NOTEBOOK

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EDITED BY MARTIN HOLLADAY AND JON VARA

Leaky Condos Plague British Columbia

Government imposes fee on builders to pay for future repairs

In British Columbia, Canada, the problem of moisture penetration in multifamily housing is so widespread it has earned the nickname "leaky condo syndrome." To meet the ballooning demand for housing during the 1980s, a number of new construction companies were established in Vancouver, B.C. By the mid-'90s, thousands of condo owners discovered that their recently built homes were rotting, and that the contractors responsible were no longer in business. The leaky condo problem in Vancouver created a crisis in the building industry, leading

Water penetration has caused thousands of relatively new wood-framed buildings in British Columbia to rot. A government inquiry placed blame on faulty design, shoddy construction, and inadequate inspections.

to new regulations that have changed the practice of residential construction in the province.

What caused the leaks? What the Canadians call leaky condo syndrome — often defined as "premature building envelope failure" — occurs in single family homes as well as condominiums. Most of the failing buildings in British Columbia suffered from rotting sheathing or wood framing due to moisture entry into walls. "This is a rain penetration problem," says Jacques Rousseau, a building researcher with

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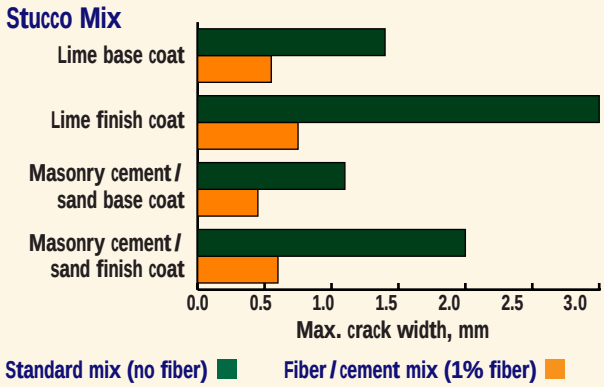
Cellulose Fibers Improve Stucco

Recent research on new uses for fiber cement has shown that when small quantities of cellulose fibers are added to stucco, there is a dramatic improvement in the stucco's performance. After adding cellulose to typical stucco mixes at a ratio of 1 part cellulose fibers to 100 parts cement, by weight, researchers found improvements in a variety of characteristics, including ductility, flexural strength, bond strength, abrasion resistance, durability, and resistance to cracking and impact. For example, the maximum width of shrinkage cracks in stucco with cellulose fibers was 63% to 80% narrower than cracks in unreinforced stucco.

Effect of cellulose fibers on shrinkage cracking of hardened stucco



Some stucco plasterers use nylon or polypropylene fibers to reinforce the base coat of stucco. However, such fibers result in a hairy stucco that cannot be used for the finish coat. Unlike polypropylene fibers, cellulose fibers are invisible, even when used in the finish coat. "Polypropylene fibers are coarse fibers that don't disappear in the mix," says Parviz Soroushian, who conducted the research at Michigan State University. "Cellulose comes naturally in a very fine diameter."

Cellulose fibers suitable for use in stucco are available from DPD Inc. in Lansing, Mich. (517/485-9583).

Leaky Condos Plague British Columbia

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Canada Mortgage and Housing Corp. "The water is getting in through faulty building details."

The coastal climate in British Columbia, which is notably wet and windy, is unforgiving of careless construction detailing. The troubled condos were often designed with minimal roof overhangs, and many had poor flashing details. For example, some condos had water entry at cantilevered deck joists, or at the connection point where deck rails meet siding.

"The water is entering the walls in buckets," says Rousseau. When told that their sheathing and studs were rotting, many homeowners incorrectly blamed the siding. "On a leaky condo, the siding can be anything — vinyl, wood, or stucco," continues Rousseau. "The problem is the design, not the products. It's not an EIFS problem, a stucco problem, or a vinyl problem. It's a wall problem." Changes in construction practices over the last 20 years have resulted in slow drying walls. "Because we have made these buildings more energy efficient, it causes us more grief than buildings in the past," says Rousseau. "Now, with the insulation, your outer wall is very, very cold. If you are in a moist, cold climate, and if you get water in the walls, there is no drying."

Government steps in. In April 1998, in response to rising public outcry from irate homeowners, the provincial government established a Commission of Inquiry, headed by David Barrett, to investigate the leaky condo problem. In June 1998, the Barrett Commission issued its report, describing a "crisis of quality" that threatened the stability of the residential housing market in British Columbia. The report noted that the average leaky condo repair cost $23,300 (Canadian) per unit, with the total repair cost for all affected condos estimated at between $500 million and $1 billion.

The report's assignment of blame was wide-ranging. Summarizing the commission's conclusions, Rousseau says, "There was a systematic failure. There was bad design. There were shoddy contractors, uneducated workers, and building inspectors who couldn't inspect."

Responding to the recommendations of the Barrett Commission, the

provincial government passed the Homeowner Protection Act, requiring licensing of all residential builders. All new homes must be covered by a third-party warranty covering building envelope failure for a period of five years. As of July 1, 1999, builders of new multi-unit housing in the coastal area of British Columbia must pay a special assessment of $750 per unit toward an interest-free loan fund for owners of leaky condos. The loans are administered by the Homeowner Protection Office, which handed out more than $19 million in assistance to 1,065 homeowners during its first few months of operation — the first stage of a program that is expected to total $75 million.

Best practice guide. As part of the reforms ushered in by the Barrett report, the Canada Mortgage and Housing Corporation has published a design and construction detail book for builders called the *Best Practice Guide* (available for $104 from Canada Mortgage and Housing Corp.; 604/731-5733). One of the guide's main recommendations is the use of rain screen cladding, where siding is installed on vertical furring strips rather than directly against the sheathing (see "Rain Screen Siding Retrofit," 4/98).

Not just a Canadian problem. Although coastal British Columbia is notably rainy, building envelope problems are occurring in a variety of climates. "This is an enormous problem," says Pete Fowler, a consultant in San Juan Capistrano, Calif., specializing in construction defect cases. "In excess of 95% of the litigation we've been involved with has concerned water intrusion issues in multi-unit projects." According to Michael Aoki-Kramer, code development analyst for the city of Seattle, "We think that about 20% of the multifamily buildings built in Seattle in the last 15 years are having some sort of building envelope problem."

Some U.S. states are establishing funds similar to British Columbia's reconstruction fund. For example, Connecticut recently passed a law requiring new home builders to pay a fee of $600, due every two years, $480 of which is earmarked for a "new home guaranty fund." Connecticut consumers defrauded by contractors must prove their claims in court. If the builder has no assets or has gone out of business, the consumer can recover money from the guaranty fund.

For builders who are nervous about the rising tide of lawsuits, Fowler has some simple advice: "Keep the water out of the buildings, and you're likely to stay out of the courtroom."

OFFCUTS

Online building permit applications may soon be available to San Francisco contractors who are willing to pay $50 to $500 a month to a for-profit "expediter." A company called NetClerk.com is now testing its services with 50 area contractors. In Orlando, Fla., the city makes building permit application forms available online at no charge at www.ci.orlando.fl.us/permits.

Jet Equipment has bought Powermatic Tools after Powermatic's parent company, DeVlieg-Bullard, filed for bankruptcy under Chapter 11. Jet Equipment & Tools of Auburn, Wash., is a subsidiary of Walter Meier Holding AG of Zurich, Switzerland.

Building permit fees are illegal when the fees are higher than the amount necessary to cover permit processing costs, according to a State Superior Court decision in Whatcom County, Wash. The court ordered the city of Bellingham to refund $1.6 million in excess permit fees to builders. City officials announced their intention to appeal the ruling.

Most owners of manufactured homes report defects, according to a survey by AARP. The seniors group found that more than 75% of those who bought a manufactured home in the last eight years complained of problems. Leading the list of reported defects were improper fit of interior parts, improper fit in doors or windows, and cracks in the walls.

Sales and profits have fallen for makers of manufactured homes, according to a report in the *Los Angeles Times*. Overproduction has resulted in a surplus of manufactured homes on retailers' lots. The *Times* predicts that the glut will force some retailers out of business.

A new nationwide "Call Before You Dig" number has been established to prevent ruptured utility lines. The toll-free number, 888/258-0808, should simplify life for wide-ranging contractors, who now have to remember the "dig safe" numbers for each state where they work.

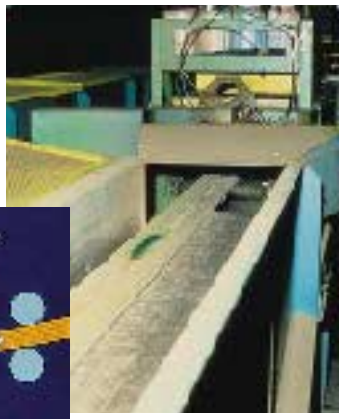
Machine-Rated Lumber

Since computers excel at dull, repetitive tasks, performing them many times faster and more accurately than humans, it was only a matter of time until someone developed a computerized machine to grade lumber.

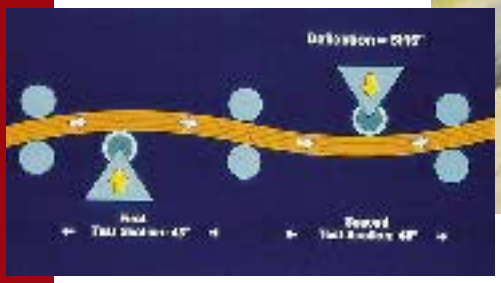
Visual lumber grading relies on the vigilance of a person trained to evaluate a board's characteristics as it passes by at a rate of three seconds per board. Although visual grading works well enough, it's easy to see how the repetitive, fast-paced work allows a percentage of defects to slip through the cracks. To achieve more consistency, two methods have been developed to rate lumber by machine: machine-stress-rated (MSR) lumber, and the more recent Canadian technology, machine-evaluated lumber (MEL).

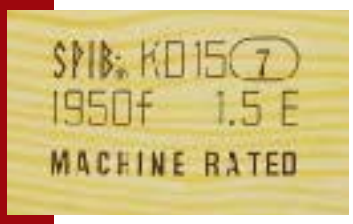
In the MSR process, lumber is fed into a machine that uses sets of rollers to introduce loads. Electronic sensors measure a board's resistance to these forces, producing a precise evaluation of the board's stiffness and elasticity. The MEL process uses X-rays to measure a board's density. Combining the data from either of these two processes with visually observed characteristics gives a higher degree of accuracy to the grading process than visual grading alone.

MSR and MEL lumber are primarily used in engineered wood products, such as floor trusses, roof trusses, and glue-laminated beams. Approximately 1.2 billion board feet of MSR lumber was produced in 1998 — mostly 2x4 SPF, but also Doug fir, Hem-fir, and SYP, in dimensions up to 2x12. Purchasers of machine-graded lumber, which is more expensive than visually graded lumber, feel there is added value in the consistency of machine grading. As engineers, architects, and builders learn that MSR lumber is reliably rated for strength and relatively free of wane, the market for machine-rated lumber is likely to expand to include an increasing percentage of solid-sawn lumber used for built-up beams, joists, and rafters.



Lumber is subjected to calibrated stresses as it passes through the grading machine. Sensors gauge the resistance forces, giving an accurate evaluation of lumber strength.





MSR grade stamp interpreted, clockwise from upper left: grading agency (Southern Pine Inspection Bureau); moisture content (15%); mill identification; modulus of elasticity; grade designation; bending strength.

Little Septic System on the Prairie

Homeowners in Glenwood, Iowa, claim that the county's failure to enforce septic regulations has caused many inadequate systems to fail. A class-action lawsuit seeks damages from the county, but builders may ultimately find themselves picking up the tab.

If a builder installs an undersized septic system, and the county doesn't inspect it, who's to blame when it fails? In Mills County, Iowa, where more than 20 septic systems on new home sites have failed recently, that question will be decided in court.

Many of the failed systems are located in the small town of Glenwood, where a ten-year building boom has resulted in the construction of more than 750 new houses intended to appeal to newcomers from the nearby urban center of Council Bluffs. As in many other rural areas across the country, there was little or no enforcement of zoning or building codes — a situation that apparently led some septic installers to cut corners when installing new systems. An area newspaper, the *Omaha World-Herald*, reviewed two years' worth of county septic permits and found that nearly all were sized to the state minimum, even when the size of the home in question should have required a larger tank and leach field. According to the Iowa Department of Natural Resources, the county did not require perc tests before permits were granted.

Last June, two Glenwood homeowners with failed septic systems filed a class-action lawsuit against the county sanitarian, the board of health, and the board of supervisors, claiming that they had failed to inspect the new systems properly. Twenty additional homeowners have since joined the suit, and others will probably appear as the case moves forward.

"The county is the fulcrum," says the plaintiffs' attorney, James Webering. "There were 15 general contractors involved and 30 subcontractors, but if the county had done its job, people wouldn't have pools of sewage in their yards."

But builders won't be off the hook even if the county ends up paying to replace the failed systems. "If the county loses," Weberson says, "it can always turn around and sue the contractors to recover its costs. I know that's what I'd do if I were them."

Two New SIPs

A company in Indiana is selling "pre-configured" SIPs — structural insulated panels that are delivered to the job site with the rough window and door openings already cut. The panels, which sandwich urethane foam between OSB sheathing, even come with electrical boxes and 3/4-inch conduit already installed.

To order the panels, a builder provides the factory with a standard set of prints or CAD files. At the factory, the panels are manufactured with all of the rough openings cut out and framed with 2x4s. "Because we build each panel in its final shape," says Patrick Egan, president of Thermocore, the manufacturer of the pre-configured panels, "there is far less waste generated at the job site or the factory."

In a separate development in panel technology, a shop in Greenfield, Mass., is building insulated panels without any foam at all. Each "no stress panel" is framed with a double row of 2x3 studs and insulated with cellulose. A layer of filament-reinforced polyethylene stretched between the doubled studs keeps the cellulose away from the innermost stud bays, which are used for wiring. The panels come with plywood sheathing on the exterior side only, and the inner 2x3s come predrilled to make wiring easier.

"I developed these new panels because I was concerned about the durability of foam-insulated panels, and concerned about all the environmental issues," says Leo Ojala, the owner of Ingenuity Wood, which began manufacturing the panels recently. The company is still working out some kinks in the system: At its first job, the cellulose insulation in some panels got wet before the roof was up. "It was certainly a learning experience," says Leo. "We'll be using plastic-wrap for shipping the panels on the next job."

Structural insulated panels are available with factory-prepared rough window openings, reducing on-site labor.

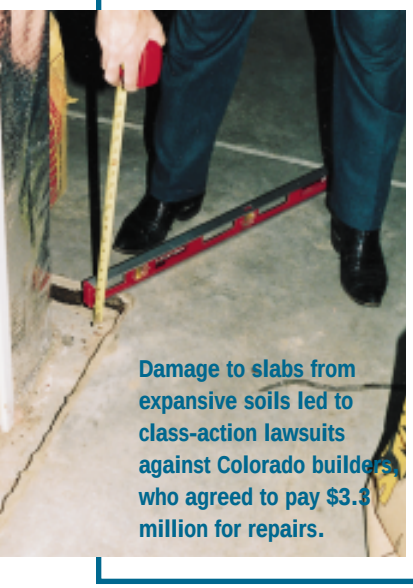
Petition by Demolition

Developer Dan Kohrdt expressed his dissatisfaction with local land-use planning by demolishing the new sheriff's substation he planned to donate to the county (left). Kohrdt mashed the debris into small pieces and boxed it up for delivery to county commissioners (below), who subsequently reversed a ruling against Kohrdt's development.

Dan Kohrdt is a developer who has lived in Oroville, Calif. for less than a year. Trying to be a good neighbor, he offered last spring to build a 600-square-foot sheriff's substation at his own expense and lease it to the county for $1 a year, as one element of a development that he hoped would eventually include a gas station, small supermarket, motel, and RV center. After completing the substation, Kohrdt began excavating a detention pond to control runoff from the anticipated development. But in early autumn, the Butte County Board of Supervisors notified him that the grading in progress was not covered by the existing permit for construction of the substation. He was ordered to stop work and apply for a new permit.

Irked at what he saw as unwarranted interference with his business, the former demolition contractor got so mad that he reverted to his old trade. He applied for and received a demolition permit, tore down the just-built substation, and packed the debris neatly into 150 cardboard boxes. Then, accompanied by a busload of cheering supporters, he delivered the boxes to the county offices. "When they come down on you like this about one little motel on the second largest lake in California," Kohrdt says, "you know something's wrong."

The unconventional appeal apparently worked. On October 21, the county supervisors voted 3-2 to allow the site work to resume. And although some hard feelings may remain, Kohrdt has announced his intention to build another substation. "The people supported me when I tore it down," he says, "but they need the station, so I'll support them by building a new one."



Damage to slabs from expansive soils led to class-action lawsuits against Colorado builders, who agreed to pay $3.3 million for repairs.

Bentonite is Bustin' Out All Over

Dallas-based Centex Homes has agreed to a $3.3 million settlement with homeowners in Douglas County, Colo., to repair basement floor slabs that cracked and buckled when uplifted by expansive soils. The agreement covers about 1,500 homes built between 1988 and 1996, most of them in the Denver suburb of Highlands Ranch. The Centex settlement is the last in a series of class-action suits against Colorado home builders, including Richmond Homes, Mission Viejo, and four others.

Like others parts of Colorado, the area is underlaid by soils that may expand as much as 15% when exposed to moisture. "Moisture is the catalyst," says Denver soils engineer Richard Ricks. "When you have development, you have moisture getting into the ground from sprinklers and runoff from paved roads. It can't evaporate if the ground is covered with roads or buildings, so that's where you get heaving." The expansive soils are commonly known as bentonite soils, for their similarity to a clay-like mineral used for waterproofing well casings and — ironically — sealing leaky basements.

"By now, most big builders have gotten the message that it isn't that difficult to get it right," says attorney Scott Sullan, who represented the plaintiffs in all of the soil expansion lawsuits. "It only costs an extra $2,500 to build a structural floor over a crawlspace so the soil can expand without damaging anything."

Stripping in Boston

The shortage of skilled construction workers in the Boston area has led to an increase in labor practice known as "stripping," by which labor organizers persuade non-union electricians, carpenters, masons, and other tradespeople to leave their current jobs to work for contractors with union agreements. Workers are often attracted by the higher wages typically paid by such contractors. According to one union official, Mark Erlich of Boston's Northeast Regional Council of Carpenters, the wages and benefits for a journeyman carpenter with his union come to more than $37 an hour.

"Actually, stripping isn't our first choice," Erlich says. "We'd rather bring the whole company into the union." But if efforts to unionize a company fail, he concedes, the workers are fair game. One Rhode Island builder working on a condominium project in Quincy, just south of Boston, reportedly lost 19 of 25 carpenters to the union last summer.

In the past, union organizers have largely ignored non-unionized residential builders, focusing instead on large and medium-sized companies involved in commercial construction. But given the shortage of labor in the Boston area — where last summer's unemployment rate, according to Erlich, was "about zero" — that may be about to change. "We're starting to put some effort into residential now," Erlich says. "Some of the medium-sized builders are starting to talk to us, and even some of the mom-and-pop outfits."

OFFCUTS

The boom in huge new homes has been a boon for butlers, the *New York Times* reports. With more and more new houses exceeding 3,000 square feet — which, according to the *Times*, is often considered the size threshold for domestic help — there's a nationwide shortage of qualified butlers, even at the prevailing wage of $60,000 to $120,000 per year. "I wish I had more students and more applicants," said Carol Scudere, the owner of a butler school in Columbus, Ohio. "I could place them all."

The main source of environmental lead is gasoline, not paint, according to an article in *American Scientist*. When studies in Maryland, Minnesota, and Louisiana found "urban metal islands" of contaminated soil in areas near major downtown intersections, researchers concluded that the largest single source of the lead was accumulated residue from vehicles that once burned leaded gasoline. Lead levels in such areas were 10 to 100 times that of soils in comparable neighborhoods in smaller cities.

Builders must take erosion control classes in Cobb County, Georgia. Any builder seeking a building permit is now required to have someone on site who has completed a four-hour course in erosion and sediment control.

The NFRC will require new ratings on windows beginning in January 2001. In addition to the presently required U-factor, the National Fenestration Rating Council will begin requiring that manufacturers rate windows for visible transmittance and solar heat gain.

Radiant heating continues its rapid growth, as shown by the 22% increase in sales of tubing used for in-floor heating between 1997 and 1998.

DeWalt has recalled screwguns that can give users an electrical shock. The defective screwguns, also sold under the Grabber and Black & Decker brands, are stamped with date codes from 9601 to 9833. DeWalt has also recalled some 7 1/4-inch circular saws (model DW378G with date stamps from 9813F to 9820F), because of defective blade guards. Call 888/302-7703 or visit www.dewalt.com/pressroom/index.html for more information.