IN THE NEWS

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Deck Researchers Scrutinize Railing Attachment

As deaths and injuries continue, an engineering team zeroes in on flawed deck details

A Virginia Tech task force examining the critical structural details for residential decks and balconies released detailed data and conclusions about deck-to-house attachments this spring (see "Load-Tested Deck Ledger Connections," 3/04). Now the team is shifting its focus to the other end of the deck. In a process that Virginia Tech professor emeritus Frank Woeste expects to take at least a year, the group will apply its mix of field investigation, engineering analysis, and laboratory

testing to railing and rail post connections in hopes of identifying which details will prevent death and injury and which won't.

Each year brings a fresh crop of deck structural failures, occasionally with multiple casualties. Only the most dramatic failures, like last summer's Chicago disaster that killed 13 partygoers, get widespread press attention; no one knows how many deck calamities go completely unreported. But failures that kill or injure people are common enough for Richmond, Va., attorney John

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Home Inspectors, Home Builders Consider Construction Defects

Relations between home builders and home inspectors can be uneasy. Some inspectors see builders as careless nail bangers whose primary interest lies in slapping up houses as quickly as possible, while builders tend to view home inspectors as clipboard-toting nitpickers. But there's obviously a lot of common ground between the two groups, and a recent article in the *ASHI Reporter* — the monthly magazine of the American Society of Home Inspectors — describes an ongoing effort by ASHI and the National Association of Home Builders (NAHB) to share information of interest to both groups.

According to the staff-written article, which appeared in the magazine's February 2004 issue, informal networking between the organizations began in 2002, when an ASHI official sat in on a meeting of the NAHB's Building Products Issues Committee. At subsequent meetings in 2003 and 2004, ASHI past president Rich Matzen presented the results of a survey of members who inspected new construction. Among the survey's reported findings:

✔ Improperly installed flashing is a pervasive problem. Almost a third of respondents reported that needed flashing was often not installed at all. Of nine common flashing applications listed, chimneys, roofing, wood decks, and windows were identified as particularly troublesome by more than 50% of survey participants.

✔ Problems related to site drainage were also common, with 73% reporting difficulties with downspouts and 64% mentioning improper backfilling.

✔ Errors in roof construction included valleys that terminate at walls and downspouts that empty onto lower roofs. Improper nailing was the most commonly reported defect associated with shingle roofs.

✔ Bathroom fans are the most common source of ventilation problems. Attic venting — including a lack of vents and vents blocked by insulation or paint — is a close second.

✔ "Plumbers are the most likely [trade] to be unaware that they can compromise the structure and other systems in the house as they complete their part of the job." One quoted respondent put it more bluntly: "The most dangerous of all the trades is a plumber with a Sawzall."

Deck Railing Attachment

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Conrad to make part of his living defending the resulting lawsuits, and Conrad has no trouble calling examples to mind. He joined Frank Woeste and Virginia Tech wood science professor Joe Loferski in presenting a three-day seminar titled "Liability Issues, Design Data, and Inspection Techniques for Wood Decks, Balconies and Porches" at Virginia Tech in April.

"There are a lot more cases than people realize," Conrad told *JLC* in February. "Usually it's the owner who gets sued, because they are usually covered by insurance. That's the economics of a lawsuit. But when the insurance won't cover the damages for any reason, plaintiffs can also turn to the designer or the builder." There's usually little room for argument, adds Conrad: "If a deck falls down and someone is hurt or killed, people expect the owner to pay. It's pretty much time to get the checkbook out."

Loferski sometimes serves as an expert witness in deck-related lawsuits. "I'll be hired by one party or the other, and my role is to help these people understand what actually happened," he explains. He says there's a reason the Virginia Tech team has zeroed in on ledger connections and post and railing attachments: "These are the two components on the deck that, when they fail, people get hurt or killed. I have not heard of anyone falling through a deck board, for instance. We haven't heard of a single column that has collapsed due to buckling or overload. The only ones we hear about are those two: the deck ledger and the handrails."

In contrast to total collapses caused by a failure of the ledger connections, says Loferski, railing failures usually involve only one or two people. "When ledgers fail, it's because a lot of fasteners let go at once. With railings and rail posts, a catastrophic failure can occur when only one or two fasteners fail. A couple of people lean over, and they fall."

News reports about major collapses typically include a bystander's opinion that the deck was overloaded with people, but Loferski gives that notion little credence. "If you look at the design code loads — 40 pounds live load plus 10 pounds dead load — it's hard to make that up with people. Even if you had the whole deck full of 300-pound people, I don't think you could do it."

For a railing, says Loferski, it might be possible in theory to exceed code-specified design loads. "The design code load is 200 pounds in any direction, applied at the top of the railing. In *ASCE 7*, the document that codes refer to for loads on buildings, there's an additional provision of 50 pounds per lineal foot of railing, and if the posts are 10 feet apart, that would govern. That sentence from *ASCE 7* didn't get into the building code; but if you had posts spaced 10 feet apart, and people leaning against the whole length of the rail, it may be that you could overstress a post."

But in the real world, says Loferski, the railing failures he knows about had nothing to do with overloading: The structures were clearly inadequate. "One or two of them might have worked when they were new, but even those were underbuilt. Typically, the railings that failed were less than ten years old, and they tend to be built with untreated wood that has deteriorated in service, and with ungalvanized nails that have rusted. Often people used finish nails or screws that were never adequate for the design loads even before they started to rust."

Even as Loferski spoke, news reports indicated that the 2004 deck failure season was already underway. In late February, seven men brawling at a New Jersey party broke through a railing and fell 25 feet (five went to the hospital and two left the scene, police said). And in DeKalb County, Ga., four adults and two toddlers ended up at the emergency room with minor injuries and charcoal burns after a deck collapsed during a cookout. The six were fortunate, DeKalb County Fire Department captain Eric Jackson told TV reporters on the scene: "They were able to walk away."

OFFCUTS

Nebraska legislators have introduced a bill to repeal the state's new sales tax on home repair and renovation labor, reports the *Omaha World-Herald*. Facing a budget crisis, the state started taxing remodeling labor last October. Labor on new construction is not taxed, however, and remodeling contractors say the tax creates an incentive for citizens to buy new homes instead of maintaining their existing buildings. But the new tax is expected to bring in close to $160 million over the next four years and for that reason is unlikely to be repealed.

NBA basketball legend Michael Jordan and his wife, Juanita, are suing the Sto Corporation for consumer fraud in connection with what they say is extensive water damage, rot, and mold growth in the walls under the EIFS exterior of their Chicago mansion, according to the *Chicago Tribune*. The couple's custom home was built in 1992. When they found moisture under the EIFS in 1999, they charge, the manufacturer advised them that only minor repairs were required. The Jordans say they have since spent $2.6 million on engineering and repairs and had to move out while work was done.

OFFCUTS

Thieves who stole a compressor and other tools from a home under construction in Vancouver, Wash., evidently were not professionals, according to a story in the *Vancouver Columbian*: One of them left a clue behind. The thieves' noisy Chevy Blazer attracted attention during the theft from neighbors, who then got a good look at the vehicle when the thieves drove past the house a second time. Police stopped the Blazer three blocks away but had a positive identification of only the vehicle, not its occupants — until the home's owner discovered one of their wallets back at the site, in the tank of his shop vacuum. "The investigation went very smoothly after that," said a police sergeant.

If you sell kitchens, you'll like the sound of this: Almost all American women homeowners say they want to renovate the kitchen in their home, according to survey results released by Wilsonart, manufacturers of countertop and flooring materials. A poll of 1,128 women found that 68% of respondents expected to renovate within the next five years, while 37% said they plan to renovate within two years, and 15% within the next six months.

Removing "abandoned" data cables during commercial building renovations, as required by the latest *National Electrical Code,* may pose a health hazard, according to a March report in *Environmental Building News*. Most communications cable is sheathed in PVC plastic that uses lead as a stabilizing agent, says *EBN*. As the cable gets brittle with age, it can release lead-contaminated dust, allowing workers and building occupants to unknowingly inhale or ingest the toxic metal. Although the requirement to remove cables is already being enforced in some localities, *EBN* says the issue of possible toxic lead exposure has not been studied in depth.

Delisting of "Threatened" Flower Fuels Criticism of Endangered Species Law

Over the last decade and more, California builders and developers have had to tiptoe around the Hoover's woolly-star, an annual herb with gray fuzzy stems and tiny white or blue flowers. The Interior Department added the plant to its list of threatened species back in 1990. According to the government's report at the time, the fuzzy little flower's restricted range was under pressure from grazing sheep, encroaching non-native plants, and the raging bulldozers of developers.

Now, after millions of public and private dollars have gone toward efforts to preserve the plant's habitat, the government has changed its mind. Upon further review by the officials, the flower turns out to be nowhere near the end of its rope. On the contrary: Hardy, adaptable, and with few natural enemies, woolly-stars are busting out all over.

Critics say the case of the woolly-star is a prime example of why the 30-year-old Endangered Species Act is due for a major overhaul. Writing in the *Sacramento Bee*, attorney Emma Suarez of the Pacific Legal Foundation said, "Billed as a shield for vulnerable animals and plants, the Endangered Species Act is too easily used as a sword by anti-growth forces." Suarez said the law "invites the cynical use of junk science to justify labeling hale-and-hearty creatures as 'endangered' in order to sideline housing construction, agricultural production and other land uses.... In the case of the Hoover's woolly-star, regulators decided that it was 'threatened' based on surveys that looked at only limited regions and that had been conducted during a Valley drought."

Interior's official announcements framed the delisting as a success for its recovery plan for the woolly-star. But a closer look indicates that the government's contribution to "meeting the delisting criteria" consisted mainly of more people looking for the plant — and finding it.

The plant showed up at higher elevations, in different terrain, and in mixes with more different kinds of other species than had been suspected. And biologists learned that livestock don't eat the woolly-star, that it can handle being stepped on, and that it recolonizes disturbed ground within two growing seasons. In the *Federal Register*, the government concluded: "*Eriastrum hooveri* is more resilient and less vulnerable than previously thought."

The government didn't save the woolly-star, says Suarez: "What saved the plant, if 'saving' is the word, was the rain. That's the problem with the listing in the first place: It took anecdotal information about a plant that was reacting, as all other vegetation in the Central Valley does, to drought conditions. Unless the 'recovery plan' included the Fish and Wildlife Service making it rain, I can't see how anything the FWS did really addressed the threat to the woolly-star — if it ever was threatened."

Flexible Gas Piping Involved in Fires Caused by Lightning

Corrugated stainless-steel tubing, or CSST, is much easier to work with than traditional threaded black steel gas pipe (see "Flexible Gas Piping Catching On," *Notebook*, 4/00). Since 1988, when it was approved for residential use by the *National Fuel Gas Code*, it's been installed in countless new homes, and it's generally regarded as safe. But according to some fire investigators, CSST is a potential hazard in the event of a lightning strike.

J. Lyle Donan is vice president of Donan Engineering, a consulting firm with offices in Michigan, Indiana, Ohio, Kentucky, and Tennessee that specializes in analysis of accidents, structural failure, and fires. An engineer and NAFI-certified fire and explosion investigator himself, Donan observes that since August of 2000, his company has investigated seven incidents involving the vinyl-coated flexible gas lines. "We think that's a significant number," he says.

A fire was ignited in this crawlspace by a lightning strike that arced from the flexible gas tubing to a metal heating duct. The local fire department arrived in time to save the structure.

The holes in the tubing wall are visible in the photo at right. The plastic insulation that originally covered the tubing was burned away in the fire.

In an unpublished article titled "Just Waiting on Lightning," Donan investigator Gary Woodall provides some particulars on each of the incidents. In four cases, lightning struck the metal chimney cap of a gas fireplace; in the remaining three, lightning entered the house after striking a nearby tree and passing through the roots to a buried gas line.

In all cases, the surge then passed along the CSST before arcing to ground where the tubing passed close to another metal object, such as a furnace duct. In at least four of the seven events, the arc was powerful enough to burn one or more holes in the stainless-steel tubing and ignite the escaping gas.

"This is something that's sneaked up on the industry," Woodall says. The thicker wall of black pipe, he observes, is strong enough to withstand such an arc. Woodall also believes that CSST's flexibility increases its vulnerability to arcing during a lightning strike. "The flexible gas line can sag down until it touches a furnace duct that runs below it," he says. "That doesn't happen with rigid pipe."

Woodall's article states that UL-certified materials had been used in all the cases described and that no building code violations were noted. It proposes several possible countermeasures, including grounding of metal fireplace boxes and placing sleeves of PVC pipe over the flexible gas line where it passes over water pipes or metal furnace ducts.

Bob Torbin, an engineer with Foster-Miller, a Waltham, Mass.–based company that acts as a consultant to the American Gas Association on technical issues relating to CSST, confirms that there have been reports of tubing-wall failures caused by lightning. "I'm familiar with what's going on," he says. "But the fires are started by the lightning striking the house, not by the gas escaping from the tubing. If lightning hadn't struck the house, we wouldn't be talking."

Reinforced OSB Could Double Shearwall Capacity

Researchers at the University of Maine have developed a fiber reinforcement system for structural wood panels that can boost the racking strength of a typical house wall by 20% and double the shear values for an engineered stud-and-plywood or stud-and-OSB shearwall. Professors Habib Dagher and William Davids share a patent for the new technology, which centers on reinforcing edge nailing areas with a tough fiber-reinforced polymer, to enhance the holding power of nails. Besides strengthening conventional wood shearwalls, the pair expect the method to be useful with panelized systems and narrow shearwall sections. For more information, see the University of Maine's Advanced Engineered Wood Composites (AEWC) website at www.aewc.umaine.edu.

New Health Savings Accounts Combine Insurance, Retirement Plan

While general liability coverage is the most expensive type of insurance that most builders have to purchase, employee health insurance takes another big bite out of the budget. But a provision in the Medicare bill passed by Congress last year — which took effect in January 2004 — may reduce health insurance costs for some.

The bill created Health Savings Accounts, or HSAs, which are part insurance, part investment, and part tax shelter. Open to anyone under age 65 who's not listed as a dependent on someone else's tax return, they're aimed primarily at small businesses and self-employed individuals who now have little or no medical coverage.

In a nutshell, here's how they work: An individual (or the individual's employer) purchases a high-deductible health insurance plan from a private insurer. A policy must meet a number of criteria to qualify, but the most basic requirement has to do with the size of the deductible. An individual policy must carry a deductible of at least $1,000 per year but not more than $5,000; a family policy must carry a minimum deductible of $5,000 and a maximum of $10,000.

The cash to pay those hefty deductibles comes from a separate HSA account, which may be funded by the employee, the employer, or partially by both. Annual contributions to the account can't exceed the annual deductible on the accompanying insurance policy. Money withdrawn from the account to pay medical costs isn't taxable, and any cash that remains in the account at the end of the year stays there and earns tax-sheltered interest, as in an IRA account. It's possible to make withdrawals for nonmedical uses as well, but those funds are taxed as ordinary income, plus a 10% penalty for those under age 65. (A more detailed and surprisingly readable description of the rules governing HSAs is available on the IRS website at www.irs.gov/irb/2004-02_IRB/ar09.html.)

The unanswered question at this point is how successful the new accounts will be at reducing overall costs. Matt Hollister, president of Business Benefits in Clinton, Mass., notes that high-deductible insurance policies do reduce premiums but not by as much as you might expect. "People think it'll cut the premium in half," he says. "In most cases, the reduction will actually be more like 25%. There are brokers and consultants who can help you decide whether it makes sense for you."

Hollister also observes that HSAs are so new that relatively few insurers now offer policies that are compatible with their requirements. "Most of the big companies will probably have plans in place by the end of the year," he says, "but they seem to be hanging back for now."

Builders may want to take a similar stance, at least in the short term. As with a new insulating sheathing or engineered siding, there's much to be said for letting someone else take the plunge first.