



WHOLETREES, LLC

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hen executives at Festival Foods grocery store sat down to design their brand new store in Madison, Wisconsin, they bucked the trend of using traditional steel beams to support all of their massive 57,000 square ft. structure. Instead, they chose to align with another local business that could not only offer them an alternative to steel, but a chance to make history with their eco-conscious and awe-inspiring design choice.

PHASE III SUCCESS

\$2.65 million in private equity funding since the SBIR grant; additional commercial revenue from local partnerships.

AGENCIES

USDA

SNAPSHOT

Madison-based WholeTrees®, LLC developed a patented way to use round-timber trees and branches for major structural applications that can replace engineered wood, steel and concrete construction with the lowest embodied-energy and highest carbon storing building material.

WHOLETREES, LLC

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By using round-timber columns, beams and trusses as an engineering structural system, nearly 40 tons of diseased ash trees were re-purposed from the City of Madison parks that needed to be removed. This is the business model of WholeTrees – using lots of unmilled small-diameter and other waste trees that are very abundant and need culling, but have little commercial value until now.

“We have been using branched timbers in structures since 1993, and what we had found was that not only are branched timbers an abundant waste product, they are very strong, serving as bracing and spanning in buildings,” explains WholeTrees Principal Architect and Co-Founder Roald Gundersen. “Wood connections are usually the weak points in architecture. Surprisingly, there was a gap in the knowledge and no research had been performed on the strength of branched timbers.”

Gundersen wanted to explore this use more thoroughly, so he applied and received a Phase I Small Business Innovation Research Award with the USDA, and its Forest Products Laboratory (FPL) in Madison, WI. The Phase I project tested 50 branch timbers. It was found that the “crook” intersection of the branches were the strongest part of the tree, yet these sections are difficult to mill and end up as a waste product. This strength is compounded by the fact, established by previous testing at FPL, that round timbers are 50% stronger in bending strength than an equivalent square section of milled timber, and could potentially replace steel and concrete in medium and large scale construction projects. The subsequent Phase II project further confirmed this theory and WholeTrees knew they had the ingredients for a brand new industry.



◀ WholeTrees' installation provides support as well as beauty at the YWCA in Dallas, Texas

Caro Bambino in Santa Monica, CA uses WholeTrees' round timbers for an organic and sustainable feel to its store ▶



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ROALD GUNDERSEN
ARCHITECT AND CO-FOUNDER

“We now have high value uses for forest cullings which can help catalyze healthy forest management,” adds Gundersen. “Forest management in the U.S. suffers from infrequent and expensive management and infrequent return. Any return on forests are normally about 20 to 30 years, but most people can’t afford to pay 20 years of taxes, pushing forests into grazing or other less sustainable uses. This is a way that one can effectively thin and prune forests every year and get an annual return from forest cullings. If you’re in an urban setting, you can get this from prunings and

from diseased trees like ash. WholeTrees donated to Madison’s tree replacement fund and reduced the city’s removal and disposal costs. Supply chains become more abundant but also closer to the end user, creating more local jobs.”

The other obvious benefit to this method of construction is the one-of-a-kind beauty these timbers create. The Minnesota Zoo quickly signed on to work with WholeTrees and in 2015, completed its Hanifl Family Wild Woods exhibit using WholeTrees Architecture & Structures. The Forest Scramble, located in Crosse, WI hired WholeTrees to design

and construct a two-story playscape with a swinging rope bridge leading out to a free-standing ‘bird’s nest’ platform, inviting children to experience the varied levels of the forest including the floor, trunk zone, and canopy. Other businesses, both local and nationwide, such as the YWCA and Cleveland Zoo, also wanted to get in on the action. Caro Bambino, an ultra high-end designer baby boutique in Santa Monica, CA, enlisted WholeTrees to build its store that is frequented by celebrities.

Currently, WholeTrees is immersed in its newest endeavor of digitizing trees and putting them into catalogues as a new design material/medium that can be pre-engineered. With this scanning technology, soon on smart phones, a forest owner can upload and post what he wants to harvest this year – and it would be hosted on the online platform. Then, buyers from all over the country, whether they be builders, architects, or interior designers, would be able to search the catalogue and download scans into Building Information Modeling programs to be designed into buildings. They could then place an order to purchase the trees.

“Instead of cutting trees into limited shapes of lower-strength, using lots of energy, we are offering the vast and rich structural intelligence of trees as a new medium of structural design, manufacturing and construction,” says Gundersen.

Wisconsin, though not well known for it, has the biggest forest products industry in the country. With the decline of paper manufacturing, WholeTrees is able to utilize the supply chain of pulp trees and is providing products to customers all over the country. The company hopes to work with strategic partners who also utilize regional manufacturing and forests to replicate what they are doing in Wisconsin.

Gundersen credits the USDA SBIR program with helping his small business scale.

“I think the SBIR program is an important touchstone for start-ups to begin to access the research and development tools necessary for business growth,” adds Gundersen. “By utilizing the program, along with the Small Business Development program at University of Wisconsin La Crosse, we were able to perform market research and develop the fundamental operations of the business.”