

NOTEBOOK

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International Residential Code Is Published

The *International Residential Code* (IRC) is now a reality, five years after the three regional model code organizations — BOCA, ICBO, and SBCCI — decided to work together to create a single model code for residential construction, suitable for use throughout the U.S. (see *Notebook*, 12/97). The IRC, which covers one- and two-family detached dwellings and apartment buildings up to three stories, was approved by code officials at a conference in September 1999 in St. Louis, Mo., and published at the end of January.

The push for a national code originated with major manufacturers of building materials, as well as many architects, who have long complained of the inconsistencies in the existing model building codes (namely BOCA's *National Building Code*, used mainly in the Northeast and Midwest; ICBO's *Uniform Building Code*, used in the West; SBCCI's *Standard Building Code*, used in the Southeast; and the CABO *One and Two Family Dwelling Code*). Although

a national code would have obvious advantages to manufacturers, the benefits to builders — especially small residential builders — are less clear. "The IRC was a concept that was first formulated by the archi-



tect," says Andrew Cattano of the New Jersey Builders Association. "They all wanted to be working off the same sheet of music. The home builders were all a little tentative about the idea." One builders organization that supports the new code is NAHB. "We feel that the *International*

Residential Code represents a big step forward," says NAHB's Ron Burton.

What's New About the IRC?

The IRC is a thorough stand-alone code, including chapters on foundations, framing, plumbing, electrical, mechanical, fuel gas, and energy. "Unlike the CABO code, the IRC code is complete," says Cattano. "You can build an entire home from this code." The electrical and gas chapters are identical to provisions of the NFPA *National Electrical Code* and the American Gas Association *Fuel Gas Code*.

The IRC, unlike the existing model codes, includes detailed requirements for some newer construction methods, including steel-stud construction, frost-protected shallow foundations, and insulated concrete forms. The section on ICFs, for example, includes tables prescribing concrete wall thickness and rebar requirements.

Some observers have questioned whether a national code will have the
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MORE HOUSEWRAP PERFORMANCE TESTS

New research by Paul Fisette at the Building Materials Technology Program at the University of Mass. in Amherst has confirmed earlier research showing that most housewraps do not effectively resist liquid water (see *Notebook*, 6/97). In Fisette's 1997 tests, he showed that most housewraps leak when they are fastened to the bottom of a vertical PVC pipe filled with water. A new round of research looks at the performance of a variety of housewraps in conditions that more closely resemble those found on a house.

Fisette tried to design a laboratory experiment that would mimic the exterior layers of a house built with

unprimed wood siding installed directly over housewrap on plywood sheathing. To conduct the tests, Fisette cut samples of unprimed 1/2-inch bevel cedar siding into 2-inch squares, and soaked the siding until saturated. He then placed the siding squares in a petri dish half filled with water, with the top of each siding sample above the water line. Next, he draped a 4-inch square of housewrap over each piece of siding, without letting the housewrap touch the water, and with the edges of the housewrap extending well beyond the perimeter of the dish. On top of each square of housewrap he placed a 2-inch circle of blot-

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flexibility to reflect different regional needs. In fact, the new *IRC* includes maps detailing regional variations of such factors as frost depths, snow loads, and the level of termite threat. Unlike the CABO code, the *IRC* also includes criteria for building in areas subject to floods, high winds, and seismic activity. Local authorities considering adoption of the *IRC* will determine whether any areas under their jurisdiction should be classified as high-wind, flood-prone, or seismically active.

Stair debate. One of the more heated debates at the final meeting of the code bodies in St. Louis concerned stair geometry. One proposal from safety advocates would have required a maximum 7-inch riser and a minimum 11-inch tread. At the other extreme was NAHB, which proposed a steeper 8:9 stair. Both proposals were defeated by votes at the St. Louis meeting. "The *IRC* settled on a 7³/₄-inch maximum riser and a 10-inch minimum tread, the same as BOCA and CABO," said Ron Burton of NAHB. "We were championing the 8-inch riser and 9-inch tread, and we will continue to try to get that changed." Builders operating under the ICBO code, which permits the steeper 8:9 stair, will need to make adjustments if the *IRC* is adopted in their areas.

Energy provisions. The energy provisions of the *IRC* have also been controversial. These provisions now mirror those of the *International Energy Conservation Code*, the successor to the *Model Energy Code*. Some builders feel that the energy provisions go too far — objecting, for example, to the requirements that basement walls be insulated, and that builders calculate window area as a percentage of wall area.

Egress. The *IRC*, unlike BOCA,

CABO, or SBCCI, requires all basements to include an emergency egress window.

Published but not adopted. Although the *IRC* has been completed, it has yet to be adopted anywhere. Most observers predict that adoption will be gradual, and is unlikely to occur in most states before 2003. Although one of the touted advantages of the *IRC* is nationwide consistency, NAHB is predicting that the *IRC* will be amended as it comes up for adoption by the individual states. In fact, the NAHB plans to distribute information kits to its local affiliates, to help lobbying efforts at the state level for *IRC* amendments favored by NAHB, including the push to permit steeper stairs.

The future of the model code groups. Ever since the three regional code organizations announced their agreement to work together to write the *IRC*, observers have wondered whether there will be a continued need for three separate code organizations. Not surprisingly, officials at BOCA, ICBO, and SBCCI do not imagine that their organizations will be withering away any time soon. "The regional code bodies have no plans on merging," says Mike Pfeiffer of BOCA. "The new code will be published jointly by the three organizations."

However, Paul Armstrong of ICBO foresees evolution ahead. "The roles of the model code bodies have changed," says Armstrong. "Before, we argued over the technical differences between the codes, and we no longer have those issues. Now, the three model code groups will be competing with each other to provide services to our members, such as training and information on using the codes."

The *IRC* can be ordered from BOCA (708/799-2300), ICBO (800/284-4406), or SBCCI (205/591-1853). The cost is \$50 post paid.

Maine Dam Yields Cache of Rare Wood

When the Edwards Dam was removed from Maine's Kennebec River last July, nearly 2 million board feet of logs used in its construction came to light for the first time since the structure was built in 1837. Despite their long immersion, most of the logs are still perfectly sound, and a Portland company that produces furniture and architectural woodwork has begun sawing and kiln-drying them to incorporate the well-aged wood into its product line. Selected sections of the wood may find new life in pianos, fiddles, and other musical instruments.



According to Michael Perkins, the founder and co-owner of PerkinsWood, most of the salvaged logs are spruce, pine, or hemlock, with perhaps 50,000 board feet of hardwood mixed in. "There are logs up to 30 inches in diameter," Perkins says, "and it's the kind of old-growth wood that just doesn't exist nowadays." The growth rings on one large hemlock log, he notes, indicate that the tree it came from was already 380 years old at the time it was cut — meaning it must have been a good-sized sapling when Columbus set sail for the New World.

Housewrap Performance Tests

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ting paper, and finally a 2-inch square of 1/2-inch plywood. The entire sandwich was held together with a rubber band. The test lasted two days.

The results. Six types of housewrap were tested: Amowrap, Barricade, Pinkwrap, R-wrap, Typar, and Tyvek, and #15 asphalt felt. The only wrap that kept the blotting paper bone dry for two days was asphalt felt. Two of the housewraps — R-wrap and Tyvek — prevented the passage of liquid water, but left the blotting paper feeling slightly damp at the end of the period. The Typar samples all leaked within the first two hours of the test. The blotting paper above the perforated wrap samples of Barricade, Pinkwrap, and Amowrap became saturated immediately, even before the layers of test material could be secured with a rubber band.

A second test. In another test, Fisette repeated the experiment penetrating all layers of the test sandwiches with a nail. All the housewraps and the felt leaked around the nail hole during the first two hours of the test.

Fisette's conclusions are similar to those he reached in 1997: Builders should choose Tyvek, R-wrap or asphalt felt. "It seems like a no-brainer," says Fisette. "Why not choose the product that doesn't leak

water?" Fisette praises asphalt felt, because "it is inexpensive and forgiving." He explains, "Felt is dynamic. If water gets on the wrong side of a felt-wrapped wall, the felt can absorb the water and over time allow drying to the outside of the building. Non-per-



Do housewraps resist liquid water? Different types of housewraps were tested in the lab by building "sandwiches" of damp siding, housewrap, blotting paper, and plywood. The sandwiches were put in petri dishes with a shallow layer of water. The blotting paper was checked periodically.

forated housewraps can't allow water to move in this way, because they are nonabsorbent, and they rely on vapor diffusion to move water that gets on the wrong side. Vapor diffusion is a slow and weak force."

Real world applications? Fisette's research raises a cautionary note for builders who assume that housewrap will act as a secondary barrier to water that gets behind the siding. Dramatic differences in the lab performance of

these housewraps may or may not be useful indicators of how the housewraps perform on a building, as Fisette well knows. "I'm leery of extending lab results into predictable field performance," says Fisette. Although the lab tests used unprimed



siding, virtually all experts recommend that wood siding be back-primed before installation. Moreover, as the second round of testing showed, all housewraps fail equally quickly when they are penetrated by nails, as they would be on a house.

In any case, Fisette says that the main culprit in cases of water intrusion is not housewrap. "The leading causes of water damage are poor flashing and bad design," says Fisette.

LOW-FLOW AQUARIUM

A transparent toilet tank that doubles as an aquarium is being marketed by Elsewhere Design in Brooklyn, N.Y. The acrylic tank is partitioned into two sections, so the fish in the front section are in no danger of being flushed away.

The tank is designed to connect to almost any standard toilet bowl, using an offset 3-inch PVC connector pipe. The heavy tank requires three steel legs to support its weight, since it holds 8 gallons of water in the aquarium section and at least 1.6 gallons in the rear section.

"The standard toilet was designed about a hundred years ago, and it hasn't changed much," says the designer, Oliver Beckert, who is now taking orders for his \$1,200 toilet tank. "The idea is to bring more fun into the bathroom."



OFFCUTS

Drywall taper Taper Michael Bone has sued Ames Tool Taping Systems, manufacturer of a taping gun, alleging the tool caused his carpal tunnel syndrome. A federal appeals court has ruled that Bone has a right to take the manufacturer to trial, noting that the tool weighs 17 lb. when fully loaded with compound.

Magnetic ballasts for fluorescent lights will be banned by 2005 if a preliminary agreement between the U.S. Dept. of Energy, lighting manufacturers, environmental groups, and state governments survives the final rulemaking process. Energy-efficient electronic ballasts are replacing the less-efficient magnetic variety.

The state of Massachusetts will require professional home inspectors to be registered and licensed, beginning in April 2001. The yet-to-be-drafted licensing requirements will exempt inspectors who have been in business for at least three years and have performed a minimum of 125 inspections by the time the new law takes effect.

Customer complaints about 1.6 gallon toilets often focus on the need to “double flush.” But a recently released study conducted by the American Water Works Research Foundation suggests that there’s less double-flushing going on than the number of complaints would lead you to believe. The three-year study of 1,100 households in 14 cities in the U.S. and Canada found that households equipped with the water-saving fixtures averaged 5.04 flushes per person per day — only marginally higher than the 4.92 average for households using the old-style 3.5 gallon fixtures.

Overworked builders can look forward to a little more time off this year if economic forecasters are correct. The NAHB is predicting a “moderate slowdown” in housing starts, from 1.659 million in 1999 to 1.535 million in 1999.

Some Chinese space vehicles have an exterior heat shield made of resin-impregnated wood, according to Texas space engineer James Oberg. “They’ve been doing it since 1975,” says Oberg. “The wood is an insulator on their recoverable satellites, for the return through the atmosphere. It’s just as functional as our heat shields, and probably a lot cheaper.”

Louisiana is considering mandating that all framing and sheathing used in new construction be pressure-treated, according to Random Lengths newsletter. The requirement is one option being considered by a task force looking to combat the Formosan termite, which is now ravaging wood buildings in New Orleans.

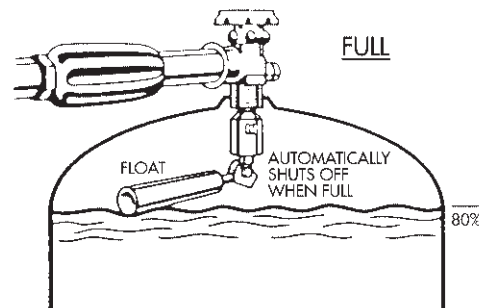
New Valves on Propane Tanks Irk Roofers

Some roofers who install heat-applied membranes have been complaining that their propane torches aren’t putting out as much heat as they used to. It turns out that the problem may be in the gas valves.

As of October 1, 1998, federal regulations began requiring a new kind of safety valve on 5-, 7½-, and 10-gallon propane tanks. Called OPD valves (for “overfill prevention device”), the new valves are equipped



OPD valves, designed to prevent overfilling of propane tanks, can impede the operation of a propane torch by limiting the Btu output. The new valves can be identified by the OPD stamp under the handle.



with a float that prevents overfilling. When an overfilled propane tank heats up — for example, when left in a car trunk on a hot day — the relief valve releases propane. The new OPD valves are designed to prevent the overfilling that can lead to such a dangerous propane release.

The new valves are effective for their intended purpose; however, they have a maximum output of only 125,000 Btu. Since roofing torches sometimes require between 185,000 Btu and 295,000 Btu, the OPD valves may prevent a torch from generating enough heat to melt roofing asphalt. One solution is to use larger 12½- or 25-gallon propane tanks, which are exempt from the requirement for an OPD valve.

OSHA Ergonomic Standards Move Forward

Late last November, OSHA released the final version of its proposed ergonomic standards for general industry, which will apply to most jobs involving manufacturing or materials handling. After a two-month period of public comment, scheduled to end at the beginning of this month, the standards will be reviewed by Congress and continue toward what OSHA hopes will be final approval at the end of this year.

The standards are intended to reduce the frequency of strains, back pain, carpal tunnel syndrome, and similar workplace injuries collectively known as musculoskeletal disorders, or MSDs. While the general industry standard specifically exempts the construction industry — which will be covered by separate rules that are probably years away — this standard is widely seen as the blueprint for the construction industry as well.

Under the new standard, any business with one or more employees suffering from a job-related MSD would be required to identify problem jobs, modify practices to reduce or eliminate any hazards identified, and provide treatment to injured employees. The average cost of altering a job to prevent such injuries, OSHA says, is about \$150 per year.

But according to NAHB spokesman David DiLorenzo, the proposed standards are too vague, and place an unfair burden on the employer. "It's not a prescriptive standard," he says. "It doesn't say 'Mr. Builder, you need to go out there and provide this type of equipment under these kinds of conditions.' It requires the employer to identify problems and come up with solutions, with no guarantee that the solutions he comes up with will actually work."

In the coming years, many builders will be keeping an eye on OSHA's response to ergonomics, in hopes that the agency takes a constructive approach rather than a confrontational one. "If this is going to work," says a construction industry source who has served on an OSHA advisory committee, "they're going to have to focus on outreach and education, not on waving that regulatory stick."

A Wormdrive Saw, an Air Nailer, and a Copy of *Wuthering Heights*, Please

In what might seem an unlikely alliance, the Internet merchant Amazon.com — best known as a book retailer — has purchased the catalog tool supplier Tool Crib of the North. Amazon has been offering an extensive line of products at its online Home Improvement store since mid-November. Despite its name, the online store hopes to become a major supplier of professional quality tools and equipment to contractors and other building professionals, while also serving the homeowner and do-it-yourself markets. Visitors to the site can browse tools by category, search for specific tools by name or by manufacturer, and read tool reviews submitted by past customers.

Rhode Island Sues Lead Paint Manufacturers

The tiny state of Rhode Island, citing a massive problem with lead contamination, has filed a lawsuit against eight former manufacturers of lead-based pigments and the Lead Industries Association, an industry trade group. "We have a high and unacceptable rate of lead poisoning among children," says Jim Martin, a spokesman for State Attorney General Sheldon Whitehouse. "One in three children who entered kindergarten in 1999 had elevated levels of lead in their blood." The lawsuit would require the defendants to repay the state for health care costs incurred in treating affected children, and pay for ongoing lead abatement efforts.



COURTESY OF JOHN ZILKA

Rhode Island is the first state to bring suit against the lead industry. But Jeff Miller of the Lead Industries Association maintains that similar suits by the cities of New York and Philadelphia were unsuccessful. He notes that the state's law firm has agreed to handle the case on a contingency basis, and says, "There's nothing new here. If the state had to pay for this themselves, they probably wouldn't have filed the suit."

Foldable Buildings

A Canadian couple, engineer Ramon Kalinowski and his architect wife, Amparo, have invented what they call a “foldable portable building.” The building is carefully designed to fold into a compact package measuring 8x8½x20 feet, the standardized dimensions of an ISO shipping container. Once delivered to a site, the container unfolds to become a 700 sq. ft. house. The walls are structural insulated panels with galvanized steel cladding. The roof is built of lightweight trusses that can be designed for a pitch up to 12/12.

Kalinowski was inspired to invent the foldable building in the 1980s while working at remote building sites high in the Andes. There he supervised the construction of temporary housing for maintenance workers on the Peruvian railway system. After 10 years of development work, the Kalinowskis have built several prototypes and received a patent. They are finishing negotiations on a joint venture with a U.S. manufacturer, and hope to begin mass production within the next few months. Because the foldable house is so easily shipped, Kalinowski believes that he can market it worldwide for use as emergency or temporary housing.

