

From Tamales To Skateboards: A Green Idea Harvested From The Corn Belt

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Professor Scott White, Ph.D., had a regular weekly lunch date with two colleagues in the early 1990s who, like him, had recently been hired at the University of Illinois. They had similar backgrounds in designing composite materials, so they started brainstorming over their lunches about a project they could work on together.

White, who is a professor in the aerospace engineering department and in the school's Beckman Institute for Advanced Science and Technology, added another challenge: They should come up with a material that had a distinct Illinois feel. It didn't take long to figure out how to infuse a Midwestern ethos into their project.

"Every day when driving into work we'd pass acres and acres of cornfields," White remembers. Thus their idea was born. The group would turn corn waste into a plywood-like building material.

Nearly two decades later, their innovation is out on the market in the form of skateboards and, soon, outdoor furniture

produced by a company in Texas that licensed the university's technology. The product, called CornBoard, helps the environment in two main ways. It sequesters carbon in the boards instead of allowing the cornhusks and stalks to decompose in farmers' fields. This saves 1.5 tons of carbon dioxide (CO₂) emissions per acre, according to the company now manufacturing CornBoard. And it's a renewable resource that reduces the number of trees that need to be cut to use as lumber.

"I thought that was a pretty cool aspect," White says of their quest to create a corn-based material, even though the idea of green technology wasn't as pressing an issue as it is today. Since then, the world has learned a lot about the need for environmentally sensitive products.

"It's very, very satisfying," White says of the realization that his innovation could help the planet. "It's a huge problem now, and it's nice to have already tackled that to some degree."

Trips to the Grocery Store and Testing in the Lab

White, along with colleagues Nancy Sottos, Ph.D., and Thomas Mackin, Ph.D., began his efforts to turn corn into a composite material by going to the grocery store and buying a bunch of tamale wrappers. After all, they were just cornhusks that someone else had taken the time to clean and dry.

They used the outer sheath of the corncob because it's constructed of fibers embedded in a matrix. A matrix is the key component in composite materials because it gives the material its structural integrity. The trio played around with the matrix to find just the right architecture for the fibers and laminated the test material in hot presses. (They soon graduated from tamale wrappers to carloads of corn waste, known as stover, that a student volunteered to drive in from his parents' farm.)

"The kinds of material we were using for CornBoard were basically left on the field and had no value at all," White says. "You're taking something that was basically useless and making something valuable out of it."

And it worked.

"It became pretty clear very early on that this stuff was kind of neat," White says. "It looked cool, it felt like a material, it looked like a material."

They got a grant from the United States Department of Agriculture, which they used to perfect their material. The next step was to bring it to market by licensing the technology.

A Setback and Then Success

White, Sottos and Mackin got a patent in 1998 with the help of the university's Office of Technology Management (OTM). Several years later, in 2005, the office signed an agreement with a company to develop the product.

Then nothing happened.

The licensee essentially disappeared, explains Steven Wille, assistant director of marketing and senior technology manager at the OTM. This was frustrating for everyone since that company had an exclusive license to the technology. "We want to make sure technology is out there in the world and not sitting on the shelf somewhere gathering dust," he says.

It took four years for that dust to get brushed off, and it happened through a fortuitous meeting on a Texas beach.

Lane Segerstrom, a Texas entrepreneur, was on South Padre Island in 2008 when he met a friend of a friend who had been involved with CornBoard. The man represented several investors in the original licensing company who were upset that they hadn't recouped their money. He asked Segerstrom to look into the defunct company's technologies to see if any of them had legs.

"One jumped out, and it was the University of Illinois technology," Segerstrom remembers. "Being a farm boy from Iowa, I thought that one had some possibilities."

While he was researching, one of the investors called to ask if Segerstrom would investigate bringing CornBoard to market. Segerstrom agreed and spent several months on the project.

He was struck by the abundance of corn stover in the country. "It's just ridiculous," he says, citing a stat that if one year's worth of American stover was rolled into 1,000-pound bales it would stretch around the Earth 21 times. "All we had to do is get just a little bit of it."

Despite his excitement, the man who hired him wouldn't return his phone calls. Segerstrom was angry and felt like he'd been used — he never got his final paycheck — and decided to channel that frustration into turning CornBoard into his own endeavor.

"I felt like I was going to the pound and rescuing this championship dog that somebody left abandoned," he says.

He called the OTM and asked if he could get a new exclusive license to the technology. They agreed, and by 2009 were able to void the original license and grant Segerstrom his own, a process that is highly unusual, Wille says.

Unusual, but beneficial, says Wille, who calls Segerstrom a model commercialization partner. He respects the professors, had a clear, focused plan to commercialize the product, and "the man understands marketing."

CornBoard Goes to the Smithsonian

Part of that marketing push was to make CornBoard sexy. Segerstrom likens it to the fact that everyone knows what Kevlar is because it's in bullet-proof vests. So when people hear that Kevlar is in other products, like rope, consumers immediately respect those products.

“*What can we put CornBoard in that's a sexy product, a wow product?*” Segerstrom wondered at the time. The answer: skateboards.

Segerstrom's CornBoard Manufacturing Inc. in McKinney, Texas, created the Stalk It Longboard, a skateboard that has been endorsed by professional skaters and surfers. Last year he had a truck tow him on a Stalk It board down an airport runway. At 78.1 mph, he broke the Guinness World Record for speed on a towed skateboard. That board is scheduled to be officially inducted into the Smithsonian in August. The boards are for sale through the company's website and, as of this writing, slated to be in retail stores in 2011, eventually being sold in 11 cities worldwide.

Next up is a line of modular outdoor furniture that will be out this year. CornBoard also plans to produce a green version of wood shipping pallets. According to the company, more than 2 billion wooden pallets are used every year in the United States alone — the equivalent of approximately 1 million acres of hardwood forest.

Cabinets and other products will follow. Segerstrom's first plant is currently being built in the Texas panhandle near corn farmers who are happy to have their waste bought and towed away. Segerstrom plans to build more plants as demand increases in small, Corn Belt towns around the country. Any money the farmers make on their stover is a

bonus, since most leave it in their fields to decompose and be tilled into the soil the following spring.

Segerstrom believes his company will be able to produce Corn-Board in a carbon negative way, meaning it will sequester more CO₂ than it uses to produce its products. Plus, he says, “every bit of board we make reduces board that comes from a tree. That’s less trees that need to be cut down.”

He knows that consumers are eager to purchase green, but the main stumbling block is that environmentally friendly products often cost more than their less-green counterparts. Because CornBoard is being custom engineered for the specific product it will become — the skateboard boards are designed specifically to become skateboards, the furniture boards to become furniture, etc. — they are a superior product than other pressed wood boards, Segerstrom says. And the company will ensure that their products never cost more than the same items made out of conventional materials.

“If we can deliver to the consumer at the same price a product that is better designed and better quality, then somebody is going to buy green over not green,” he says.

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