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Plywood and OSB Could Have Cut L.A. Quake Losses

by Ted Cushman

The Los Angeles earthquake of January 1994 is in the record books as the most costly natural disaster in U.S. history. Now, experts involved in evaluating the damage say much of the destruction to single-family and multifamily residences could have been prevented simply by the proper use of structural wood panels — plywood and oriented strand board (OSB).

An American Plywood Association (APA) report on the quake says that some two- and three-story wood-frame buildings that did not have structural panel bracing in the exterior walls suffered severe damage in the quake.

Los Angeles area engineer John Aldenado is busy these



At left, a stuccoed building whose bearing walls were reinforced only with metal strapping was destroyed in January's quake. The building shown at right had plywood nailed to the inside face of its bearing walls, underneath the drywall, and escaped with only non-structural stucco cracking.

days with repair work on quake-damaged structures. "I'm spec'ing a lot of plywood," he said. "A lot of



these buildings had nothing for sheathing but chicken wire and stucco." The "whip action" of upper stories mov-

ing from side to side in a quake places a heavy stress on lower walls, said Aldenado: "The first floor is where you really have to beef it up. A lot of engineers are calling for 7/8-inch or even 1-inch plywood on first-floor walls."

APA Senior Engineer John Rose, co-author of the recent APA report, says some of the badly damaged buildings were approved for construction under "conventional construction" provisions, so that the building designs were not required to undergo a complete engineering analysis. "The engineering shows that it will take more than conventional construction to achieve seismic resistance," said Rose. "You have to go to thicker panels or closer stud spacing," *continued*

Summer Work Warning: Watch Out for the Heat

Builders get a lot of work done during the long, hot days of summer. But summer's heat also brings danger. Doctors advise anyone working hard in hot, humid weather to watch out for heat injury.

Heat exhaustion and heat stroke. Working muscles produce a lot of heat. The body deals with the excess heat by bringing blood to the skin, where the evaporation of sweat cools the blood. In hot weather, a worker can sweat off two or three gallons of water a day. If that water is not replaced,

dehydration leads to heat exhaustion.

When the weather is hot and humid, the cooling action of sweating is less efficient, and working may produce heat faster than the body can get rid of it. In extreme cases, the brain itself might overheat and lose its ability to regulate body temperature. Called *heat stroke*, this is a medical emergency.

Symptoms. A person with heat exhaustion has sweated off more water than he has taken in. He is dehydrated, and his

continued



To prevent heat injury in hot weather, doctors advise drinking enough water to replace two or three gallons of sweat per day.

Well Pump Lead Scare Fades

New tests show that an April report describing well pumps leaching lead into drinking water may have exaggerated the scope of the problem. The original lab tests measured the lead content of several 1/2-gallon samples of water in which a brand-new submersible pump had been sitting for 24 hours. Although lead counts dropped off sharply over the 30-day test period, high lead counts in early samples prompted the U.S. Environmental Protection Agency (EPA) to recommend that people drinking from wells containing pumps less than a year old get their water tested for lead, and drink bottled water until the test results showed their well water to be safe.

But in recent follow-up tests, when the same pump models tested in the lab were installed in real wells, the water they

produced contained much less lead. In fact, water drawn from the test wells after standing water was flushed out reportedly would meet U.S. Food and Drug Administration standards for lead in bottled water.

The EPA is sticking by its recommendations for now, however, as it continues to gather information. "The data aren't telling us that we have a major public health problem," says Peter Cook, assistant director of the EPA's water division, "but they aren't telling us that we absolutely don't have a problem, either." Cook says that the EPA would prefer to have no lead at all in drinking water because even low levels of lead contamination may cause "subtle" developmental problems in children.

What should builders do? Since lead is part of the recipe for brass, flush all plumbing

fixtures and fittings that contain brass — including brand-new well pumps — immediately after installation to remove any brass particles or dust left over from the manufacturing process. Urge concerned customers to have their water tested, and explain that the phenomenon appears to be temporary. If lead levels are high initially, they should return to normal in about four weeks.

But the most obvious solution is to install only lead-free submersible pumps. Even before the April well pump tests were done, most manufacturers were already offering submersible models that contain a no-lead brass made with silicon and copper or that replace brass parts with stainless steel and thermoplastic. Since the publicity surrounding the EPA announcement,



This Goulds submersible well pump is manufactured without any lead. Most pump manufacturers now have a lead-free model available.

pump makers have accelerated plans to phase out lead in submersibles altogether.

For help in locating a certified water testing lab, call EPA's Safe Drinking Water Hotline at 800/426-4791. □

Plywood & OSB, continued

and use more nails." Rose warns that even builders outside earthquake-prone areas should not be complacent about conventional techniques: "An 80- to 100-mph wind can actually put a greater load on a multistory building than an earthquake does."

Bob Harder of the L.A. Department of Building and Safety said that many single-story residences also could have benefited from structural panel sheathing. Many one-story southern California homes fell off their short supporting "cripple walls" or "knee walls" because of inadequate sheathing. "The committee looking at that is recommending that all those types of homes be retrofitted with plywood right from the first floor on down," said Harder.

Harder said L.A. codes are being changed on an emer-

gency basis to reflect information learned from the quake. For instance, some interior walls will now have to incorporate plywood, because walls sheathed with gypsum proved too weak.

The APA is encouraging builders nationwide to exceed minimum code requirements by using heavier panels. The organization's Code Plus program provides sales and promotional assistance to builders who agree to build using panels one step thicker than the minimum required by code, and who strictly follow nailing schedules.

For a copy of the earthquake report, APA Report T-94-5, or for information on the Code Plus program, contact APA at 206/565-6600. □

Ted Cushman is an associate editor at the Journal of Light Construction.

Heat Stroke, continued

body temperature is starting to rise. The loss of fluid volume makes the victim feel weak, light-headed, dizzy, and woozy. He looks pale and sick, and may even faint.

The person with heat stroke has passed the point of heat exhaustion, and his brain is malfunctioning. He may be unconscious. If he is still conscious, he may be disoriented, confused, and irritable. Hot, dry, red skin is a symptom of heat stroke.

Response. Heat stroke is no joke. If you think someone has heat stroke, do not delay — call an ambulance immediately. The victim needs emergency medical care to save his life and prevent brain damage. Until the ambulance comes, get the victim to a cool, shady area. Bathe him with ice water if you have any; otherwise, spray him with cold water and get a fan

on him. If he's not conscious enough to swallow, don't try to give him water — he might choke.

A person with heat exhaustion, on the other hand, will usually get better if he replaces his lost fluids. He should sit in a cool, shady area, drink plenty of water, and let his body's cooling system catch up. If a worker has fainted, or doesn't feel better after resting and drinking, he should probably knock off for the day.

Prevention: Drink early and often. The key to preventing heat injury is to drink plenty of water. Start the day by chugging some water, and take frequent breaks to drink and cool off. Drink whether you're thirsty or not. "The goal is to pee a lot," says one physician. "If your urine is clear, you're getting enough water. If it's dark or you don't pee at all, you're getting dehydrated and you need to drink more." □

STATE BY STATE

Massachusetts. The state Supreme Judicial Court has ruled that municipalities must follow the state's competitive bidding statute on public housing projects, even if all funds are provided by the federal government. Under the state law, all contracts and subcontracts for public construction must be awarded in competitive open bidding.

Vermont. A watered-down version of worker's comp reform passed the state legislature near the end of the session, but backers of the original measure were disappointed with the final package. The measure that finally passed limits disability benefits to net weekly wages, provides for employer designation of the initial health-care provider, and toughens enforcement provisions.

New Hampshire. Businesses with five or more employees should have health and safety committees set up as of July 1994 under the state's new worker's comp law. Businesses with ten or more employees must file a summary of their health and safety program with the Department of Labor each year or risk a \$1,000-per-day fine. Though most businesses have not filed their summaries, the state reportedly has yet to begin assessing fines under the new law. For a copy of the summary form and related rules, call the Department of Labor at 603/271-3176.

Costs Escalate as Economy Heats Up

Mortgage rates have continued to rise in response to a series of interest rate hikes by the Federal Reserve. The May average of 8.6% is up from 6.9% last October. Predictions for future mortgage rate moves vary, but it seems likely they will fluctuate near or slightly above current levels.

The National Association of Home Builders (NAHB), which says each half-point rise in mortgage rates cuts demand for houses by around 38,000 units, has cut its latest prediction for single-family starts from 1.23 million to 1.17 million. But the overall strength of the economy, indicated by rising production and falling unemployment, means that current predictions for housing starts are still higher than those of last fall.

While mortgage rates affect housing starts, the long-term, underlying demand comes from the needs of the population. Young people reaching home-buying age and people immigrating to the United

States will probably maintain a strong demand for homes. In fact, the number of new households in the U.S. is expected to continue rising at least until the end of the century.

All good economic news, however, has a down side. The bad news this time is that as builders move into a year of

price of an average house by \$7,500 this year.

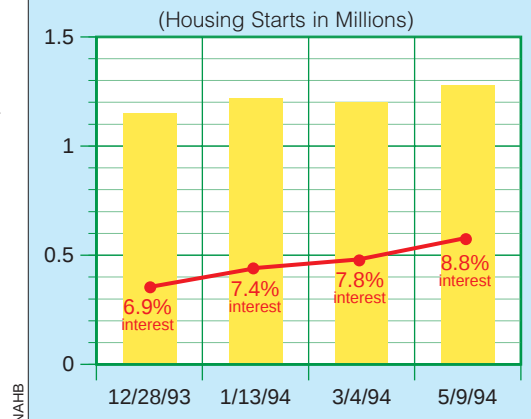
Of course, this year's "average" house isn't like the average house of five or ten years ago. The average house of today contains around 500 more square feet of living space than it did five years ago, and amenities like three-car garages and whirlpool

baths are considered standard items in many markets. So there is still room to economize if builders and buyers are willing to moderate their expectations.

Increased demand has also caused labor shortages. Builders in hot markets like Denver, Kansas City, and Phoenix are finding that shortages of framers are delaying home completions by as much as three months. Contractors

in these cities are recruiting from other parts of the country, but if building activity continues to be strong through the rest of this year, the scarcity of trained tradespeople is likely to affect builders nationwide. □

Recent Mortgage Rate Trends



Homebuilding remains strong despite rising interest rates.

strong activity, material and labor shortages are causing problems. Supplies of some materials, such as lumber and gypsum drywall, are not keeping up with surging demand. NAHB estimates that cost pressures will drive up the

Disposable Answer to Nature's Call

Did you know you can buy a PC for less than \$12? No, it's not a personal computer. It's a portable *Personal Commode* — a "human ecology toilet" that the supplier says is "ready to go when you are."

The *Personal Commode* is made of heavy-duty, biodegradable cardboard and uses biodegradable, disposable plastic liners. The cardboard seat can support up to 1,200 lbs., and folds up when not in use. The units saw duty in Operation Desert Storm, and

company spokesman Rick Diaz says the camouflage version used by the military is



The fold-up portable "Personal Commode," in use by the military, provides a solution to job-site sanitary needs.

still the most popular model. But he says the system is widely useful for disasters like the L.A. quake, for use by agricultural field workers, for remote construction sites, or anywhere people have to work away from sanitary facilities.

The toilet sells for \$11.95 and comes with three liners. Replacement liners cost \$1.95/dozen, and a shower-curtain-like "privacy cover" is available for \$49.95. To order, call 800/633-3246. □

One-Piece Washer/Dryer Solves Space Problems



Space-saving units that can wash and dry laundry in one operation are being offered by three companies. Shown above is the Equator Clothes-Processor.

Small is beautiful, but it's still small. Trying to fit a lot of living into a small space can be a perplexing problem.

If you're trying to squeeze laundry facilities into a small area, you might want to consider a combination washer and dryer. According to June's *Demand Side Technology Report*, models from at least three manufacturers are available nationwide. The European-made machines are relatively new to the U.S. market, but they have been widely used in Europe for years.

In addition to saving space, combination

washer/dryers offer convenience to busy consumers — you can load your wash, push the buttons, and come back to find your laundry not only clean but dry. Some of the models available are ventless versions that condense the moisture from the drying process into water and send it down the drain.

Prices for the appliances range from a high of \$1,300 (\$975 to contractors) for New Harmony's model, to \$795 (\$600 to contractors) for Equator's model. The contractor prices compare favorably with the price of a washer and dryer sold separately. □

Sources of Supply

New Harmony Systems Corp., 122 Parkdale Plaza, 1660 South Hwy. 100, Minneapolis, MN 55416; 612/593-0629.

Equator Corp., Arena Tower II, Suite 855, 7324 Southwest Freeway, Houston, TX 77074; 713/270-1565.

Marine Appliances, 2807 Antigua Dr., Burbank, CA 91504; 800/672-8297.

FROM WHAT WE GATHER

Small businesses have a new source of short-term credit.

The Small Business Administration (SBA) has introduced a new program called GreenLine to provide federally guaranteed revolving lines of credit to small businesses who don't have access to short-term financing. The federal government will guarantee up to \$750,000 of bank financing per borrower. The line of credit advanced must be secured by company assets. Ask your banker for more information, or call SBA's Answer Desk at 800/827-5722.

Most homes aren't bullet-proof. But if yours need to be, call

Scott Shaheen of Bullet Resistant Systems in San Antonio, Texas (210/492-9411). Shaheen's company has developed a line of bullet-resistant house siding they say will stop any size bullet up to a .44 Magnum and beyond. "There are levels of protection," said Shaheen. "We can make our product strong enough to resist NATO armor-piercing rounds." The siding contains a fiberglass material already used in banks and courtrooms. Sliding window panels are also available.

A biodegradable form-release agent is now available from

Bio-Form (1951 N. 25th Ave., Franklin Park, IL 60131; 708/455-5700). The product is made from vegetable oil and can be applied just like ordinary form oil. Bio-Form costs more than petroleum-based release agents, says the company, but some users may have no choice but to switch because of government environmental regulations. Petroleum-based form oils have been blamed for soil contamination at locations where forms are washed or stored.

U.S. Brass has filed for Chapter 11 bankruptcy, as

predicted. The company has decided that it may be unable to absorb the cost of litigation involving failed polybutylene plumbing installations. U.S. Brass will continue operations under federal court supervision.

Municipal "flow control" laws for solid waste are

unlawful, the U.S. Supreme Court has ruled. This means that towns can no longer require solid waste, including construction debris, to be hauled to specific landfills, incinerators, or transfer stations. Some local governments have required trash in their jurisdictions to be taken to particular facilities in order to keep those facilities financially viable, a practice the court said violated interstate commerce laws. The ruling is expected to give people with trash on their hands freer access to competitively priced disposal options.

Cotton may be the next new insulation material,

Environmental Building News reports. Greenwood Cotton Insulation Products Inc., of Roswell, Ga. (404/998-6888), plans to introduce the new material in faced and unfaced batts and as a blown-in product. The insulation will be manufactured from waste cotton scraps from textile mills, with a small amount of polyester binder.