Hundred-year-old timbers recovered from old mills can be resawn into beautiful finish flooring.

The company is able to get the heart pine timbers at a good price, said Fine, because they are also willing to take the less desirable demolition wood. They sell torn-out Douglas fir and spruce to big contractors for uses like shoring, concrete forming or sewer lining. But after resawing, the heart pine is prized for uses from fine flooring to furniture. "When you see it

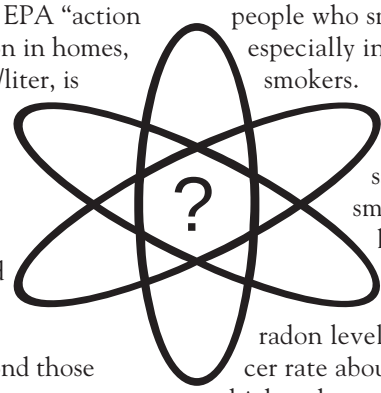
continued

Radon Hazard: Jumping to Conclusions?

Spurred on by government efforts, radon detection and abatement has become a growth industry. But a scientific debate continues on the actual health risk posed by radon in homes. A study of Swedish lung cancer victims published in January's *New England Journal of Medicine* was widely reported as confirming the belief that radon in homes causes lung cancer.

The Swedish researchers investigated the homes where the cancer victims had lived for the past 50 years and compared radon levels in those structures with the radon levels in the homes of a group of healthy people. The study concluded, "Residential exposure to radon is an important cause of lung cancer in the general population."

The study stated, "Our risk estimates correspond well to extrapolations based on studies in miners." This claim is important because the current United States EPA "action level" for radon in homes, 4.0 picocuries/liter, is based in large part on studies involving miners, even though the miners studied were exposed to radiation levels far beyond those found in homes.

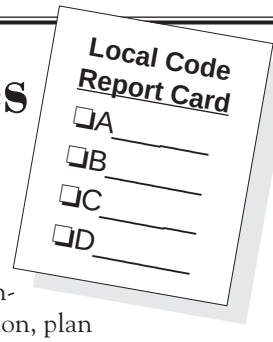


But a closer look at the data contained in the new study shows that the relationship between low levels of radon exposure and lung cancer may be far less definite than the headlines have reported. As was the case in many previous studies, the definite trend linking cancer to radon was found only in people who smoked, and especially in the heaviest smokers.

Among the study sample, heavy smokers who lived in homes with very high radon levels had a cancer rate about 30 times higher than non-smokers who had low radon exposure. But among those who never smoked, high radon exposure levels were not associated with a large or statistically certain trend in the cancer rate.

Political scientist Leonard Cole, author of the 1993 book *Element of Risk: The Politics of Radon,* teaches science and public policy at Rutgers University. He pointed out that five "case/control" studies similar to the recent Swedish one have had ambiguous results. In addition, he said, many studies comparing radon levels with lung cancer rates in different geographical areas have found an inverse correlation: lower cancer rates in areas with higher concentrations of radon in the outside air. "I would not advise anyone to take any action based on this one study," said Cole. □

Insurance Industry Presses for Code Enforcement



Hurricane Andrew socked property insurance companies with losses of $15 to $18 billion in 1992. Investigations after the storm convinced insurers that some of the worst damage could have been prevented if homes had been built to code. Now, the insurance industry is gearing up for a major effort to toughen code enforcement around the country.

The keystone of the insurance industry effort will be a nationwide grading system for state and local building departments. Organized by New York-based Insurance Services Office (ISO), the system will resemble ISO systems already in place that evaluate communities' fire protection services and flood planning programs.

In the case of flood or fire, ISO gives each community a grade from one through ten for its efforts to prevent property loss, with ten being the highest. The communities' grades are available to anyone, and insurers use them to set property insurance rates. A home or business located in an area with no fire department, for example, pays more for property insurance.

By the year 2000, ISO plans to give every community in the country a similar grade for its code enforcement efforts. A hundred communities have already been chosen for a pilot program. Each town's grade will be based on their answers to a questionnaire that asks about code administration, plan review processes, field inspections, and building programs.

Insurers will use the ISO grades to set their insurance rates. The immediate result will be to boost property insurance rates in communities with lax code enforcement, thus reducing the financial risk to the insurers. But the insurance companies hope that the ultimate effect will be to toughen code enforcement nationwide, especially in disaster-prone areas. Code officials are welcoming the proposal. Said one, "This is a real shot in the arm for our folks …. It's like having a 500-pound gorilla in your corner." □

Harvesting, *continued*

on the truck at the site, you say, gosh, who would want that?" said Fine. "Then you see it installed as a floor in somebody's house, and you say, 'Wow.'"

Tom Fazekas of International Wood Products in Queen Anne, Md., which resaws the old timbers into flooring, says the process is very labor-intensive. To protect the big band saw and planer blades, all nails or spikes have to be carefully removed. "We go over it with Geiger counters and metal detectors," he said. But the results are worth it, according to Fazekas: Heart pine flooring is as hard as red oak and has a unique warmth and beauty. And, said Fazekas, "We aren't cutting down the forest. It's the environmentally correct thing to do." □

STATE BY STATE

Massachusetts. The state attorney general's office has stepped up its efforts to fight workers comp fraud with help from the Insurance Fraud Bureau, a nonprofit insurance industry group. A spokesman for the attorney general's office says the state is using its reformed comp law to go after employers who lie about their payroll to reduce their premiums, as well as workers who fake injuries. Attorneys, insurance adjusters, and health-care providers who profit from fraudulent claims have also been prosecuted under the new policy, the spokesman said.

Vermont. The Republican-controlled State Senate has voted twice to reject all three of Democratic Governor Dean's nominees to the state Environmental Board, the body that decides appeals in Vermont's environmental permit process. The vote signals Republicans' dissatisfaction with enforcement of Act 250, the state law controlling development in Vermont. Critics say Vermont's strict environmental laws and lengthy permit process are hurting the state's economy.

New York. More than a million toilets in New York City are targeted for replacement with modern low-flow units in a rebate program starting this spring. In order to ensure proper installation of the new toilets, the city is requiring rebate work to be done by licensed master plumbers. The three-year program is slated to cost $275 million. The city hopes the changeover program will help it avoid spending billions of dollars on new sources of water.

Constructed Wetlands: Alternative Septic System

Builders struggling with low-perk soils and communities facing heavy sewage-treatment expenses should take a look at a low-tech, low-cost septic technology called "constructed wetlands" that proponents say is a cheap and effective alternative.

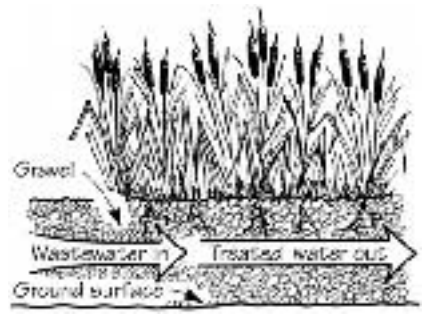
Constructed wetlands have been in use in Europe for decades. More recently, hundreds of systems have been installed in the American South under the auspices of the Tennessee Valley Authority, ranging in size from small units serving single homes to municipal systems serving entire towns. TVA officials say they know enough now to judge the experiment a success.

How it works. A constructed wetland system consists of a bed of gravel 2 or 3 feet deep, lined with plastic or concrete, with plants growing in it. After trying a variety of plants, experimenters report the best success with an aquatic reed in the genus "*Phragmites*." Most of the systems are "sub-surface flow systems" in which wastewater keeps the buried gravel bed continuously wet, while the surface remains dry. The reed bed replaces a standard leach field or mound. Wastewater flowing from the septic tank passes through the reed bed and emerges containing very low levels of bacteria, suspended solids, or nitrates.

The plants themselves take up very little of the pollutants in the water — most of the work is done by bacteria. Practicing engineer Sherwood Reed of Norwich, Vt., explains: "The plants are there to provide oxygen to the system. Aerobic microbes — those needing oxygen — can grow on the root surfaces. That's how you get rid of nitrogen." Anaerobic bacteria, which don't require oxygen, finish the job.

Reed is designing a constructed wetland for a Vermont school, and a system he designed for a single home was recently installed in northern Vermont. He says the cold Vermont climate is not a problem: When the reeds die back in winter, they form a blanket that insulates the bed, and the roots continue to grow all year.

Reed Bed Cross Section



SOURCE: SMALL FLOWS CLEARINGHOUSE

This cross section of a constructed wetland shows plant roots extending into a gravel bed to oxygenate the wastewater.

TVA expert Jerry Steiner, author of a TVA manual on wetland construction, echoed Reed's confidence. "They're using these systems in Norway and Sweden with no problem," said Steiner. "If it'll work in Norway, it ought to work in Vermont."

Developer Richard Scott consulted German scientists before he built a concrete-lined wetland system for an 80-unit trailer park in Rockaway Beach, Mo. He now installs systems for individual homes as well as for developments. He says the larger systems are more economical. "You can put in this system for a single house for the same cost as a standard septic, and get better sewage treatment," said Scott. "Anything over three houses, you're getting a deal on cost."

Cost aside, these systems offer a practical alternative for sites where conventional septic systems don't work at all, says TVA's Steiner. Steiner says Chattanooga developers have begun using them as a way to open up areas for building which had been unusable. The TVA is replacing substandard or nonexistent septic systems with constructed wetlands to reduce pollution of the watershed areas in the South. □

For More Information

Carol Davis
TVA Water Management
HB 2C
1101 Market St.
Chattanooga, TN 37402
615/751-7338

Richard Scott
Taneycomo Projects Inc.
P.O. Box 18
Rockaway Beach, MO 65740
417/561-4641

Sherwood Reed, P.E.
Environmental Engineering Consultant (EEC)
RR1, Box 572
Norwich, VT 05055
802/649-1230

Small Flows Clearing House
P.O. Box 6864
Morgantown, WV 26506
800/624-8301

FROM WHAT WE GATHER

Plumbing products will carry water-use labels beginning in October, in compliance with federal law. The Energy Policy Act of 1992 requires water-use information to be shown on packaging and catalogs as well as on the products themselves. The law also sets limits for water use of 1.6 gallons per flush for toilets and 2.5 gallons per minute for shower heads and faucets.

Energy savings from low-flow shower heads are often less than expected, a study shows. Theoretical savings from the efficient fixtures are exaggerated because people using the less efficient older fixtures usually don't turn the water on full blast. And the finer spray of a water-saving shower head feels cooler to the user, so people tend to compensate by running hotter water.

Contractors uncertain about job-site posting requirements might want to consider buying an all-in-one poster tailored to comply with regulations in their state. Personnel Policy Makers of Arcadia, Calif., is one company that supplies customized posters for all 50 states. Required federal and state postings are combined into one big job-site poster. The company sends out update notifications automatically when regs are changed. For information, call 800/548-4776.

A recall involving three million ceiling fans sold under the "Casablanca" name is underway following an agreement between Casablanca Fan Co. and the Consumer Products Safety Commission. The company has received 50 reports of the fans falling off the ceiling. Building occupants could be struck by the falling fans, and dangling wires may pose a shock hazard. If a fan falls, power to the unit should be shut off before touching it. For information on the recall, call 800/390-3131.

Steel suppliers are donating more than $1 million worth of framing material to the continuing effort to rebuild South Florida, which is still hurting from 1992's hurricane. Member companies of the American Iron and Steel Institute plan to supply enough steel to frame 200 houses targeted for low-income storm victims. The homes will be constructed with volunteer labor organized by Masterserve Associations, a Christian charity. Contact Masterserve at 800/537-7060.

With Los Angeles facing a major rebuild after this winter's quake, the news from a previous rebuild effort is not encouraging. "Rebuild L.A.," the organization formed to reconstruct the city's riot-damaged areas, has spent most of the federal money it received on administrative expenses and is now strapped for cash, reports the *L.A. Times*. The group's board of directors disclosed last fall that 70% of its spending was for wages and administrative costs and only 17% was for program services in the first 13 months of operation.

Training Programs Help Women Enter Trades

When Magan Gannon, job developer at Hard Hatted Women in Cleveland, Ohio, approached area ironworkers about taking some of her trainees as apprentices, they resisted the idea. "They told me women can't do this job," says Gannon. "I said, 'Bull! There are men that can't do that job.' They laughed and said, 'You got that right. But women *really* can't do this job.'"

The ironworkers finally agreed to take on four women apprentices. And, says Gannon, they called her back to tell her that the women were doing fine. But Gannon admits that it isn't easy for a woman to enter the building trades. It isn't a fluke that only 2% of construction trade workers nationwide are female. Even women who are interested in construction work often aren't prepared for it. Few women have the connections men have in the world of construction, and most aren't raised to be familiar with the tools and vocabulary of construction work.

But employers might want to take a second look at female job applicants who have graduated from Gannon's program, or others like it around the country that prepare women for entry-level building trade jobs. Designed to give the would-be apprentice an extra edge, the programs have attained a measure of success.

The point of the women's programs, says California remodeling contractor Leann Gustafson, is to provide women with the kind of support men can often take for granted. Gustafson came up through the California Carpenters Union before starting her own remodeling company. She's now the lead teacher at EnTrade, a newly formed San Francisco-area training program for women.

Like the successful programs it imitates, EnTrade's focus is on practical training: familiarity with tools, construction-related math techniques, blueprint reading, basic carpentry, plumbing, and electrical work, and, of course, safety. English classes focus on passing apprenticeship exams. The women lift weights for strength.

Discrimination and harassment can be issues for a woman on a construction site, admits Gustafson, but the programs tend to take a practical approach here as well. "We focus on making alliances," she notes. "Figure out who your friends are and work with them." Gannon says she tells her students that all apprentices have to prove themselves, not just women; they have to learn to distinguish between the usual hazing and real discrimination. "If they send you out for coffee — hey, you're an apprentice. If you're not getting the training that the men are getting, so you can't advance — *that's* discrimination."

Asked whether she found her early experiences as a carpenter discouraging, Gustafson laughs. "I loved everything about it. The humor, the rhythm of a job, the sense of accomplishment … I wish everyone could experience it." Gannon says, "Listen, this is no cakewalk. You're up on a 50-foot scaffold, down in a trench under the building... If you're just in it for the money, you won't last. You're heart's gotta be in it if you're gonna make it as a woman in the trades." □

Bent-over columns and severed connections bear witness to the earthquake's powerful jolting shocks. The steel column shown here contained no concrete.

Leaning porch posts are a sign that this house has jumped off its cripple walls.

Although this stucco damage looks severe, this house is still structurally sound.

Earthquake,
continued

chimneys lying on the ground, or fallen front porch roofs.

Often, we were the first relief workers local residents had seen. Many people whose homes were basically okay were too scared to sleep inside, even after we explained to them that the damage was only cosmetic. Other people, sadly, we had to tell what they already knew: that their homes were destroyed forever.

Minor damage to stucco and windows was common. This earthquake involved up-and-down jolts rather than the more typical side to side motion. It produced distinctive diagonal cracks radiating from all four corners of any opening or stress point, such as windows, doors, or steel plates. Although the stucco cracking looked severe on many buildings, in many cases the underlying structure remained sound. However, even on these buildings, the cracks looked frightening to residents.

A common type of serious damage to single-family homes was the collapse of basement cripple walls, commonly used on West Coast houses to add height to a crawlspace. When unbraced cripple walls collapse, the house moves sideways a distance equal to the height of the cripple wall. Then it falls the height of the wall — typically 2 to 3 feet.

At several three-story apartment complexes near the epicenter in the suburb of Northridge, the damage was severe.

Hollow steel columns, and in some cases 4- or 6-inch steel I-beams used as columns, had been wrapped with stucco, giving the illusion of more substantial strength. These were bent, sometimes to the ground. Steel girders separated and twisted, allowing the upper floors to collapse.

Collapsing second stories reduced parking areas and, in some cases, first-floor apartments to as little as a few inches in height, resulting in a record number of deaths. At the end of the main shock, second-floor balconies were resting on the ground, and the Northridge Meadows apartments had moved 8 feet north and 3 to 5 feet west. A National Guardsman commented that the quake had caused worse destruction than an artillery barrage.

The buckled girders, separated connectors, and doubled-over steel posts of Northridge buildings are a testament to the awesome power of a major earthquake. Upon analysis, they may also offer clues about how to construct stronger buildings. No man-made structure can be completely safe from earthquake damage, but well-built structures can save lives. Saving lives will be the goal as experts piece together the lessons of January 17, 1994. □

Arc Torch May Stabilize Foundation Soils

Georgia Tech researchers say a new technique that hardens soft soils could be used to stabilize settling foundations. Scientists at the university's Construction Research Center used a 100-kilowatt plasma arc torch in the laboratory to melt and bake problem soils into substances that resemble dark glass and hard brick. The treated soil is "five to ten times stronger than concrete," according to Dr. Lou Circeo, the center's director. A sample of the material sent to *JLC* looked like a chip of obsidian.

The plasma arc torch, originally developed by NASA, generates a lightning bolt that reaches temperatures hotter than the surface of the sun. Circeo says the torch offers two to three times the heating capacity of fossil-fuel systems that have traditionally been used to stabilize soils. By drilling a series of holes around an unstable foundation and lowering the torch into the holes, soil around the foundation could be heat-hardened to prevent settling or seepage. Circeo hopes to develop the technique for commercial application. □