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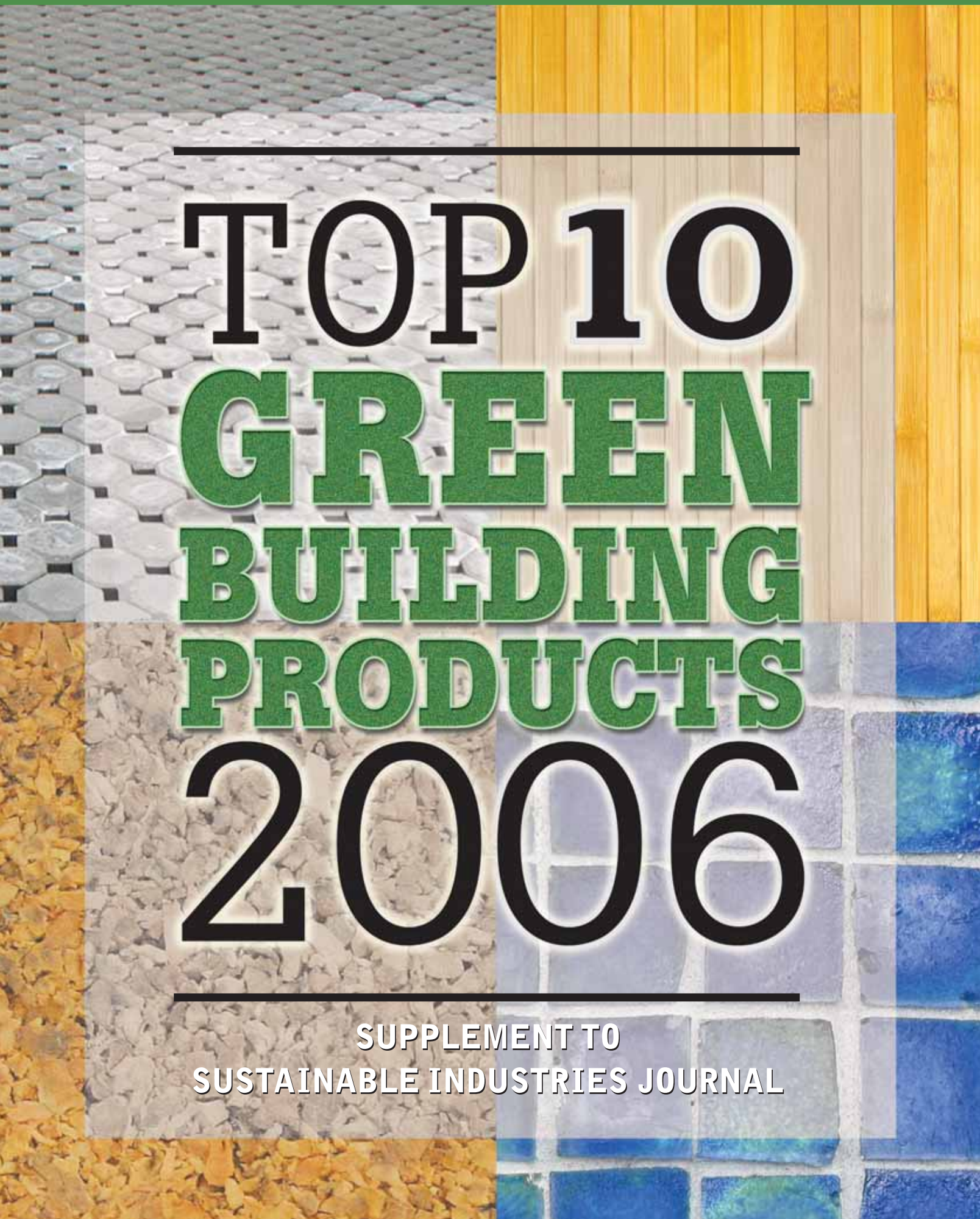

TOP 10 GREEN BUILDING PRODUCTS 2006

SUPPLEMENT TO
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New Construction,
Institutional Facilities

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Commercial Interiors,
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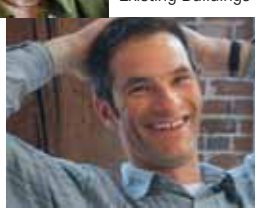

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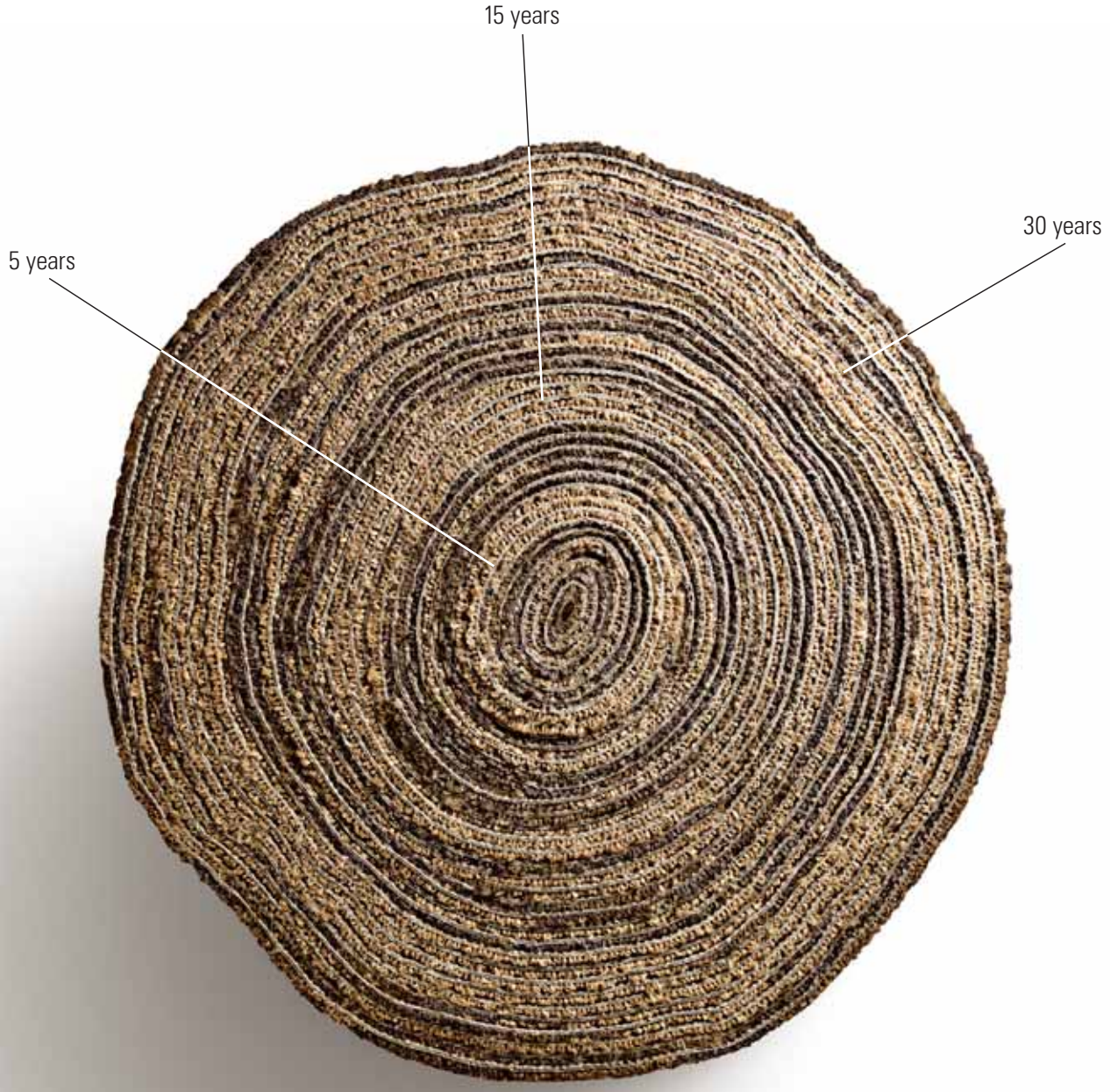

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SUPPLEMENT TO AUGUST 2006, Issue 43
Sustainable Industries is published monthly by Celilo Group Media, 3941 SE Hawthorne Blvd., Portland, OR. Standard subscription price is $39 per year. Periodicals Postage Paid at Portland, OR.
POSTMASTER: Send address changes to *Sustainable Industries*, 3941 SE Hawthorne Blvd., Portland, OR, 97214-9905.

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Welcome to Top Green Building Products 2006

Thanks to the wildly successful growth of green building certification over the past decade, we've entered an era where new, innovative building materials are increasingly crucial to design practice. Developers everywhere are realizing the economic advantages of green building in a market where mindless energy consumption and excessive waste are major liabilities.

But sifting through the wide range and growing number of green building products can be a dizzying affair for commercial and residential builders. In addition, determining how well a product performs can mean the difference between short-term or negligible payback on the investment.

The Top Green Building Products guide you hold in your hands was introduced by *Sustainable Industries Journal* to provide a snapshot of some of the most innovative building materials on the market today. The guide can also be downloaded from our Web site, *www.sijournal.com*.

Our knowledgeable team of judges from the fields of architecture and design helped the editorial team select 10 products that perform well in green building applications, or have a significant potential to do so. The final selection of products is diverse, from bricks-and-mortar materials such as high-performance concrete and formaldehyde-free plywood, to the technological wizardry of microsolar cells and "nanogel."

Thanks to all who contributed to the first installment of this new annual publication. We hope to receive your feedback, as well as your ideas for more innovative products that should be considered for nominations next year.

Warm Regards,

Brian J. Back
Founding Editor

Celeste LeCompte
Special Publications Editor

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Transforming the world with innovative design

COMMENTARY BY BLAINE BROWNELL

For the first time in history, more than half the world population now lives in cities. At the same time, awareness about human influence on the environment is finally sinking in, but we have only begun to understand this influence. We are faced with several imminent challenges, the likes of which we have never seen before.

Sometime during the next decade or so, fossil fuel supplies will peak and demand will forever after outpace supply. Global warming promises to reshape climate, currents, sea levels and ecosystems in unimaginable ways. Our insatiable hunger for virgin materials such as iron ore, copper, and bauxite will lead to their depletion within three generations or less. For those involved in design and construction industries, these challenges should sound a particularly loud alarm. We simply cannot approach energy, waste, and materials the same way today as we did yesterday.

Construction has been a challenging field in which to inspire change. The scale, economic risk, liability concerns, and complexity associated with making buildings typically lead to safe, conventional approaches based on past methods. The problem is that such methods rely upon significant quantities of raw materials and non-renewable energy sources, and they generate enormous amounts of waste. These methods are inadequate to solve tomorrow's problems.

It's been said that if the automobile industry developed at the pace of the construction industry, we'd all still be riding in horse-drawn wooden carriages; a painful reminder that building construction is notorious for its slow adoption of new technologies. However, seemingly countless new sustainable technologies are being developed, and these innovations hold the promise of revolutionizing the way we make buildings and products if they can be deployed at a greater scale.

In the history of building construction, architecture now faces its greatest challenge: the design of buildings that not only function and inspire, but also consider the future of humanity and the planet.

In my own practice as an architect and researcher, I find it necessary to adopt a method based on two parallel paths with regard to these new technologies.

Since it is not realistic for most architects to pause our current projects and start over from scratch, we must first make what positive changes we can while respecting our clients' budgets and schedules. On this path, progress is evolutionary, incremental, and responsible with regard to short-term outlooks.

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MECHANICALELECTRICALPLUMBINGTECHNOLOGYLIGHTINGLIFESAFETYCOMMISSIONING

The U.S. Green Building Council's LEED (Leadership in Energy & Environmental Design) Certified through Silver levels best represent the incremental approach. Common material applications include the specification of high fly-ash content in concrete, recycled steel for rebar or studs, high second-billet aluminum content in curtain wall systems, formaldehyde-free agrifiber building panels, rapidly renewable source products like bamboo floors, or any number of recycled products used mostly for decorative purposes. With a small amount of effort, we realize that environmentally sensitive design can thus be relatively painless and even economically beneficial.

However, even LEED-certified buildings still have a large ecological footprint, and we have to remember that such incremental progress does not solve core problems, even if it delays their development. It is critical that we also reach far beyond conventional practice and consider alternative design and construction methods which employ radically creative thinking.

Rather than a piecemeal, *a la carte* kind of approach to programming materials for architecture, the second, parallel path is holistic, and it considers the integration of multiple building systems and assemblies. On this path, progress is revolutionary, makes big strides, and responds to a long-term outlook — on par with a LEED Platinum rating and beyond.

A building-scale solar daylighting system which passively "pipes" sunlight to interior spaces using fiber optic technology is an example of such a disruptive technology. The system saves the energy that would normally be utilized by artificial lighting, as well as the energy needed to counteract the heat emitted by lighting fixtures. High alumina-oxide ceramic or aerogel-impregnated window assemblies turn conventional thinking about windows — that daylighting is a trade-off for insulation — on its head. Light-transmitting systems provide unprecedented thermal, fire-resistance, and durability properties that surpass those of some opaque walls.

Looking into the future, biomimetic materials that are "grown" via biochemical processes rather than manufactured via conventional "heat, beat, and treat" methods will significantly reduce energy consumption and pollution, while taking an important step toward emulating life.

Courtesy Moule & Polyzoides Los Angeles

A LEED Platinum building in Santa Monica, Calif.

We live in a time when new, innovative materials are increasingly crucial to architectural practice. The global challenges we face are serious, and true progress relies on active participation from all of us. We have only begun to understand what makes some products "greener" than others, and with time our environmental knowledge base will expand, as will our ability to make informed choices.

In the history of building construction, architecture now faces its greatest challenge: the design of buildings that not only function and inspire, but also consider the future of humanity and the planet.

Blaine Brownell is an architect, researcher of materials and sustainable building advisor with NBBJ in Seattle. Author of "Transmaterial," Brownell is also editor of a weekly electronic journal about innovative materials.

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TOP 10 GREEN BUILDING PRODUCTS 2006

From their workshop in Jepara, Java, the carpenters, carvers and other workers at Tropical Salvage can see lava spewing from the crater of Mount Merapi, Java's most active volcano. On Java, in Indonesia, volcanoes, mudslides, earthquakes, tsunamis, and other disasters are everpresent phenomena, says Tropical Salvage founder Tim O'Brien.

"It just continuously, constantly rattles," he says of the island.

In this remarkable location, O'Brien's crew makes a remarkable product — one of 10 also remarkable products profiled here in the first annual Top Green Building Products.

The products here range from beautiful furnishings to high-tech materials, from interiors to exteriors, ornate to functional.

Our team of judges from the West Coast's green building community winnowed through nearly 90 nominees, submitted by readers, architects, designers, distributors, the companies themselves, and more. Each of the judges submitted a list of their top 10 picks, comprising 29 finalists. The editorial staff of *Sustainable Industries Journal* reviewed comments and scores to pick the final top 10.

Following are the winners of this year's selection process.

Nanogel

WHO MAKES IT
Cabot Corp.

WHERE ITS MADE
Frankfurt, Germany

WEBSITE
www.cabot-corp.com

TOP 10 GREEN BUILDING PRODUCTS 2006

Call it sunscreen for your skylights, sealant for your walls or insulation of the invisible kind.

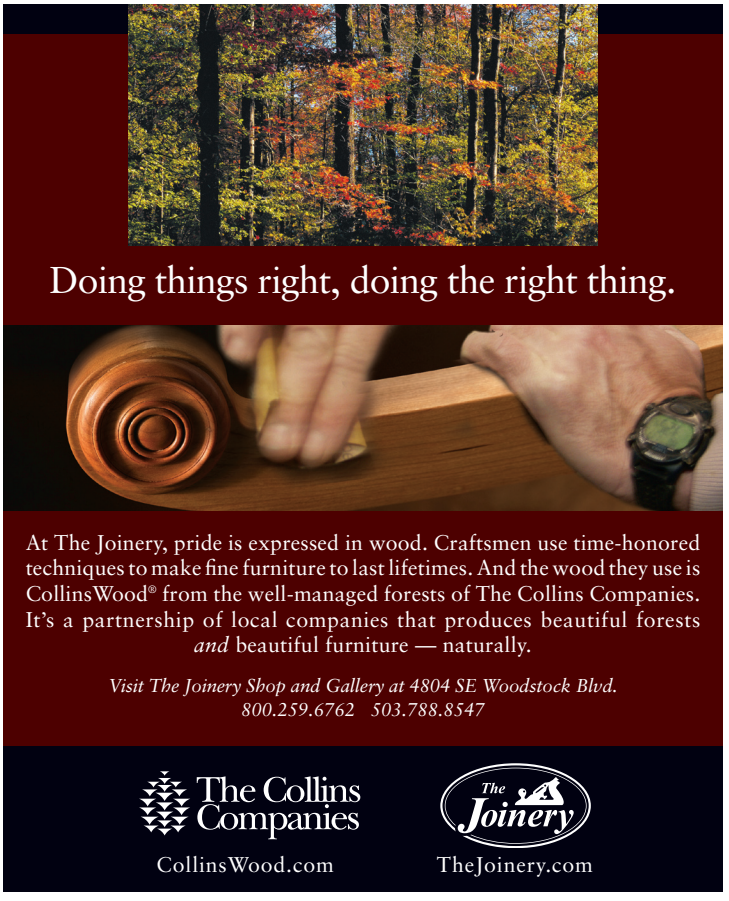
Cabot Corp. (NYSE: CBT) calls it Nanogel, a highly porous coating that is 95 percent air, 5 percent silica-based solid, making it ideal for use in a wide range of building applications, according to the Boston-based company. Every inch of Nanogel provides an R-8 insulation value, and just half an inch transmits 73 percent of natural light with minimal heat gain, according to Cabot.

In the commercial and residential building and construction industries, Nanogel is increasingly used in daylighting applications. *SIJ*'s judges praised the material's ability to allow optimal natural light into a building without unwanted thermal heat gain.

Because Nanogel is made of aerated silica, judges also praised its efficient use of materials. "Dematerialization of building components is key to material use efficiency and the reduction of the use of non-renewable materials," wrote one judge.

The lightweight, nano-porous material may also have an advantage in rainy climates like the Pacific Northwest. Cabot says Nanogel is permanently hydrophobic, meaning the material is moisture- and mildew-resistant.

The company's translucent aerogel has been used on fiberglass reinforced panels, polycarbonate systems, glass and skylights.



PureBond Plywood

WHO MAKES IT
Columbia Forest Products

WHERE ITS MADE
Klamath Falls, Ore. (West Coast plant)

WEBSITE
www.columbiaforestproducts.com

TOP 10 GREEN BUILDING PRODUCTS 2006

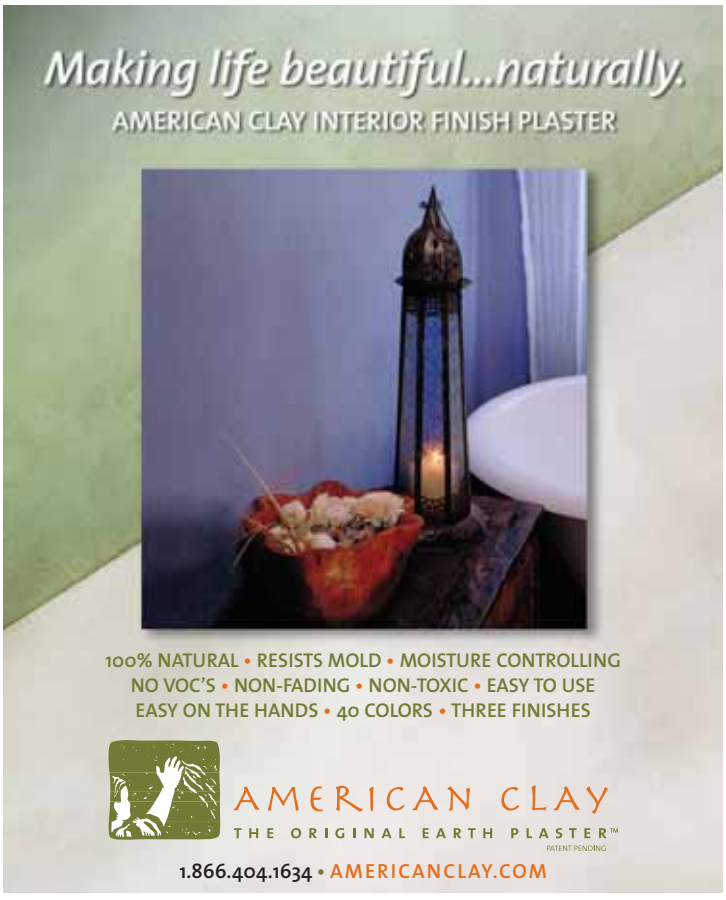
It's been exactly a year since PureBond first graced the pages of *SIJ*, when we noted Oregon State University researcher Kaichang Li's new glue, developed for Columbia Forest Products, patterned after the way mussels cling to the rocky Oregon coastline. Since then, Columbia Forest Products has built a reputation for the mussel-mimicking adhesive based on its unique history and its environmental performance.

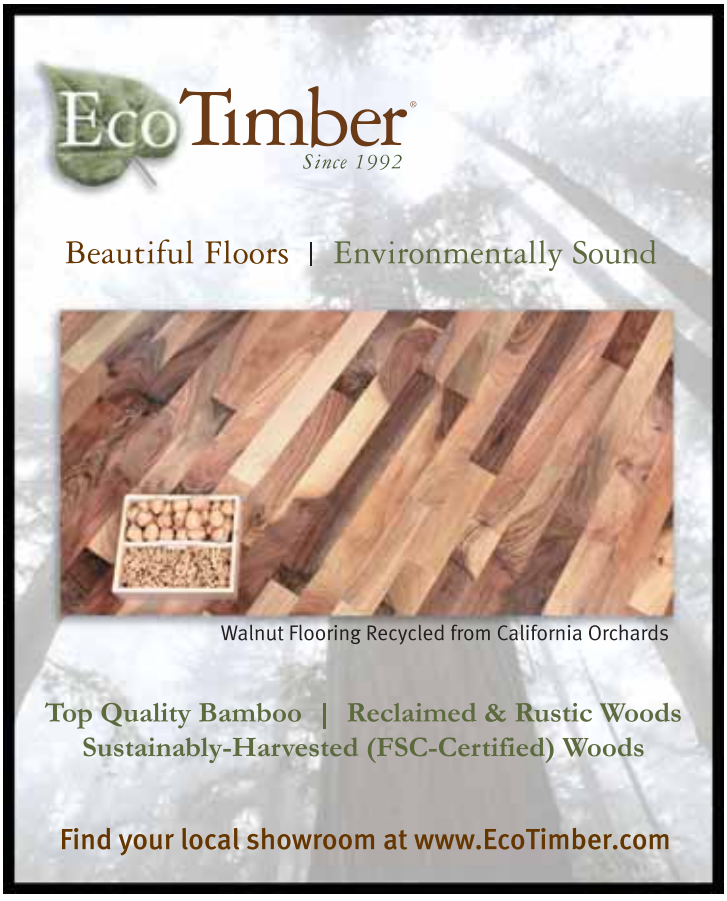
By switching to PureBond, Columbia cut formaldehyde from the company's entire hardwood plywood line, and 95 percent of VOC (volatile organic compound) emissions from its manufacturing plants. Columbia has also avoided increasing the cost of the plywood [see "Natural selection," *SIJ*, June 2006].

Because of the product's environmental performance and competitive pricing, Columbia stands to impact the industry in a big way. "The resin used in this product could revolutionize the composite wood products industry ... especially for indoor applications," wrote one judge.

In keeping with its efforts to transform the marketplace away from formaldehyde-based adhesives, Columbia also hopes to introduce a line of particleboard using the PureBond adhesive.

"Particleboard is a huge deal," says John McIsaac, Columbia's public relations manager. "That opens up a whole new world — a big world." The company is likely to announce its research and development partner this fall.





Recycled Metal Lighting

WHO MAKES IT
Eleek

WHERE ITS MADE
Portland

WEBSITE
www.eleek.com

TOP 10 GREEN BUILDING PRODUCTS 2006

In October 2005, California's revised building codes goosed the market for low-energy lighting fixtures. Eleek is one of the few companies ready to meet growing demand for design-savvy, energy-efficient lighting fixtures.

Across the board, judges said they were inspired by Eleek's Arts and Crafts-style fixtures for their "elegant and sensible designs" that "blend resourceful material use with energy efficiency."

The company uses recycled aluminum and salvaged wood, finishes, and waxes in its designs and takes back any of its products for in-house recycling. Many Eleek designs feature pin-type ballasts, ensuring that buyers continue to use energy-efficient fluorescent lamps.

Eleek also received high marks from judges for its commitment to reducing the company's environmental footprint.

"I think that our efforts toward sustainability are a natural outgrowth of our personal values," says Sattie Clark, who owns the shop with her husband Eric Kaster. "It has never seemed like a choice to us; that's just the way it is."

The company is expanding its distribution network into Oakland, Calif. this October, and has recently made a new catalogue of company designs available to architects nationwide.

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Designer Mulch looks great and comes in three colors – Black, Dark Walnut and Red. It is made of 99% "post-consumer" recycled wood, helping contractors achieve the high recycled content requirements needed for LEED certification.

Recovery 1's documented recycling rate for co-mingled construction debris is hovering around 98%. Containers deliver co-mingled construction debris to Recovery 1 and are used to deliver Designer Mulch back to the jobsite for the landscaper's use.

Designer Mulch is 99% post consumer recycled product.

Recovery 1, Inc.
800-949-5852
www.recovery1.com
www.designermulch.com

Sphelar

WHO MAKES IT
Kyosemi Corp.

WHERE ITS MADE
Hokkaido, Japan

WEBSITE
www.kyosemi.co.jp

TOP 10 GREEN BUILDING PRODUCTS 2006

While not yet commercially available, the potential for Kyosemi Corp.'s spherical microsolar cell captured our attention and imagination.

Sphelar is a spherical solar cell using single crystal silicon, formed by the free fall of molten silicon through a tube. The manufacturing process significantly reduces the energy used in silicon cell production compared to conventional technologies, and it also maximizes raw material use, according to the company.

Material efficiency and high power output make Sphelar a breakthrough product in the photovoltaics industry, according to one judge.

While current photovoltaic technologies gather energy from light that strikes a flat-top surface, Sphelar cells absorb light from all directions because they have a nearly-perfect spherical surface. Kyosemi Corp. estimates Sphelar cells convert 19 percent of solar energy to electricity, comparable to the most efficient solar panels on the market today.

Sphelar is likely to make its first appearance providing power to Japanese cell phones, but it appears to have enormous potential for providing integrated power sources in windows, roofing materials, canopies and other surfaces.

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Ductal

WHO MAKES IT
Lafarge North America

WHERE ITS MADE
Herndon, Va.

WEBSITE
www.imagineductal.com

TOP 10 GREEN BUILDING PRODUCTS 2006

Humans have been using concrete for 2,000 years, from Roman baths to San Franciscan skyscrapers. Tomorrow's concrete structures, however, may be like none of their predecessors, if new types like Ductal take off big [see "Romancing the stone," *SIJ*, April 2005].

Global concrete company Lafarge (NYSE:AD) recently introduced Ductal, a high-performance concrete with a surface so smooth it acts like plastic. The self-reinforcing concrete contains tiny organic and steel fibers that provide support throughout the material without the use of rebar. The fibers are randomly oriented, making the material flexible and up to six times as strong as traditional Portland cement-based concrete, according to Paris-based Lafarge.

"Consider the environmental implications of significantly reducing the overall mass of concrete for a building project," wrote one judge. "Ductal has the potential to radically change the way we think about commonplace concrete with its strength and versatility."

Manufacturers also claim Ductal emits about 75 percent fewer greenhouse gas emissions during its production, compared to conventional concrete.

Ductal has been used in several international projects, including the Shawnessy light rail train station in Calgary, Canada. The station features 20-millimeter-thick Ductal canopies, as well as struts, columns, beams and rain gutters, all made from Ductal, according to the company.

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WHO MAKES IT
Northwest paint companies Miller Paint and Rodda Paint

WHERE ITS MADE
Portland

WEBSITE
www.rodda.com • www.millerpaint.com

TOP 10 GREEN BUILDING PRODUCTS 2006

In the words of one judge, "How could we play favorites?"

No matter which way you look at it, Portland-based paint companies Miller Paint and Rodda Paint are helping grow the market for paints without VOCs (volatile organic compounds).

Rodda and Miller Paints' Green Seal-certified products are both high-performing and come highly recommended by our judges. The two companies have been leaders in environmentally preferable paints for more than 10 years, and the market is starting to shift.

Todd Braden, vice president of Rodda Paint, says the changes are most noticeable in the raw materials market. "When we first developed [Horizon] back in 1995, we developed it with what we had to work with ...and now those raw materials are becoming mainstream," says Braden.

Miller, meanwhile, has helped reach a broader market for its zero-VOC interior paint by promoting its Acro paint with Microban, an anti-microbial agent that helps protect surfaces against mold, mildew and bacteria.

In 2005, Rodda Paint also helped launch Yolo Colorhouse, a designer palette of zero-VOC paints from Portland designers Janie Lowe and Virginia Young. Yolo Colorhouse extends its environmental ethic into its marketing activities as well, with reusable poster-size color swatches for sampling its colors. Judges also noted that Yolo has helped improve the image of low-VOCs paints by appealing to design-oriented buyers.

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Polyx-Oil

WHO MAKES IT
OSMO Germany

WHERE ITS MADE
Frankfurt, Germany

WEBSITE
www.environmentalhomecenter.com

TOP 10 GREEN BUILDING PRODUCTS 2006

When it comes to floor finishes, there are two basic options: urethane finishes and oil finishes. In the United States, urethane makes up 95 percent of the market, says Matt Freeman-Gleason, co-founder of Seattle's Environmental Home Center.

Oil finishes don't put a plastic-like film on the floor, but they also don't offer the same durability, says Freeman-Gleason. Historically, oil-finished floors needed to be sealed with wax to protect the wood — and they also needed to be resealed annually.

Today, working with German finish manufacturer OSMO, Environmental Home Center (EHC) offers an engineered wood finish known as Polyx-Oil. Formerly known as OSMO Hard Wax Oil, Polyx-Oil is a plant-based finish that offers the durability of petroleum-based finishes with the low-toxicity of natural materials.

"It gives people an alternative that didn't exist in the past," says Freeman-Gleason. Better yet, judges said, it gives them an option that is "beautiful, clean, and basic."

Because the product can be spot-repaired, rather than requiring a complete re-finishing, it minimizes downtime in commercial and retail spaces, says Freeman-Gleason.

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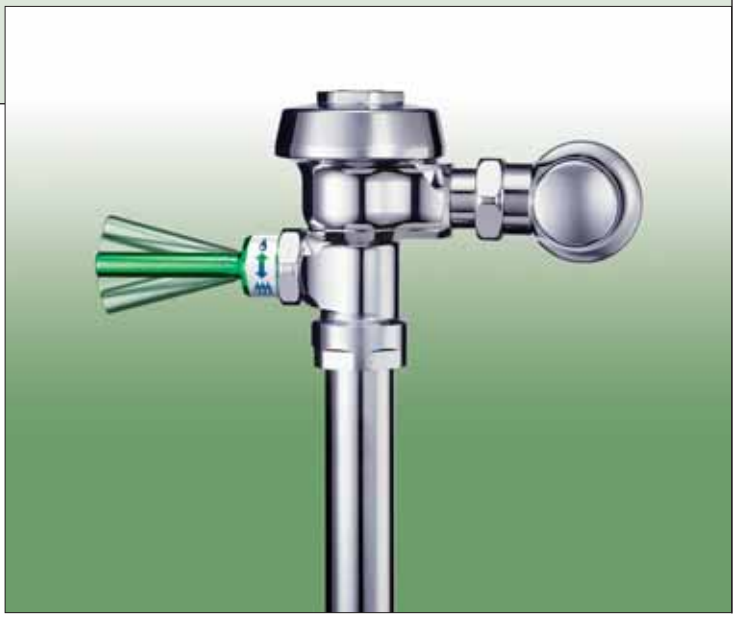
Uppercut Dual-Flush Flushometer



WHO MAKES IT
Sloan Valve Co.

WHERE ITS MADE
Franklin Park, Ill.

WEBSITE
www.sloanvalve.com

TOP 10 GREEN BUILDING PRODUCTS 2006

Water-efficient technology for toilets inspires even the most mature adults to euphemism, and the Sloan Valve Co.'s Uppercut Dual-Flush Flushometer is no exception.

The short explanation for the Uppercut is this: "Because you don't do No. 2 every time," quips Jim Nowakowski, a company spokesman.

It's a cleverly designed system that allows two types of flushes — one with less water (1.1 gallons per flush) and one with more water (1.6 gallons per flush). On average, the Uppercut claims to reduce water volume usage by as much as 30 percent.

Although new toilets in the United States are limited to 1.6 gallons per flush, there are thousands of toilets in the existing market that aren't subject to the standard. Uppercut can be installed as a retrofit on most existing toilets.

"These are great not only for new construction, but especially for those water hogging existing buildings that use over four gallons per flush!" wrote one judge. "The next challenge: getting people to lift up for that half-flush."

But Sloan thought of that too. It employed a green handle to call attention to the dual flush without sacrificing its original design. The green handle also has an antimicrobial coating to protect against germs.

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WHO MAKES IT
Tropical Salvage

WHERE ITS MADE
Jepara, Java, Indonesia

WEBSITE
www.tropicalsalvage.com

TOP 10 GREEN BUILDING PRODUCTS 2006

"Tropical Salvage's beautiful hand-crafted traditional furniture has an amazing back-story," wrote one of our judges. "They tap into the abundant supply of fallen trees and utilize indigenous craftsmen to create richly textured and colored furniture. This cottage industry provides a stable job base while reducing logging in tropical rain forests. This is a model that can (and should) be replicated around the world."

We couldn't agree more.

The company's beautiful furnishings take advantage of the quirky qualities of wood buried by a variety of natural phenomena, from earthquakes to tsunamis to landslides.

Although the Indonesian market turns up its nose at Tropical Salvage's aesthetic — meandering natural grains, mismatched styles, and unusual wood and carved pattern choices — the North American market is rapidly growing. Tropical Salvage imports its furnishings by the container-load and distributes them from Manhattan to Manitoba, from St. Petersburg, Fla., to San Francisco.

O'Brien is also working with the local community and a Pacific Northwest-based nonprofit to create a 16-acre botanical park site in a secondary growth forested area near the production site. O'Brien says he hopes the park will help educate the local population about the economic potential of non-timber forest products.

WaterFurnace Geothermal Heating System

WHO MAKES IT
WaterFurnace

WHERE ITS MADE
Fort Wayne, Ind.

WEBSITE
www.waterfurnace.com

TOP 10 GREEN BUILDING PRODUCTS 2006

Ground-source heat pumps aren't exactly the sexiest item in the green building marketplace, but they're slowly gaining traction across the country as the quest for high efficiency and both federal and state rebates feed demand.

"This technology is time-proven, but now systems like WaterFurnace provide a wide range of options for use in many building types and sizes," wrote one judge.

Ground-source heat pumps circulate water through a network of polyethylene pipes buried near the building, drawing solar energy from the earth in the winter and using the ground as a heat sink in the summer. Because underground temperatures are typically stable around 47 degrees, ground-source heat pumps are more efficient than the more common (and less expensive) air-source pumps on the market.

Heat pumps' efficiency claims are tested by the Air-Conditioning and Refrigeration Institute. According to the company, WaterFurnace is the only manufacturer whose products have never failed to meet their stated efficiency levels.

In August, the company is launching its Envision series of ground-source heat pumps, which received some of the highest efficiency ratings in the industry, according to John Dibble, division manager for the product line.

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The *Sustainable Industries Journal* Top 10 Green Building Products for 2006 were selected with help from the following individuals. We would like to recognize and thank them for their contributions.

GREEN BUILDING SERVICES

Ralph DiNola, AIA Assoc., LEED-AP
Principal

Ralph DiNola has worked as a designer, consultant and Historic Preservation Specialist for more than 15 years. As a principal at Green Building Services, he specializes in consulting and project management to support numerous projects seeking LEED (Leadership in Energy & Environmental Design) certification. DiNola has been a U.S. Green Building Council LEED faculty member for over four years and serves on the LEED Retail Committee. DiNola is co-founder and board president of the Sustainable Products Purchasers Coalition based in Portland.

Elaine Aye, IIDA, LEEP-AP
Principal

Elaine Aye has been a practicing interior designer for 23 years prior to joining Green Building Services. She is a managing principal and her primary focus is on LEED-CI and LEED-EB. She is USGBC LEED faculty and sits on the LEED-CI Core Committee. She helped develop the training module for LEED for Project Manufacturers. She has successfully managed and consulted on three LEED-CI projects, three LEED-EB projects and over 10 LEED-NC projects.

Chessa Adsit-Morris, LEED-AP
Project Coordinator

Chessa Adsit-Morris recently joined Green Building Services as a project coordinator. She graduated from the University of Washington with a B.A. in fine arts and a minor in architecture. She is an active member of both the USGBC Emerging Green Builders and the Surfrider Foundation.

Tess Russo
Project Coordinator

After getting a degree in mechanical engineering and teaching high school on Hawaii, Tess Russo has returned to the Northwest to join Green Building Services. With her engineering background, interest in architecture and dedication to the environment, she believes green building is growing steadily into a revolution.

MITHUN

Tom Nelson, AIA/LEED AP
Principal

Tom Nelson brings 22 years of experience in planning and designing major institutional projects. As a collaborator in the development of sustainable design practices and standards, Nelson has received highest honors for his leadership in sustainable design. Nelson joined Mithun in 2005 following 17 years with the Los Angeles office of Hellmuth Obata + Kassabaum Inc.

SERA ARCHITECTS

Logan Cravens, AIA, LEED AP
Associate, Green Building Resources

Logan Cravens has more than 19 years of experience in architecture and education, with a special emphasis in environmental design issues. Since 1992, Cravens has been a recognized leader in Portland's sustainable design community and he advises SERA in the implementation of sustainable policies and procedures. A founding board member and past president of the Cascadia Region Green Building Council, Cravens is SERA's representative to the U.S. Green Building Council.

ZIMMER GUNSUL FRASCA

Johanna P. Brickman, LEED AP
Associate Partner and Director of Sustainability

Johanna Brickman has more than five years experience with ZGF. She is responsible for researching and facilitating the design of efficient and healthy buildings through the innovative use of materials, technology, and design techniques. Brickman assists in the coordination of ZGF's sustainable design team effort providing in-house sustainable design consultation. She also leads ZGF's sustainable design continuing education series.

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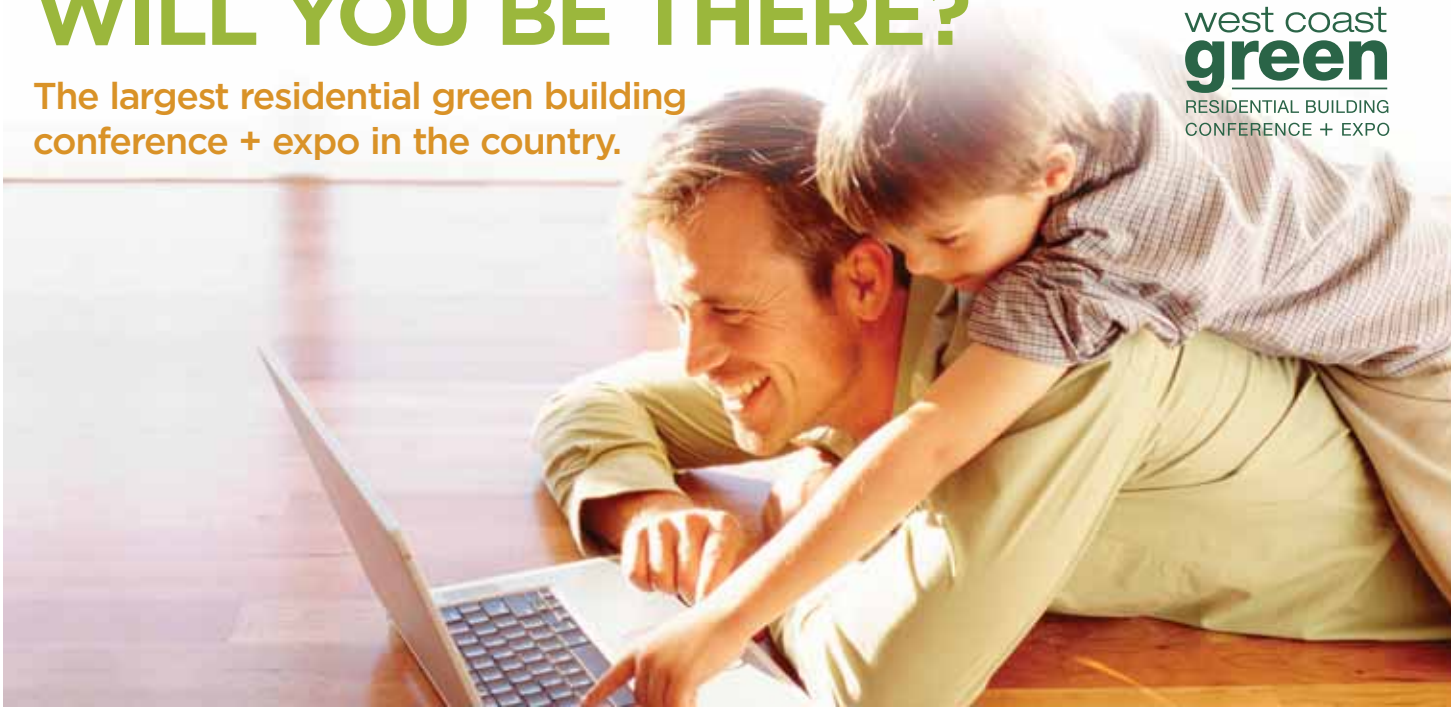

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