



Splinters from Green Materials: Conversations about the Frictions of Green Exhibition Design

by Greg Belew, Kathy Gustafson-Hilton, Sharon Handy, and Lyn Wood

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The following individuals were interviewed for this article:

Mark Anderson

Project Production Manager,
Science Museum of Minnesota

Julie Bowen

Director of Science,
TELUS World of
Science—Calgary

Tim Darr

Senior Designer, Jeff
Kennedy Associates, Inc.

Ben Durrell

Exhibit Designer, Boston
Children's Museum

Penny Jennings

Senior Exhibit Designer, West
Office Exhibition Design

Jeff Kennedy

President, Jeff Kennedy
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Andy Kramer

Principal, West Office
Exhibition Design

Erik Lizee

Director of Exhibit and
Media Development, The
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Kate Marciniac

Project Manager, Boston
Children's Museum

Kathy McLean

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What is it about the word “green” that creates so much friction in the world of exhibition design? During the decades Hands On! Inc. has been creating interactive exhibitions for science centers and children’s museums, we have seen a lot of shifts in exhibition design. We have witnessed the upheaval and rethinking of the museum economic model that followed September 11, 2001, and are now experiencing a new shift as museums turn their attentions to environmental sustainability.

There has been increasing attention given to the idea of green exhibition materials, but as we worked on LEED-certified projects, talked to our clients, read articles and listened to our peers at conferences, we found ourselves scratching our heads. When it comes to design and fabrication of interactive exhibits, which have a set of durability and safety needs that are wholly unique in the wide-ranging world of museums, what exactly is green? How are people making decisions about building green interactives? Our fabrication partner, Charlie Shaw, made the conversation even more complex when he questioned what we meant by sustainability and the impact of our decisions. If, he asked, you’re designing an exhibition filled with energy-intensive projectors and monitors filled with plastic and toxic waste but surround them in Plyboo® (a laminated bamboo plywood), are you being green? Things got thorny quickly.

Recent steps in our industry to try to codify the idea of green, particularly with regard to material usage, followed in short order by Requests for Proposals that referenced a checklist of specific green materials, made us wonder how best to respond to our

clients’ wants and needs when it came to green exhibitions. How could designers, fabricators and museums make the most positive impact given information and opinions that often conflict?

We decided to ask some colleagues what they thought about green interactive exhibitions, to get this issue out of the closet and get people talking about the frictions they were experiencing. What were people saying? Better yet, what were they thinking but maybe not saying? Following are the key themes that arose again and again in our conversations.

Green vs. Greenwashing

Green describes a color, but it doesn’t describe too much beyond that very well. It’s convenient shorthand for describing a value judgment on a material without specifying what that value judgment really is. It doesn’t give you a good framework for making complex decisions in design and fabrication. Scott Moulton, Exhibit Designer, Gyroscope, Inc.

At first, we were surprised, and then a little heartened, at the consistency with which each person described how complex he or she had found the issue of “green” to be. When it came to exhibitions, one of the biggest issues was the grayness of the way materials are measured as green. Diane Perlov, Senior Vice President for Exhibits at the California Science Center, described the effort to sort through the many claims, as well as the significant investment of time and money required to do that research:

One of the more basic challenges we deal with is identifying what is “green” and what is just “greenwashing” and telling the difference between the two. The

question used to be, “Is this recycled,” but it’s not so simple anymore. You have pre- and post-industrial or consumer waste, percentages, sustainable, managed, recovered, rediscovered, reclaimed—what do these things mean? And then there’s the certification process. Who is verifying the veracity of any of these claims? We had to put in a lot of time to wade through all of this during the design process. It adds a lot to the budget and schedule, you’re still just hoping you got the information correct, and the products, information and regulations continue to change on us every day.



A detail of Plyboo® exhibit cabinetry at the Brooklyn Children's Museum. Photo ©Hands On! Inc.

Everyone we spoke with echoed the problem. How do you measure the greenness of a material? What are you valuing? The green label now covers everything from the source of raw materials to carbon footprint, water use, human/social costs and the impact on the waste stream. The green grade of a material can slide across a long spectrum depending on the particular lens through which a museum, designer or fabricator chooses to view it. Scott Moulton, exhibit designer at Gyroscope, Inc., used Plyboo® as an example of a requested material whose green-ness becomes complicated when you scratch its surface:

Plyboo® is made from a rapidly renewable resource (bamboo), has great durability and has an inherent beauty. But if you were looking at it in terms of economic cost and environmental cost in getting it from China to the United States, and the fact that I don’t have a clear understanding of how it’s made or what the working conditions are in China where it’s made, it doesn’t look as good. There is an undeniable grayness to its label as a green material.

Many of our interviewees found themselves caught in shifting sands when it came to these kinds of evaluations, the complexity of which compounded when issues of budget and schedule were added.

Economic Sustainability vs. Environmental Sustainability

Sustainability is bigger than the environment. It’s also financial sustainability and community sustainability. When we talk about sustainability, we mean the balance of all those areas. Jane Werner, Executive Director, The Children’s Museum of Pittsburgh

In all of our conversations, the most common phrase we heard repeated was “trade-off.” Museum professionals and independent designers and fabricators acknowledged that many museums are operating with increasingly stretched resources. While they desire to make green choices for exhibitions, they often feel hampered by the higher cost and limited availability of those materials. They wish to be innovative in their approach to being green,

The following individuals were interviewed for this article, continued:

Dr. Sally Montgomery
Executive Director,
W5:whowhatwherewhenwhy

Scott Moulton
Exhibit Designer,
Gyroscope, Inc.

Michael Myers
Vice President, Universal
Services Associates, Inc. (USA)

Diane Perlov
Senior Vice President
for Exhibits, California
Science Center

Barbara Punt
Principal, Punt Consulting

Jussi Sava
Production Manager, Heureka,
the Finnish Science Centre

Charlie Shaw
Exhibit Designer &
Fabricator, C.W. Shaw, Inc.

Eric Siegel
Director of Planning &
Program Developing, New
York Hall of Science

Lamar Smith
Vice President of Exhibits &
Planning, The McWane Center

Jane Werner
Executive Director, The
Children’s Museum of Pittsburgh

Harry White
Science Centre
Consultant, Techniquist

Steve Wiersema
Partner & Design Director, West
Office Exhibition Design

Joe Wisne
President, Roto Studio



Instead of printing new graphics, **Our Green Trail** at the Boston Children's Museum used routed, painted lettering on scrap materials as signage. Photo ©Boston Children's Museum.

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but they need innovative solutions that don't break the proverbial bank. Julie Bowen, the Director of Science at TELUS World of Science—Calgary, summed it up:

The cost of acquiring some of these materials is often really high. A green floor covering for an exhibition might cost the same as three or four exhibits in that gallery. I can't make that call and then ask visitors to admire the greenness of our floor when they're here. Our primary duty is to give our visitors good experiences, or we can't stay open.

Interviewees noted that many of the green materials that show up in LEED-certified buildings aren't financially feasible for exhibitions because such small quantities are used. The discount from bulk purchasing disappears, so exhibit designers and fabricators end up paying higher prices. Many we spoke with also noted that some green materials have limited lifespans in the highly active environments of science centers and children's museums. Continuing upkeep and replacement

costs can be significant, increasing the lifetime cost of the exhibition beyond its initial funding.

Ultimately, our interviewees agreed that their approach to environmental sustainability was always tempered first and foremost by economic sustainability. Museums and independent designers and fabricators alike were as green as they could afford to be within the very particular funding and schedule circumstances of each exhibition.

Separate vs. Integrated Processes

The closer design and production are married, the greener you can be. You can think through all those issues of fabrication, floor life, reuse and recyclability. The result is a fabricated product that is more thoughtful, more elegant and has a much longer life. Ben Durrell, Exhibit Designer, Boston Children's Museum

Given the ongoing limitations of budget and schedule, many people we spoke with noted that the closer they aligned the design and fabrication processes, the more green they felt their exhibitions were, whether or not they were made of materials labeled "green." Close communication between designers and fabricators from the start of exhibition conception and design was seen as particularly essential when it came to the reuse of exhibit parts, leftovers from previous fabrication efforts, or salvaged materials from the community.

In the case of the Boston Children's Museum, which handles some exhibition design and fabrication in-house, this approach allowed them to maximize what they called their "Yankee thrift" approach to environmental sustainability, which includes a materials library

“As far as green goes, I think the problem with exhibitions isn’t so much that the materials aren’t healthy or sustainable but, rather, that there’s too much material in them to begin with.” Eric Siegel

of drops and cut-offs from previous fabrication efforts. Ben Durell and Kate Marciniac spoke of a green exhibition called *Our Green Trail* that was specifically designed and fabricated with reuse in mind:

We started out looking at all the flashy new eco-materials, until we got to the station that was about reduce/reuse/recycle and realized those new material choices weren’t matching the mission of that exhibition. Rather than buying new, we designed around the fabrication materials we had on hand. Thinking about the materials from the start allowed us to do things differently, and the result is an exhibition that is less wasteful and more authentically green than we would have achieved just specifying a blanket list of green materials or green suppliers.

All of the independent designers and fabricators echoed this sentiment. Fabricators, in particular, noted that they often received designs with specifications for green materials that were wholly unsuited for the use and abuse an interactive exhibition takes. This required stopping a project’s momentum, gathering the team and rethinking the design, all costing time and money most projects could ill afford. Even something as simple as designing to standard material sizes to minimize waste and cost was often missed when design and fabrication were viewed separately. Many wished for a more integrated approach that brought the fabricators’ extensive knowledge and ability to source materials into the design process earlier as a way to make smarter, more ecologically sound choices for exhibitions.

For those interviewees who have used an

integrated approach to design and fabrication, the results spoke for themselves. Exhibitions were seen as more durable, more elegantly designed, easier to care for, and more likely to have a “second life” as reusable parts in other exhibitions.

Environmental Flash vs. Environmental Friendliness

As far as green goes, I think the problem with exhibitions isn’t so much that the materials aren’t healthy or sustainable but, rather, that there’s too much material in them to begin with. There’s this vocabulary of design, especially in the past decade, that dictates huge armatures and settings and surrounds with relatively small exhibits embedded in them. A traveling exhibition built like that was the turning point for me. I thought, “That’s a lot of stuff! We need to stop doing that.”

Eric Siegel, Director of Planning & Program Developing, New York Hall of Science

Interviewees repeated many times that they felt interactive exhibitions, even green ones, were often overbuilt, with excessive materials invested in furniture and custom environmental surrounds that couldn’t be reused. Independent designers and fabricators, in particular, felt the friction of creating interactive exhibitions for clients who asked them to use green materials but still desired something flashy and highly environmental. Like many of the designers and fabricators we spoke with, Joe Wisne of Roto Studio noted:

Clients have a lot to say about this through their preconceived expectations of what makes a “good” exhibition. They may be readily willing to embrace a particular green-sounding material but are often less prepared to take the

People felt there was no point zealously focusing on green exhibit materials if the business itself was run in a non-sustainable way.

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more radical approach of building the same essential visitor experience with half the overall volume of “stuff.”

Scott Moulton at Gyroscope agreed, but is starting to see a shift:

Clients still have a tendency to want that unique, one-off look, but the trend is starting to go toward something simpler, something that can be taken apart and reused or transformed into something new. It's a good idea; even if we don't use a single green material, a reusable exhibit can have a far more positive impact than a single-purpose, fixed-use thing made with sustainable materials. It's important not to get too focused thinking that the use of materials is the only tool we have.

Interviewees at museums expressed an increased interest in stripping things down and making better use of the exhibit structures they do build. They discussed the desire for exhibits with multiple active sides rather than single-exhibit kiosks, as well as a desire to reuse everything from base cabinetry to metal armatures in new configurations. Given the limitations on financial resources and the competing need to present new content continually, museum professionals felt this was not only a way to decrease material use and increase the environmental sustainability of their exhibitions, but also a logical way to stretch their funding far beyond the initial outlay for a single exhibition.

Sally Montgomery, the executive director of W5 in Belfast, Northern Ireland, found another benefit to a simpler, more straightforward design for interactive exhibitions:

The more environmental surrounds you put in, the more you prevent economical change. We can move our exhibits around, along with their graphics, and shuffle the content mix easily because the exhibits are not dependent on a lot of fixed environmental elements. Just moving a few exhibits makes people think about them and use them in a different way without requiring any extra expense on our part. To me, that's a big part of being environmentally sustainable—using what you have to its best advantage.

Interviewees also acknowledged, however, that the “less is more” approach, especially for interactive exhibitions that receive a huge amount of wear and tear, often required a degree of durability missing from many green materials. These observations led to another prominent theme in our discussions about the frictions in creating green exhibitions.

Opening Day vs. The Day of Reckoning

The materials that go into an exhibit are just a small part of an exhibit's life. If we're going to consider the greenness of an exhibit, maybe we should stop focusing on the Day of Opening and look to the Day of Reckoning when its life is lived. How long did it last? How much upkeep and energy and extra material did it require to maintain? How did it come apart? How could it be recycled? That's when you know whether something is wasteful or not.
Charlie Shaw, Exhibit Designer & Fabricator, C.W. Shaw, Inc.

What really makes an interactive exhibition green? Many of our interviewees stressed that they try to reuse materials, purchase locally, and incorporate green materials when designing and fabricating new exhibitions. Yet almost

all of them also suggested that the initial materials that go into an exhibition were not the biggest part of how green those exhibitions were. In science centers or children's museums, in particular, where exhibits are pushed, pulled, scratched, dinged, climbed, and generally abused by thousands of visitors every year, the durability and longevity of those exhibits were seen as far more significant than the materials used to make them. Most people we spoke with are now focused on creating interactive exhibitions with a five- to ten-year lifespan in their original form, with the additional desire to then reuse at least some of the exhibit components after that. Eliminating the need to replace an exhibit or entire exhibition two, three, or four times within that same timeframe had a far greater perceived impact than specifying a recycled material with a limited lifespan.

Julie Bowen summed up the feelings of many interviewees:

Durability is a big factor in the materials and the way we design and fabricate our interactives. We had some stuff made of recycled material that we put a lot of money into, and it was destroyed fairly quickly by heavy use. How is it environmentally friendly if now it's in the waste bin and has to be replaced, if it can be replaced at all because of our budget limitations?

Ben Durrell at the Boston Children's Museum agreed:

Our **Kid Power** exhibition wasn't built with recycled materials, but in my mind



Kid Power at the Boston Children's Museum was created by Hands On! using an integrated process that overlapped design and fabrication for efficient use of materials. The exhibition requires minimal ongoing resources for upkeep. Photo ©Oscar Williams.

it is really green because it doesn't need anything. It's solid, so we're not spending time and resources keeping that exhibition going or more materials to replace it. And, it was designed and built thoughtfully, so years from now we can take it apart and use those elements, like the steel, again and again.

“Let’s admit that as soon as we dig past superficial assumptions, choices that we’re told are environmentally friendly often don’t hold up to science-based scrutiny.” Joe Wisne

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A Small Part vs. the Bigger Picture

Being green is about how you operate your business. Are you reducing your waste and recycling all that paper you use? Are you turning off everything when you leave at night? Are you floodlighting your building? There’s no point in being green in your exhibitions if you run your business in a non-sustainable way. The exhibitions fit into that, but they’re a small part of the picture.
Dr. Sally Montgomery, Executive Director,
WS:whowhatwherewhenwhy

The measure of the impact of material choices figured prominently as another friction in our conversations. Given the environmental cost of an institution such as a museum, just how much of an effect do the materials in an exhibition have on the entire eco-equation? While many interviewees expressed the desire to use green materials where possible and practical, they questioned whether the environmental “savings” of substituting a few sheets of wheatboard for plywood came anywhere near the savings of putting the building’s lights and electronic exhibits on motion activators or strictly-controlled timers, recycling their office paper waste, or offering school program packets online rather than as printed mailers.

All of those involved in exhibitions for LEED-certified buildings (or the equivalent outside the United States) noted how little, if anything, those exhibitions counted in that larger picture of ecological sustainability. Large investments of capital in green exhibit materials were seen to have very limited payoffs in the long run, both officially with certifying agencies and practically in the museum’s bottom line.

Consistently, the museum professionals

we spoke to all described a more holistic, institution-wide view of sustainability in which the design and fabrication of interactive exhibitions, occurring as it does so irregularly, played a relatively small role. People felt there was no point zealously focusing on green exhibit materials if the business itself was run in a non-sustainable way. This was especially true for the museum professionals in California, Canada and Europe we interviewed, all of whom operate under strict and rapidly changing guidelines for energy efficiency and recycling. Business and building operations were much higher on the scale of concern and overall effect, with each institution approaching it differently based on their particular parameters.

The localized nature of the response to “being green” led to the last friction we heard about in all of our conversations.

Unique Solutions vs. Standardization

Solutions need to be rooted in a place and a situation. Making an informed decision for your situation is more important than deciding for someone else that they’re doing the right or wrong thing, because the context in each case is unique. I’d like to see us embrace local solutions to sustainability issues instead of working toward a top-down approach to what it means to be green. Julie Bowen, Director of Science, TELUS World of Science—Calgary

When it came to exhibitions, a repeated refrain was that there was no one way to define a green exhibition. Once one dug beneath the surface, being green defied easy answers, standardized checklists, or set methods of design and fabrication. The situation of each exhibition is unique; no one felt comfortable saying, “This is how we will design an exhibition to be green.”

Every institution had its own context of mission, values, audience expectations, available finances, deadlines and local regulations. More importantly, each existed in a particular place with its own unique environment, available local resources and access to materials from elsewhere. Lamar Smith at The McWane Center in Birmingham, Alabama, said it would cost a financial and ecological fortune to ship recycled materials that weren't easily available there. But, he did have access to a warehouse of reclaimed heartwood pine and other materials from defunct factories and homes. Sticking with recycled materials that were available locally made green sense to his institution. Jussi Sava at Heureka in Finland sourced wood locally: "This is our luxury, because Finland is a land of 'green gold' and we still have a lot of wood industry here." Diane Perlov noted that California and Los Angeles had many green material options, but that didn't change the complications of creating green exhibitions for an interactive museum:

Overall, the thing we've learned is just how darned complicated this is and how hard you have to work to stay on top of the current research. Everything is changing all the time. And each exhibition, each situation is different, so you have to rebalance all of these competing factors of budget, durability, safety, schedule, sustainability every time. There's no way to have a set policy or pattern that fits.

Embracing the Frictions

The frictions that our interviewees encountered when dealing with green exhibitions were wide-ranging but surprisingly consistent. The "green-ness" of a particular material or

process is highly variable depending on the factors one chooses to consider. The cost, durability and suitability of green materials for high-use interactive exhibitions are significant issues with which designers and fabricators, in particular, struggle. Many consider an overall reduction in materials and an integrated approach to design and fabrication to reduce waste as, if not more, important than the choice of materials. Interviewees advocated both a



Cattle car siding finds reuse as ceiling tiles at the Amarillo Performing Arts Center in Texas. Photo ©Hands On! Inc.

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long view that considers end-life reuse and recycling of exhibit components and a broad view that sees exhibition materials as one small factor in the bigger picture of a museum's commitment to sustainability. And, universally, they noted that there was no single definition of green choices that suits each particular museum's situation and location.

Ultimately, we discovered in our conversations that the most commonly perceived issue was the sheer complexity of the idea of "green exhibitions." Several interviewees compared it to the increasingly complex and often friction-filled dialogues about food. Just a few years ago, it was "organic is best," but the conversations about food today are much more thoughtful, resulting in situational responses that vary widely. Joe Wisne summed up the larger feeling:

Let's admit that as soon as we dig past superficial assumptions, choices that we're told are environmentally friendly often don't hold up to science-based scrutiny. Although it is important to keep doing research into new materials and product options as they arise, green exhibition building must be

about more than merely checking off a list of the greenest possible products. Instead, let's ask ourselves if we're eliminating as much waste as possible through careful design and fabrication. Do our interactives last? Are we building infrastructure that can be kept and reused? Do we need to realize our exhibition visions with such a big quantity of structures in such a big footprint? And how is the institution acting sustainably as a whole? There are so many ways to make a more substantive difference.

As complex an issue as green might be, however, all of our interviewees were interested in deepening the dialogue instead of rushing to easy answers. We were excited to hear that science centers and children's museums, institutions dedicated to celebrating innovation and inspiring new generations, embrace the frictions inherent in being ecologically sustainable. In pulling green out of the closet, we hope that our industry begins to have more open, active conversations about how they tackle these frictions—that we inspire each other and our audiences with the creativity and innovation of our responses. ✨