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# MATERIALS MATTER

**QUIRKY LIBRARY** bridges the gap between substance and design

MELODY VOITH, C&EN WASHINGTON

**ON THE SECOND** floor of a nondescript building in Manhattan on West 25th Street resides an unusual library. The collection, like in many libraries, is informative and often delightful, but it is also furry, squishy, bumpy, chunky, shiny, and twisty.

The library is owned and run by Material ConneXion and is the physical embodiment of the company's materials know-how. The firm was founded in 1997 by Egyptian-born furniture designer George M. Beylerian and colleague Michele Caniato on the premise that innovative design requires innovative materials, and vice versa. They thought that someone needed to play matchmaker.

"Materials equal design. You can't have an incredible design without the material that can make it happen," says Caniato, who is now Material ConneXion's president. Originally, the target customers were architects and interior designers, but from the beginning Caniato found himself fielding requests from consumer products companies as well.

Although its headquarters is in New York City, Material ConneXion also has libraries in Bangkok, Thailand; Cologne, Germany; Milan, Italy; and Daegu, South Korea. More than 500 corporate customers pay for access to the New York City library and an associated online database. They

include professionals who design consumer products, packaging, architecture, interiors, and apparel. They are all looking for specialized, inspiring, or just better materials to give their concept a competitive advantage. For an annual fee, members get the run of an on-site archive of 4,500 samples, many of which have properties that can fire designers' imaginations.

Some 1,500 of those samples are displayed on tiles, called material tabulas, shelved according to material type: polymer, glass, ceramic, carbon-based, cement-based, metal, and natural. The names of the samples' manufacturers are available only to library subscribers. The library obtains between 40 and 50 new materials a month, and there is no fee to the material suppliers to be included.

**IN ADDITION** to library access, Material ConneXion offers users more personalized consulting services. "It's like a gym where you can go in and use the equipment, or you can get a personal trainer," explains senior research scientist Cynthia Tyler. She uses her background in chemical engineering to sort out all the ways a new material could enhance a particular product. "When

**TREASURE HUNT**  
The Material ConneXion libraries display a wide range of materials for use in consumer products, architecture, and interiors.

we talk to suppliers, we're talking chemistry," Tyler says.

For example, one client wanted to replace the polyvinyl chloride in an inflatable consumer product with something that had

a better environmental profile. But the material also had to be puncture resistant and impermeable. Tyler's team recommended an engineered plastic that more than fit the bill and didn't require the company to change its manufacturing process.

Tyler has seen a major change in what her clients are seeking. "Two years ago, the first question we would get is 'What does it cost?' Now it's 'How green is it?'" she says. She has also encountered company representatives who want to find materials that look "natural," even if they don't benefit the environment in any way—an attitude that she calls greenwashing. On the other hand, "It's really exciting when we work with a company that's willing to go all the way," Tyler says.

The hospitality industry is looking to increase its use of environmentally friendly materials, according to Shay Lam, head interior designer at architecture firm Perkins Eastman. "We were probably the last people to cross that threshold. We still love our stone and leather, but what we're hearing from our clients is that they are all going for green building certification, and they want environmentally aware materials." Material ConneXion has helped him locate translucent concrete, light-transmitting countertops, and reclaimed red oak for his clients' glamorous interiors.

In order to perform the yenta-like service of matching needy product designers with their ideal material, staffers at Material ConneXion actively seek out manufacturers with substances that, as the firm describes it, are intelligent, ecological, and innovative. They find materials in specialized departments within big companies such as Evonik's Cyro Industries unit and Clariant's Masterbatches division, as well as in small technology-based start-ups and university spin-offs.

One small company, eze Materials, in Ithaca, N.Y., is a spin-off from Cornell University. Material ConneXion displays

**MORE ONLINE**

To see a slideshow of materials from the Material ConneXion library, go to [www.cen-online.org](http://www.cen-online.org).

the company's biodegradable substitute for formaldehyde-containing particle-board. The composite is made with renewable fibers such as bamboo, kenaf, or flax and held together with a proprietary soy-based protein resin. E2e's technology is based on the work of Anil Netravali, a professor of fiber science and apparel design at Cornell. So far, the composite has been used in office furniture and skateboards.

**SEE-THROUGH**  
Litracon cement blocks and tiles contain glass fibers that run the length of the block, transforming a usually opaque material into one that transmits light.



**ONE OF** Material ConneXion's newest finds is a natural wood finish called Poly-Whey, made by Vermont Natural Coatings. As the name implies, the product takes advantage of an abundant waste from cheese making to create a protein-based bonding agent.

Once they've found their quarry—an innovative new material—the experts at Material ConneXion have to explain it to

their designer-customers. "It's the difference between left brain and right brain—that's our strength. We understand the technology and distill it into useful information for designers," Tyler says. "Designers don't want to look at a table of mechanical properties."

Not surprisingly, many of the materials that find their way into the library claim to be environmentally friendly. The scientists

at Material ConneXion verify green claims by examining third-party certifications such as those for sustainable forestry from the Forest Stewardship Council or indoor air quality from the Greenguard Environmental Institute.

On top of "single trait" qualifications, Tyler looks for manufacturers that go the extra mile by doing a full life-cycle analysis of their product. She is partial to the Cradle to Cradle Certification developed by McDonough Braungart Design Chemistry (MBDC). The Cradle to Cradle scheme audits all the materials in a product, down to 100 ppm, and advocates that manufacturers should be responsible for the material at the end of its useful life.

Last year, Material ConneXion formed a partnership with MBDC to promote the use of its life-cycle analysis to manufacturers. Currently, the library features 40 Cradle to Cradle-certified materials. Among them are several types of textiles and an engineered stone used for countertops.

Not all of the materials in the library achieve such high levels of Earth-friendliness. But regardless of their ultimate

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goal, product designers are always faced with trade-offs when they choose materials. Finding innovative materials often means they can get more of the qualities they want without the sacrifices they are used to.

The classic sacrifices with environmentally friendly materials are cost, attractiveness, and durability. The library contains a number of materials that purportedly break those restraints. In the glass aisle, for instance, Bio-Glass is made from 100% postconsumer recycled material. The translucent slabs are stain resistant and strong enough for use as counter surfaces and floor accents.

To reduce costs, designers can find materials that are either recycled or left over from other processes. The 100-Year Pillow is filled with buckwheat hulls rather than down or synthetic fill. The natural substitute is extremely lightweight, durable, and comfortable, producer Good Guy Group states. Similarly, the Cocona finish for polymer yarns and textiles is made with coconut-based activated carbon. Cocona manufacturer TrapTek claims that treated fabrics are odor absorbing and protect against ultraviolet radiation.

**ANOTHER OPTION** for the environmentally conscious designer is to do more with less. An interior designer might choose sound-absorbing panels from Sweden that are made with thin slabs of concrete attached to wool felt. The layers are only 30 mm thick and are recyclable.

Materials that combine seemingly opposing characteristics are common in the library. Designers can find soft finishes that don't easily scratch, concrete that transmits light, and polymers and fabrics that conduct electricity.

Many clients visit the library hoping that inspiration will strike. Paul Katz is a senior design engineer at Smart Design, an industrial design firm that works with clients including Hewlett-Packard and kitchen tools maker Oxo International. He says his company has been a member of the library for many years and uses it regularly.

"Being able to have a hands-on feel for materials or see how they've been applied is very valuable. When you see how it's used, it gives you ideas," Katz reports. Conversely, "if you see it isolated from use, you get other ideas. What often happens is that we go there with the idea of looking for something, but we're not really sure what.

Then we see three or four options we didn't know existed," he says.

On one occasion Katz recalls finding a material that literally illuminated a new design possibility for a consumer electronic product. "We found something that was translucent when you shine a light through it, and we liked how it looked."

Today's consumer products ask a lot of

materials. "We need to have very sophisticated materials, highly engineered and multifunctional," Caniato says. Designers, he adds, have become more knowledgeable about the environmental qualities of what goes into their products. Tyler agrees. "Designers, chemists, and engineers need to think about how we can reinvent what we're doing to make effective change," she says. ■

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