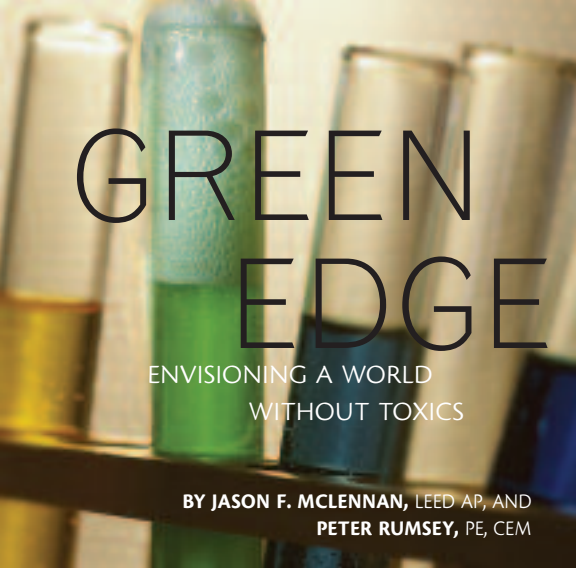

GREEN EDGE

ENVISIONING A WORLD WITHOUT TOXICS

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It seems obvious that toxic materials should not be part of the built environment in order to maintain healthy indoor spaces. Less obvious are the challenges posed elsewhere by toxic components and by-products of manufacturing. Even if materials are safe in structures, the associated use of toxic substances means that larger hazards are created somewhere along the supply chain — but still on our shared planet. Renovation and demolition waste can also pile up the risks of releasing dangerous ingredients. We must consider the "big picture" implications of our materials choices, outside and out of sight. Forward-thinking leadership guides us towards a point where our buildings and materials are as safe for current and future generations as is humanly possible.

Severity of risk is a function of how much hazardous stuff you are exposed to, how you are exposed (e.g., touch, breathe or ingest), and for how long. To paraphrase pioneering scientist Paracelsus, for many substances the only difference between a toxin and a remedy is the dose. Animal test data is used to determine how much of a substance is safe for different exposures. The U.S. Environmental Protection Agency regulates about 650 compounds. Yet we don't know even the basic hazards posed by over 90 percent of the roughly 80,000 chemicals in commerce, plus thousands more invented daily. Over six billion pounds of toxics are released annually in the U.S. — roughly seven tons per minute — and the ability of the natural environment to absorb or detoxify our wastes is deteriorating. Scientists recognize feedback from natural systems in many forms. Persistent man-made compounds are accumulating worldwide. The Center for Disease Control found 250 synthetics invented since 1945 residing in our bodies. No one can say for sure what this means for the health of humanity and the environment.

There is little argument that some substances found in common building materials are harmful to life, such as mercury, arsenic and chlorinated compounds. But for many other chemicals, the risks are less clear. Debate usually centers on the end products' usefulness, affordability, durability, and what hazards they pose in place. Vendors assert that their products are safe, backing their claims with studies in their favor or citing an absence of proof of harm. It can be very difficult to determine whether small amounts of toxins are released from those materials in use (or misuse), or over time.

The law of entropy tells us that substances don't stay where we put them forever. Some cause nasty effects when they get out. Think of asbestos fibers penetrating our lungs, arsenic leaching from CCA-treated wood in children's play structures, and kids exposed to lead from paint chips. Many problems are the unintended consequences of solutions to other challenges, ranging from safety concerns such as fire resistance to the benefits of durability to more cosmetic desires.

But when minute amounts of mercury — a potent neurotoxin — are spouted from coal-fired power plants, rain down and render fish inedible in large areas of the country (as is currently the case), doesn't common sense dictate that we immediately support alternatives or phase out the technology? In our opinion, if it is known (or even strongly suspected) that something is dangerous at concentrations that will eventually build up in the environment due to commercial use, then the precautionary principle applies. We should stop arguing about how much is safe, and focus on finding non-hazardous replacements.

It would not be practical to eliminate all toxic materials overnight. Outright bans are rare, reserved for the most egregious hazards. Trade-offs complicate cost-benefit calculations. Consider fluorescent lighting. It is very energy efficient but contains mercury. Incandescent lighting uses much more energy and adds cooling load, increasing power plant emissions. Fortunately, fluorescent manufacturers have significantly reduced mercury content. The National Electrical Manufacturers Association members used 7 tons of mercury in lamps in 2003, down from 9 tons in 2001 and 27 tons in 1990. Better yet would be equally effective, more efficient, mercury-free designs such as LEDs.

We acknowledge the utility and cost-effectiveness of many products that contain toxic substances or have toxic by-products. Yet we have a collective responsibility to encourage non-toxic substitutes, and to help manufacturers phase out these products as quickly as possible with benign and equally useful equivalents. As consumers we can apply market pressure and be willing to pay for alternatives even if they initially cost more. Each successive generation of every product made today should be less toxic than the generation before it, until (hopefully sooner than later) our environment is free of carcinogens, mutagens, endocrine disrupters and other poisons.

The Green Chemistry Institute (www.chemistry.org/portal/a/c/s/1/acs-display.html?DOC=greenchemistryinstitute\index.html) works to create solutions at the molecular level. The GCI helps redesign chemicals to detoxify products without compromising function and quality, and enable manufacturing without hazardous wastes. We applaud their efforts to promote innovation and move best practices into the industry mainstream. We share their hope that Congress will pass HR 3970, the Green Chemistry Research and Development Program. This bill would provide $83 million over three years for R&D and educational grants in this field.

McDonough Braungart Design Chemistry (www.mbdc.com) also leads the way. They provide companies with "cradle to cradle" design consulting for practical, profitable products that are non-toxic and biodegradable or recyclable, such as the highly successful Design-Tex fabric that is safe enough to eat.

A growing number of building material manufacturers share these goals and are developing safer products. Carpet makers

Interface, Collins and Aikman, and Shaw Industries for example, have begun to phase out PVCs. Cargill Dow and others are developing biodegradable plant-based plastics and fibers. Toxics are being evicted from a growing spectrum of building materials. We encourage these efforts, and most importantly, ask that you specify and purchase safer materials to build demand!

It is perhaps ironic that the Leadership in Energy and Environmental Design (LEED) Rating System offers points for remediating contaminated brownfield sites, yet relatively few credits address toxics purposefully put into new construction. Points can be earned for reducing or eliminating CFCs, HCFCs, VOCs, urea formaldehyde, CO2, and mercury, as well as for managing indoor contaminants. Renewable energy credits help curb emissions at the power plant. We would like to see LEED provide more incentives for avoiding the use of other toxic materials. Rather than creating their own list of toxics, initially the U.S. Green Building Council could choose from existing criteria used by the EPA. Ultimately LEED might reward precautionary approaches towards troublesome compounds not currently banned or regulated. We envision the development of simple, practical approaches, yet recognize the difficulty involved in developing clear guidelines in absence of firm science. As Green Chemistry Institute Director Paul Anastas has said, "just because the path is clear doesn't mean the journey will be easy."

In the end we make a moral argument. Is it appropriate to deliberately create problems for future generations and impose the need for constant vigilance by our children and grandchildren, so that we can have the convenience and low cost of certain products today? How proud should we be of our materials when many non-toxic substitutes either exist today or could be developed with more effort? Let us instead find satisfaction in taking responsibility for improving the world. It is time for the building industry to show respect for the full cycle of life.

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