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## GREEN BUILDING

# The New Transparency

## Will Cultural Trends Lead to Greater Influence for Industrial Hygienists?

BY CATHERINE BOBENHAUSEN

Traditionally, much of industrial hygiene practice is based on observing how things are made and what happens to people who are making them, and then promoting better ways to do the work. As consultants in manufacturing plants or as in-house specialists, we have functioned as the bridge between the plant floor and the front office, showing, for example, whether the engineers solved the dust/vapor problem or not.

Our field arose primarily from the medical profession. Visionary professionals such as Dr. Alice Hamilton puzzled over the illnesses of workers and built the foundation of industrial hygiene by connecting the dots between observed illnesses and what their patients did for a living. The IH practitioners who came after the founders applied the basic tenets of our profession (anticipation, recognition, evaluation, and control) to safeguard the health of workers and the general public.

Today, however, we are at a crossroads, where it could be said that we have failed to achieve the larger goal: helping to reformulate how things are made. The contemporary workplace that must be evaluated and controlled is complex, intricate, and geographically dispersed. Other factors affecting our work are the global supply chain and rising expectations of an expanded worldwide middle class coupled with the race to the bottom in cost to consumer.

Our failure to effectively channel commerce toward an inherently safer path is in large degree due to the overwhelming promise of functionality and value delivered by innovations in chemistry, which are widely recognized to be of great benefit to society. In today's world, technologically advanced materials—used in every aspect of our lives, including buildings—are very compelling and difficult to refrain from using. The allure of material goods has blinded the public from considering how things are made: if it's legal to buy, it's safe to use, or so the thinking goes. Similarly, in the world of green building, architects have generally relied on the manufacturer's local sales representative for advice on suitable building products, and refrained from asking to see safety data sheets.

### A Shift in the Landscape

But a new focus on transparency is shifting the landscape. Current trends in the broader culture suggest that industrial hygienists have a tremendous opportunity to make lasting differences not only in green building but in consumer products and other areas.

In the public sector, for example, California's new Safer Consumer Products regulation, effective in October 2013, requires manufacturers to identify safer alternatives to chemicals of

concern in widely used products. This is a bold precedent for the global marketplace and could serve as a model for federal chemical safety reform in the U.S.

The California regulation calls for companies to evaluate the function and rationale for using a given chemical and encourages manufacturers to change or even eliminate a product that contains chemicals of concern. Chemical switch-outs are to be reviewed as to their hazard (to avoid regrettable substitutions) and the product's life cycle is to be considered, as well as its impact on sensitive populations. The regulation promotes safer alternatives, including removing chemicals of concern, replacing them with safer chemicals, and reformulating or redesigning the product.

In the private sector, the world's largest retailer, Walmart, announced in September that it would begin disclosing chemicals in many of its products (cleaners, personal care products, cosmetics, baby care) by 2015 while phasing out specific chemicals in favor of safer alternatives. Walmart also intends to pursue EPA's Design for the Environment (DfE) imprimatur for some of its products. (The DfE label designates products that contain ingredients considered to pose the least concern for human health and the environment.)

This new transparency is also affecting the green building industry. Architects and other designers are increasingly expected to guide their clients toward chemical safety, a field in which they have no formal training. They are calling on industrial hygienists to make meaning of the confusing array of chemical reports associated with building products. Industrial hygiene skill and field experience is invaluable in ferreting out competing qualities and priorities for safer choices.

No longer ready to extol virtues of recycling on its own merit, designers are questioning the quality of recycled goods. They are learning about off-gassing from recycled rubber sports flooring and the presence of mercury in wallboard made from synthetic gypsum via flue gas desulfurization (FGD). Industrial hygienists' training in process chemistry and environmental engineering is useful in finding answers for these and other problems.

This month, the green building industry is anticipating the publication of version 4 of the Leadership in Energy and Environmental Design (LEED) rating system. LEEDv4's new "materials and resources" credits relate to building product disclosure and optimization. The most significant of these credits involves disclosure of ingredients in products. The intent is to prime the market toward a slow process of discovery, information exchange, and transformation toward safer building materials.

## New Focus

What is driving this new focus on transparency? First, the general public is becoming more aware of chemical exposures. Chemicals with widespread use in commerce appear in human blood, urine, and fat in unexpected and enduring levels, raising concerns about involuntary exposure and health implications. The Centers for Disease Control's Environmental Health Laboratory keeps a running tab on chemical exposure through biomonitoring. CDC's *National Report on Human Exposure to Environmental Chemicals* is currently reporting on exposure to 212 chemicals. The sidebar lists several of the building-related materials that CDC has added to its report.

Another factor is the rise of performance standards such as the Living Building Challenge (<http://living-future.org>), which certifies buildings based on performance requirements. The Living Building Challenge has identified a "red list" of chemicals that are considered "worst in class" and worthy of elimination from the built environment. Table 1 lists some of these chemicals and their common uses in construction and recreation.

The green chemistry movement, which promotes the development of chemical alternatives that are biologically and environmentally benign, is yet another driver of transparency. During his keynote address at AIHce 2011, Dr. Michael P. Wilson of UC Berkeley argued that industrial hygienists have a role to play in reforming the Toxic Substances Control Act, and that

## Keeping Track of Chemical Exposures

The CDC's fourth *Report on Human Exposure to Environmental Chemicals*, published in 2009, presents exposure data on 212 chemicals for the U.S. population. The report is periodically updated, most recently in September 2013. Among the chemicals tracked in the report are the following building-related materials: acrylamide, arsenic, phenols (bisphenol A, triclosan, benzophenone-3 and 4-tert-octylphenol), parabens, perchlorate, perfluorinated chemicals, polybrominated diphenyl ethers, phthalates, polycyclic aromatic hydrocarbons, and volatile organic compounds. For more information, visit [www.cdc.gov/exposurereport](http://www.cdc.gov/exposurereport).

federal reform could motivate industry to design-out hazards and embrace the science and technology of green chemistry.

## Within Reach

The rise of chemical "red lists," the continuing evolution of green chemistry, and new developments in green building are evidence of an abrupt change in the relationship between consumers and manufacturers. We are entering an age in which the promise of industrial hygiene's founders can be more fully realized than ever before. It's up to us to meet the challenge. 🌱

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**Table 1.** Selected Chemicals from the Living Building Challenge "Red List"

Chemical	Performance Claims	Building Use	Use in Recreational Gear
Chlorosulfonated Polyethylene	resists chemicals, temperature extremes, UV light	thermoset roof membrane, electrical connectors, green roofs	inflatable boats, folding kayaks, snowshoe webbing, windbreakers, life jackets
Chloroprene (Neoprene)	strong, UV resistant, weathers well, low flammability, chemically resistant	thermoset roof membrane	wetsuits, sports shorts, insulated rain boots, insulated water bottles, wetsocks
Halogenated flame retardants (PBDE, TBBPA, HBCD, Deca-BDE, TCPP, TCEP, Dechlorane Plus, and other retardants with bromine or chlorine)	flame resistant	foam cushions, fabrics, plastics, insulation, carpet backing, epoxy and resins, appliances, paints, and electrical devices	couches, upholstery, mattresses
Polyvinyl Chloride (PVC)	tough, strong, flame resistant	pipes, conduits, waterproofing, roofing, siding, door and windows, resilient flooring, carpet backing, wall covering, signage, window treatments, furniture, and wire cable sheathing	yoga mats, stand-up paddleboards, snorkeling equipment, ponchos, boxing workout sets, cooler totes, inflatable kayaks, weight balls, river tubes, bite valves, drink tubes
Phthalates	soften PVC, durable, low cost	vinyl flooring, wire and cable sheathing, waterproofing, roofing, siding, doors and windows, carpet backing, wall covering, window treatments, furniture	cosmetics, toys, childcare articles, food packaging