



The Green Design Revolution

The new blueprint in architecture is to create buildings that are not just eco-friendly—but safe for inhabitants as well.

When people hear the phrase “green building,” they often think of skyscrapers with solar panels and insulated windows. But that perception is outdated. Nowadays, being green requires a more holistic approach. “Historically, the green building movement was a child of the energy-efficiency movement of the 1970s,” says Bill Walsh, founder of the Healthy Building Network (HBN), a nonprofit devoted to promoting healthier building materials. Today, concerns about “sick building” syndrome, and mounting scientific evidence regarding cancer and other serious health problems, are changing that one-dimensional definition of green. “Now issues about health are a top priority,” Walsh says.

This is not surprising. The widespread use of brominated flame retardants in foam, textiles, and electronics in U.S. buildings has led to an accumulation of the chemicals in human beings. Two recent studies found that American women had the highest concentrations of flame retardants in their breast milk in the world. By contrast, when the European Union began restricting the chemicals in the '90s, levels in breast milk declined there. “Our bodies take in hundreds of chemicals on a daily basis,” says Walsh. “Some accumulate in the fatty tissues and are often passed on to children through breastfeeding.” Such flame retardants have been shown to damage the thyroid glands of animals in laboratory tests.

After noticing the startling trend,

Walsh founded the Healthy Building Network in 2000. “I’d been working in the environmental movement for 20 years when I realized that a lot of environmental problems were caused by the way we use materials,” he says. “It’s not just the waste coming out of our factories that’s destructive.” Today, HBN has an annual budget of \$2 million and strategic relationships with academic centers, such as



the Center for Clean Products at the University of Tennessee-Knoxville, and green building industry leaders, including Kaiser Permanente Health Care Systems, that promote the adoption of healthy building practices.

Green building experts, Walsh says, have shown that healthier buildings lead to better learning in schools, quicker recovery in hospitals, reduced

sick-time costs, and hundreds of billions of dollars in increased worker productivity. “In addition,” he says, “careful selection of building materials can mitigate and even reverse some of our toughest environmental health problems.”

Laying the Right Foundation

Walsh’s ultimate goal is to get the building industry to adopt what environmentalists call “the precautionary principle”: a policy of selecting less harmful alternatives to toxic materials based upon the weight of available evidence. “Typically, industry holds off action for decades while the scientific evidence of harm mounts,” he says. “The precautionary approach stimulates and rewards innovation.” The U.S. Green Building Council adopted the precautionary principle in 2006 as one of the six guiding principles for its Leadership in Energy and Environmental Design (LEED) standard, the most widely recognized standard for green building. LEED works on a points system and assigns silver, gold, and platinum ratings to green buildings based on their sustainable features and performance.

To facilitate the green building process, HBN is also developing an online screening tool called Pharos, which will let builders compare building materials on the basis of environmental, social, and health impact. Even a sophisticated commercial buyer is ill-equipped to evaluate the confusing array of green product claims and eco-labels. “So Pharos would weigh these claims



against available data to give a more nuanced recommendation between materials.” Although still in the testing stages, a Pharos prototype is available at www.pharosproject.net.

Walsh also intends that Pharos should clarify distinctions among products that are labeled—or often mislabeled—as green: “We want to highlight companies that are the most transparent about what they put into their products.” He points to Forbo, a Haleson, Pa.-based manufacturer of eco-friendly floors.

“Until we have official standards that demand products meet defined environmental criteria, there will be a lot of greenwashing, in which companies claim their products are environmentally friendly when they really aren’t,” says Tim Cole, director of sustainable initiatives at Forbo. Cole argues that manufacturers need to make a “life-cycle assessment” of their products, measuring their entire environmental footprint—from the extraction of raw materials to the

product’s end use—to truly claim the product is green.

Forbo is one of the only floor manufacturers to have published a complete, independently conducted third-party-reviewed life-cycle assessment of its primary floor product, Marmoleum. As an all-natural product—which Forbo has manufactured from linseed oil, pine resin, limestone, wood flour, and pigments and carried on a jute backing for more than 150 years—Marmoleum passed the assessment conducted by Leiden University in the Netherlands. Moreover, it is comparable in cost and durability to competing floor coverings.

Green Design for the Masses

As important as choosing the right materials are, so is a building’s architectural design. But here, the technology already exists to do the right thing. The world’s sixth-largest PC software vendor, Autodesk, is the leading provider of software for building information modeling (BIM), a process

that can facilitate the design of LEED-certified buildings. Architects using Autodesk’s Revit platform for BIM not only can see their designs in three dimensions but can also integrate analytical data into the design to predict expected energy costs—heating, lighting, air-conditioning—so as to maximize efficiency. Autodesk is also working on software to measure the carbon emissions that buildings produce.

Right now, the situation is dire in the building industry. In the U.S., buildings account for 12% of all water use, 30% of all greenhouse gases, 65% of all waste, and 70% of all electricity use. “A lot of the environmental focus has been on cars, but it really should be on buildings,” says Jay Bhatt,

Autodesk’s senior vice president of architecture, engineering, and construction solutions. “We are working to provide the industry with tools to build buildings that have a zero carbon footprint.”

But Autodesk’s goal isn’t just to do good. As it turns out, green building also makes good business sense. Kansas City-based architectural firm BNIM has built an international reputation for its sustainable building designs. A few years ago the company adopted Revit Architecture software, and it has greatly facilitated its design process.

“Revit helped significantly increase BNIM’s productivity and earn a global reputation in the green building space,” says Bhatt. “That’s the difference between green building being a fad and the thing that will change the building industry. Businesses will build their operations around doing it and can make a significant profit.”

That said, much of the waste and inefficiency in the building industry

Building A Cleaner Future

U.S. buildings are responsible for more CO₂ emissions annually than those of any other country except China. Most emissions come from combustion of fossil fuels to provide heating, cooling, and lighting, and to power appliances and electrical equipment. By making buildings high-performance, the building sector can reduce the demand for energy.

The most significant factor contributing to CO₂ emissions from buildings is their use of electricity. Buildings consume 70% of the electricity load in the U.S. "Energy is the single largest operating expense in a typical commercial building," says Larry G. Wash, vice president of service and contracting for Trane's commercial business in the Americas. "It's become increasingly important for building owners to reduce operating costs without impacting business performance, by energy-conservation strategies that incorporate analysis and planning, energy procurement, and energy conservation."

Many of these greener corporate building initiatives are done in tandem with Trane, a company that supplies energy-efficient indoor comfort systems, services and

performance-based solutions to 50% of the commercial buildings in America.

Trane's high-performance buildings tie to the mission of its customers' business, are energy efficient, use sustainable materials, and provide ideal indoor air quality. The buildings may include energy-efficient lighting, new water-control technologies, optimized irrigation systems for landscaping, and a customized control systems to optimize the use of electrical equipment.

"We enable commercial building owners to have a significant favorable impact on the environment, human health, and business profitability," says Wash. "Trane starts by understanding how building owners measure business success. From there, we design, manufacture, service, and maintain customized building systems that deliver on these requirements." ●



comes not from new projects but existing buildings. Who, for instance, hasn't been driving in a city during wintertime and seen steam pouring out of buildings' rooftops and vents? That means they have poorly managed heating systems and are wasting energy. The market for retrofitting such buildings with more efficient heating, ventilation, and air conditioning systems (HVAC) and upgrading their electrical and plumbing facilities is estimated to be \$35 billion worldwide. The energy cost savings can be anywhere between 20% and 50% a year, provided the retrofitting is done properly. To ensure that it goes smoothly, companies often hire consultants who use computer programs to simulate how much energy a building consumes on an hourly basis and then project what the benefits of retrofitting will be.

The world's best technology is

“Careful selection of building materials can mitigate and even reverse some of our toughest environmental problems.”

worthless if no one wants to use it, so one of the goals of the nonprofit foundation Kendeda Fund is to encourage building professionals to favor green design. “When you choose to build a building, you make a lot of value judgments with the materials you use,” says Diane Ives, Kendeda Fund’s fund advisor. “We want architects, designers, and builders to make good choices, ones based not just on money but on all the other things people should care about—a healthy environment for our children and clean air for our families and workforce.” Kendeda offers grants to some 100 organizations a year, many of them green-related.

One of Kendeda’s projects is the

Living Building Challenge, a contest that challenges architects to design buildings that are made from local eco-friendly materials, have zero emissions, and produce more energy than they consume. “Architects love a challenge,” says Ives. “It’s how they advance their craft and gain recognition. So the Living Building Challenge challenged them by asking, ‘What if we built a building that was part of the environment where it was built, instead of using up additional resources?’” So far, several architects have accepted the challenge. One can only hope the rest of the building industry will follow suit.

—Lewis Braham

Is Your Building Healthy?

As green building goes mainstream, unprecedented attention is being paid to whether building materials are healthy for humans as well as the planet. These tools supported by the Kendeda Fund, a nonprofit grant-making organization, can help your company identify healthier building materials.

The Green Guide for Health Care is the first green building toolkit emphasizing a health-based approach to design, construction, and operations. While the program now includes almost 150 projects

representing 35 million square feet of construction in the U.S. and abroad, it’s not just for hospitals. The Green Guide is inspiring the broader adoption of health-based approaches in other building sectors, from homes to schools.

The Green Screen For Safer Chemicals helps industry move away from hazardous products by defining four benchmarks on the path to safer chemical selection. It is just one of the emerging healthy business strategies being developed by Clean Production Action, a collaboration among business leaders,

researchers, and nongovernmental organizations.

The Pharos Project, an online materials evaluation system currently under development, uses powerful database technologies to evaluate and compare the environmental and health impacts of building products at an unsurpassed level of comprehensiveness and reliability. Pharos will empower architects, designers, and purchasers to cut through “greenwash” and knowledgeably evaluate green marketing claims.

The Living Building Challenge, a program of

the Cascadia Region Green Building Council, one of the oldest affiliates of the U.S. Green Building Council, prescribes 16 steps toward buildings that are not just green and healthy but approaching true sustainability. For example, a “living building” must supply all of its own energy and water needs with renewable sources captured on-site, while inspiring beauty and a sense of place.

These tools are helping business leaders go beyond today’s definition of a green building to one that sets the standard for the future. ●



MANAGING OUR WOODLANDS

The Sustainable Forestry Initiative is improving forest practices throughout North America and promoting responsible procurement globally.

Green remains the rage within the building community. Popular in the commercial sector and growing more attractive in the homebuilding sphere as well, buildings that are environmentally friendly have become increasingly mainstream.

But green isn't just about energy efficiency. The choice of building materials has a huge impact on the environment. And wood's inherent properties—as a sustainable, natural, recyclable, and renewable resource—make it an excellent choice for building green. Wood's outstanding environmental life-cycle rating, plus its desirable aesthetic and construction characteristics, make it an excellent environmental choice—provided, of course, it comes from a well-managed forest. But how can people be sure they are specifying products that have been logged legally from well-managed forests?

Internationally recognized forest certification standards provide this assurance. The Sustainable Forestry Initiative (SFI) program, for example, has been improving forest practices across North America and promoting responsible procurement globally for over a decade.

“As a trend with builders and architects, green building encompasses not only energy efficiency but also includes the materials you use,” says Kathy Abusow, president and CEO of the nonprofit SFI organization. “Builders want to know how the wood they're using was harvested and transported, and if it came from a well-managed forest. Obviously, you can't give green points for wood being a renewable resource unless the forest is actually renewed. That's where SFI certification comes into play. It makes the wood equation complete.”

Third-party certification bodies audit organizations to ensure that their forest management practices and tracking and procurement of forest products meet the rigorous requirements of the SFI standard. If the

certification is granted, the SFI label can be applied on building products, allowing builders and consumers to make choices that reward responsible forest management.

That said, having the SFI label isn't just a matter of legality or being responsible. “Harden Furniture prides itself on its ongoing commitment to the environment,” says Gregory M. Harden, president and CEO of Harden Furniture, in McConnellsville, N.Y. “Since we have more than 10,000 acres of managed woodlots, we work closely with the Sustainable Forestry Initiative, which is designed to ensure that future generations of North Americans will have the same abundant forests we enjoy today. That's just one of the many reasons Harden Furniture is proud to be associated with SFI.”

Today, more than 150 million acres of SFI-certified lands across North America provide a secure supply of products to meet building or design needs. Many of the leading rating tools that building professionals and consumers use to help make decisions about green building products and practices recognize SFI certification, including the National Association of Home Builders, which incorporates the SFI into its Green Building Guidelines, and Green Globes, a nonprofit operating in the U.S. and Canada that promotes green building for residential and commercial construction. The U.S. Green Building Council is also currently assessing certification programs, including the SFI program, for recognition under its LEED rating system.

More so than ever, there is a clear need to recognize and reward North American wood from certified North American forests when it comes to strengthening North American green building rating tools, like those noted above. More than ever, North America remains a leader in well-managed forests. And SFI certification is the key to making sure it stays that way. ●



Looks for homes constructed with wood from SFI-certified forests helping to ensure water, soil and wildlife habitats are well-managed.

Chooses newspapers that begin life in the 152 million acres of SFI-certified forests.

Prefers clothing shipped in packaging from SFI-certified forests, where management must meet or exceed best management practices developed under U.S. Environmental Protection Agency (EPA) approved programs.

Wants custom trim sourced from forests following the rigorous SFI Standard audited by independent experts.

MEET THE NEW ENVIRONMENTALIST.

These days, a growing number of consumers want the good life, but not at the expense of the environment. So when they shop for everything from newspapers to building materials, they look for the SFI® label on wood and paper products. These products come from well-managed forests certified to the SFI Standard and other responsible sources. To learn how you can shop to help keep our forests healthy, visit www.sfiprogram.org.



SUSTAINABLE FORESTRY INITIATIVE

Good for you. Good for our forests.