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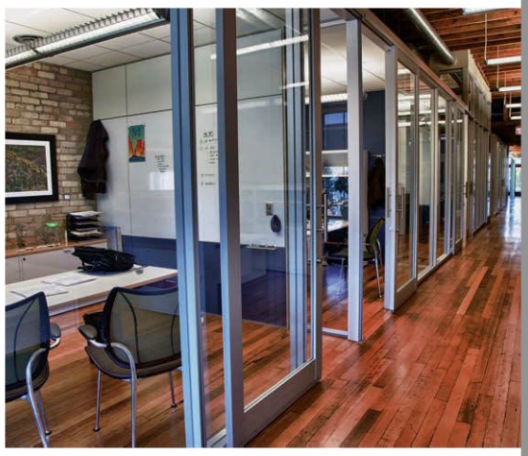

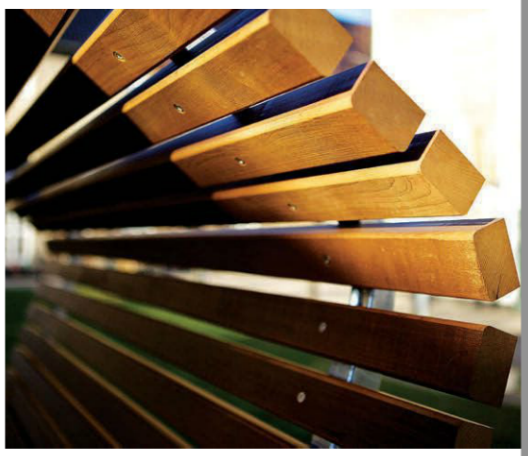


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2014 GREENbook

LEED Fellow CORNER

BY JOHN AMATRUDA, RA, LEED FELLOW, BREEAM INTERNATIONAL ASSESSOR

JOHN AMATRUDA, RA, LEED FELLOW, BREEAM INTERNATIONAL ASSESSOR, IS A PRINCIPAL AT VIDARIS INC., A MULTIDISCIPLINARY CONSULTING PRACTICE WITH OFFICES IN NEW YORK CITY, BOSTON, AND NORWALK, CONN. AMATRUDA MANAGES THE COMPANY'S GREEN SERVICES DEPARTMENT AND SPECIALIZES IN LEED/SUSTAINABLE BUILDING CONSULTING AND THE EVALUATION OF GREEN MATERIALS AND SYSTEMS. HE CAN BE REACHED AT JAMATRUDA@VIDARIS.COM.

Informed Product Selection

MANUFACTURERS ARE STARTING TO PRODUCE MORE INFORMATION THAN EVER BEFORE ON THEIR PRODUCTS, BUT HOW SHOULD YOU ANALYZE IT?

With the release of LEED v4, the U.S. Green Building Council has substantially restructured the way we analyze and select "environmentally preferable" materials. New credits that rely on Health Product Declarations (HPDs), Environmental Product Declarations (EPDs), GreenScreen assessments, responsible extraction reporting and more extensive volatile organic compound (VOC) emissions testing have set in motion a demand for detailed materials data that is far more sophisticated than the previous Materials and Resources credits we're so familiar with. And while earning LEED v4 points is one type of motivation, our firm's recent experience indicates that clients and design teams are ultimately more interested in how we can use this new information to make informed material selections.

But in the rush to make new discoveries, it's important to understand what this new process entails. Working with product transparency presents a number of hurdles and also suggests a modified and more rigorous approach to analyzing and selecting products.

Products with EPDs, like Accoya wood, help architects see what goes into making a product and can help them to make selections that better meet client goals.

IMAGE COURTESY OF ACCOYA WOOD, BY ACCSYS TECHNOLOGIES

WHEN MAKING PRODUCT COMPARISONS, BE PREPARED FOR GREY AREAS. IT'S UNCOMMON TO FIND "SLAM DUNKS," WHERE ONE PRODUCT OR PRODUCT TYPE IS CLEARLY SUPERIOR IN ALL PERTINENT AREAS COMPARED WITH A COMPETING PRODUCT.

So how does one begin to make this process work? Some of the key issues we've encountered are described as follows, along with our insights.

1.) FINDING THE INFORMATION

As one would expect with this new initiative, only a small percentage of products currently have applicable HPDs and EPDs, and even VOC emissions data can be difficult to find for certain product types. Finding the data to make an "apples to apples" comparison can therefore be challenging.

For example, in a recent project where we reviewed resilient flooring (vinyl, rubber, polyolefin, linoleum), we found a hodgepodge of available data: three industry-wide EPDs, a couple product-specific EPDs, no HPDs, and one material ingredients disclosure (not in the HPD format). And that was a good example.

So what do you do? The key is to be flexible and cast a wide net. In our resilient flooring example, we also used the Pharos Project, a subscription-based online tool, to fill in some information gaps, and we also found third-party flooring reports that were issued for healthcare applications. Other sources can include Safety Data Sheets and European Commission REACH reporting, as well as certifications such as Cradle to Cradle and Declare. By pulling in as many resources as you can, a profile of the product will ultimately begin to emerge.

2.) MAKING COMPARISONS

This is, of course, the most advanced and compelling part of the process. While the LEED v4 optimization credits compartmentalize EPD and HPD/GreenScreen analyses, for a design team these pieces need to be integrated along with a host of other criteria: VOC emissions data, product performance, maintenance requirements, aesthetics and costs. In our practice we have established a series of "screens" to prioritize these criteria and act as the basis for vetting products. The goal is to find the right balance point, which often requires judgments and input from various project team members, including operations and maintenance staff.

One inevitable issue: What do you do with the most technical data (particularly HPDs) once you get it? At the moment, we have a couple strategies. The first is to work with an industrial hygienist, who can make professional assessments of the data. The second is to work with the aforementioned Pharos Project and utilize its evaluation and ranking systems to compare similar products. As more HPDs are issued, the Pharos database is continually growing.

When making product comparisons, be prepared for grey areas. It's uncommon to find "slam dunks," where one product or product type is clearly superior in all pertinent areas compared with a competing product. It's more likely, for example, to find that one type of resilient flooring will fare well under some EPD categories (compared with other resilient flooring options), but worse under other EPD categories or under the toxic content (HPD) analysis. Conversely, it's common to find that different brands within the same product type use the same problematic chemicals, making distinctions less obvious.

In these cases, we apply the multiple screening criteria, and we've been successful in identifying preferable products for a number of material types, including topcoat paints, carpet tiles, wall coverings, engineered wood flooring and resilient flooring, among others.

Sometimes, after looking at the data, the best answer is to just avoid a particular material type altogether or, alternately, find ways to minimize its use. As an architect, I like this tactic because it expands the scope of the materials review—instead of

Designed by Gignac & Associates and built by general contractor Leyendecker Construction, the La Joya ISD Child Nutrition Center and Police Station features MBCI's eco-FICIENT Grand H insulated metal wall panel.

IMAGE COURTESY OF MBCI

just focusing on a particular product, you start thinking in terms of the whole building. And it allows for some creative solutions, which plays to the strengths of designers. Ultimately, the most successful projects will likely pursue a combination of whole-building decisions and specific product selections as their approach to materials optimization (LEED v5, anyone?).

3.) DEVELOPING SPECIFICATIONS

While the process of vetting products is ultimately the most "concrete" part of the product transparency process, the development of corresponding specifications can be just as critical. In our own practice, we've developed new specification language that covers reduced-toxicity performance criteria and corresponding submittal requirements. The criteria are tailored per specification section, based on the applicable materials types.

Specification criteria ensure that potential product substitutions meet the same standards as any listed pre-vetted products. But the additional benefit is that they capture the essence of the research that was done when products were reviewed and vetted. This gives you a head start on future projects and allows you to build up a library of criteria over time.

If the process I described seems daunting, keep in mind that we are still in the early stages of working with product transparency. In the coming years I expect that we'll see increasing availability and better quality of information, and more tools and resources to make the analysis process easier to digest and less time consuming.

But perhaps more importantly, LEED's emphasis on product transparency has already helped to establish a new paradigm for materials analysis and selection. As happened with nutrition labels in the food industry, LEED is pressing the issue of what goes into the products we build with. With this knowledge, we may never look at our buildings the same way again. edc

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Product Transparency in Practice, Part 2

APPLYING PRODUCT TRANSPARENCY INFORMATION TO THE SELECTION OF GREENER MATERIALS DOESN'T ALWAYS RESULT IN WHAT ONE MIGHT EXPECT.

In Part 1 of this article in the September issue of *EDC*, I reviewed some of the insights our firm has accrued when applying product transparency information to the selection of greener materials. I noted three major steps in the process: 1.) finding the information, 2.) making comparisons, and 3.) developing specifications. For this follow-up article, I'll present a more detailed example of this process, showing how resources ranging from Environmental Product Declarations (EPDs), to Health Product Declarations (HPDs) to the expertise of an industrial hygienist can change the way you select and specify materials—with an emphasis on improved human health and reduced environmental burdens.

I'm going to use a relatively common product type for this example: acoustical ceiling panels (ACPs). Not long ago a design team asked us to review a number of ACPs they were considering for a LEED project, including a lesser-known panel made from bio-based fibers as opposed to more common mineral wool or fiberglass-based products. The bio-fiber product seemed promising, as it was considered a rapidly-renewable material for LEED purposes, and it was Cradle to Cradle Silver certified.

The manufacturer of this product had issued an EPD, which allowed us to compare its life-cycle performance against EPD information from a number of comparable mineral wool and fiberglass products. Surprisingly, the EPDs revealed that the bio-based panels had the highest environmental impact of any of the reviewed products in all six of the Life-Cycle Assessment (LCA) impact categories: primary energy, global warming potential, ozone depletion, acidification potential, eutrophication potential and smog—photochemical oxidant—creation potential. Its global warming potential alone was between 10 to 290 percent higher than that of the other products.

THE PROMISE OF PRODUCT TRANSPARENCY IS A MORE ROBUST AND INFORMED PARADIGM FOR SELECTING THE MATERIALS WITH WHICH WE BUILD.

Another interesting EPD observation was that among the mineral wool and fiberglass products we reviewed, the one with the least recycled content had the lowest overall environmental profile. So much for intuition.

But as I noted in Part 1 of this article, EPDs only tell part of the story. Human health impacts can be of greater (or at least equal) importance in making these types of material selections, and LEED v4's credits for material ingredients, PBT source reduction and low-emitting materials provide another avenue to integrate product transparency into the material selection process.

Continuing the ACP example, we looked for available HPD and material content information as a counterpoint to our EPD reviews. Many manufacturers are still in the early stages of developing product transparency information, and that holds true for ACPs. In our research we found HPDs from only one major manufacturer, as well as product ingredient reports (not in the HPD format) from another. We were subsequently able to utilize safety data sheets, reporting for the European Commission's REACH program and the Healthy Building Network's Pharos tool for additional information.

While the available data may not be as extensive as one would like, it's usually enough to start making assessments. In our firm, we use the expertise of our in-house industrial hygienist to evaluate the overall information, assess any listed chemicals of concern and look for distinctions among the range of products and manufacturers. In many cases, follow-up calls are needed with the manufacturers to further understand the product components and options that may be available. ACP content we have identified for review has included antimicrobial treatments, polymer additives, PVC face coatings, surface paints and formaldehyde-reducing coatings.

Armed now with both LCA and health-related assessments, we can begin to integrate the information and identify distinctions that can lead to "preferred product" designations. Don't expect the data alone to

make the choices obvious. In many cases judgments have to be made since individual products often show both benefits and disadvantages when scrutinized through the product transparency review process.

This leads us to one last critical integration issue, which is assessing the targeted products against key performance criteria. For ACPs, these can include ceiling attenuation class (CAC), noise reduction coefficient (NRC), light reflectance, sag resistance, and, depending on the application, fire resistance ratings and moisture/mold resistance. You can also add appearance, cost and end-of-life recyclability to round out the evaluation.

In some situations, performance-based vetting is actually the first step in our review process, particularly for materials with which performance is both specialized and essential (e.g., flooring in chemistry labs). In other cases, such as with ACPs, it can be useful to cast a net for a wider set of products to understand the variations in product content and LCA performance. Once the distinctions have been uncovered, the environmentally preferable options can be further evaluated against traditional performance criteria. In most cases, we've found options that meet key parameters while also reducing environmental burdens and avoidable hazards. The key is in the degree you can achieve both.

So how does this research all come together? Typically as a set of "preferred products" and as a corresponding set of specification criteria. To follow through on our ACP example, our suggested specifications may include requirements such as:

- Emissions test compliance - CDPH Standard Method V1.1, 2010 - Private Office and School Classroom scenarios
- No added formaldehyde
- No PVC face coatings
- No halogenated flame retardants (HFRs)
- Ozone depletion potential less than 0.80 kg CO_2 equivalent/SF, as evidenced through a product-specific EPD
- Recycled content greater than or equal to 35 percent (PC + 1/2 PI) - OR - Bio-based, rapidly-renewable content greater than or equal to 35 percent
- Certifications (optional): Declare and/or Cradle to Cradle Silver
- Product is compatible with an existing industry end-of-life reuse or recyclability program

Some requirements are familiar, some are new. But most importantly, it is a base of criteria to build from as more information and new products enter the market.

As our ACP example illustrates, the process of incorporating product transparency is still evolving and requires time to obtain information, process it and make the necessary judgments to make informed selections. The results, however, can be illuminating and even counter-intuitive.

The promise of product transparency is a more robust and informed paradigm for selecting the materials with which we build. This in turn can lead to positive, continual improvements within the building products industry and ultimately to the improved health and environmental performance of our buildings. Time to get started! edc