

STRENGTH IN TIMBERS

Washington researchers, architects and rural town boosters see promise, and possibly sustainability, in an up-and-coming wood product.

BY MARIA DOLAN

PHOTO BY LARA SWIMMER PHOTOGRAPHY

Rod Fleck, city attorney and planner for Forks, was showing a visitor around the town's new Rainforest Arts Center.

The pretty, wood-lined main hall had been decorated with flower arrangements and place settings for a wedding reception, and a caterer was prepping in the kitchen.

Fleck popped his head in to check on a menu for an upcoming city event, and the caterer reeled off a list of local foods he thought they should use—a bounty of smoked salmon, crab, wild berries and chanterelle mushrooms.

"They know how to do it right," said Fleck.

But while eating local in Forks is easy, building local is no longer so simple, and the Rainforest Arts Center is the latest case in point. Aside from its exterior concrete shingles to protect from Forks' oceanic climate, the building celebrates the timber town's heritage by being made out of wood. Yet, from the roof to the floor, nearly every stick of timber was imported from somewhere else. Once billed as the "Logging Capital of the World," Forks just lost its last lumber mill this summer.

Fleck pointed to a wood beam milled in Oregon. "This could and should be made in the state of Washington," he said.

Now, Fleck and others believe they may have found a way to bring back some lumber production here in a way that would satisfy environmentalists and loggers alike, with the help of an engineered wood product called cross-laminated timber, or CLT.

Think of CLT as a sort of layered cake made from wood boards, each cake layer placed perpendicular to the one beneath it, up to 16 inches thick. The product is known for being wood dense and therefore, incredibly strong; the kind of strength builders once found in huge, old growth timbers. A CLT panel can be made up to 10 feet wide and 40 feet long—large enough to create a wall in a multi-story building.

The primary reason CLT has been touted as sustainable is because the carbon footprints of larger buildings made from CLT stack up favorably against their concrete and steel counterparts. Trees and wood products store carbon, unlike those other building materials. Trees absorb more carbon than they release, and the lumber stores that carbon, acting a little like a forest.

CLT can potentially lower the carbon footprint in a larger building to one-quarter that of a building made from steel and concrete. It's also beneficial because CLT can be made using smaller diameter trees, such as those thinned to reduce fuels contributing to catastrophic wildfires.

When Michael Wolcott, materials engineer and director of the Institute of Sustainable Design at Washington State University, first came across CLT about 10 years ago, he considered it just another form of "fat plywood," he said. "From an engineering perspective, CLT panels aren't very interesting, and they also use a hell of a lot of lumber," he said. But his attitude changed dramatically as he learned their potential role in reducing carbon emissions from building construction. "Processes to



ARCHITECT SUSAN JONES DESIGNED THE 1,480-SQUARE-FOOT HOME IN SEATTLE'S MADISON PARK OUT OF CROSS-LAMINATED TIMBER. CONSTRUCTION WAS COMPLETED IN JUNE 2015. PHOTO BY ATELIERJONES.

ABOUT CLT

WHAT:

Engineered wood panel product made from formaldehyde-free gluing and pressing alternating layers of sawn lumber. The cross lamination adds stability.

WHY:

Sustainable; naturally renewable; makes use of smaller diameter logs and low-quality wood (pine beetle kill wood, for example).

WHERE:

Developed in Austria in the early 1990s; used throughout Europe and emerging in North American markets. WSU's Visitor Center and Environmental Technology buildings are early commercial and institutional applications in the United States.

make timber require a lot less energy than to make steel or concrete," he says. In addition, the kinds of long-lasting structures that can be built with CLT serve as carbon sinks.

Industry and academia in Austria developed CLT in the 1990s, and it has been used in recent years to build multi-story buildings there, in Europe and elsewhere. But the product has not yet made significant inroads in North America.

Most CLT is manufactured in Europe—primarily Austria—though builders in the Northwest can also now get this product from mills in Canada, Oregon or Montana. A mill is in the works in Colville, and several other rural towns are hoping to follow suit.

"I think CLT may be the best bet for Forks to get any kind of manufacturing lumber jobs back," says Bernard Bormann, director of the University of

Washington's Olympic Natural Resources Center in Forks, who is exploring possibilities for a sustainable source of timber in the area to feed a CLT mill for the long-term. He and other forest scientists say targeting small diameter trees such as hemlock would make use of trees that have historically been thinned from forests and left in place, pulped, or piled and burned. At the same time, says Bormann, scientists could manage forests for CLT harvesting in a way that actually increases forest health, by, for instance, increasing wildlife habitat and food supply to salmon fry in streams.

As in other rural communities in Washington state, the timber industry around Forks has changed dramatically in recent decades. Fleck says in the last 14 months the area has lost some 160 jobs related to the industry—an estimated \$11 million in annual payroll, benefits and taxes.

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—SUSAN JONES

If lawmakers and environmentalists get behind the idea, and if a sustainable timber source can be found, local students could be trained in CLT manufacturing and a new industry could spring up, says Bormann. He is helping in efforts by Fleck to build a CLT mill here.

Susan Jones, the founder of Seattle architecture firm atelierjones, is volunteering for that project and says she'd welcome a new source for CLT. "If it's harvested from forests in a responsible way, it's one of the most progressive materials out there," she says. Jones and her family recently moved into a new, 1,500 square foot home in Seattle's Madison Park. Designed by her firm, it's the first permitted CLT structure to be built in Seattle, and one of the first in the country. Atelierjones has also published two books on using CLT, and is working on a project for a church in Bellevue that will feature 39-foot high undulating CLT panels. "As architects and designers we really have a responsibility to specify materials that push the world in a more responsible way," Jones says. She purchased her panels from Canada, but would have preferred sourcing locally.

Launching an industry in Washington from soup to nuts faces several challenges. The largest, on the Peninsula and perhaps elsewhere, is finding a reliable manufacturer of sustainable wood.

Another question is how taller CLT buildings react to seismic and high wind situations. WSU is involved in a multi-institutional program with the National Science Foundation to research the issue. "CLT is plenty strong," Wolcott says. "But these panels are so stiff it translates that ground motion all the way up the building."

With engineering, Wolcott says some designers think CLT buildings could reach twenty stories or more. "I think the sweet spot will be nine- to twelve-story buildings," he says.

Fire codes will also have to adapt to CLT. This product is thicker than regular timber frame construction and does not burn in the same way.

Currently, because of seismic and fire concerns, the maximum height allowance for CLT buildings in Seattle is six stories, or 85 feet, depending on the occupancy of the structure.

But proponents say it's worth the effort. Jones says with all the reasons she chose the material, "the main reason is just because it's beautiful." So beautiful, she has left the inside of her house unpainted. The CLT panels, composed of lightly whitewashed Canadian Western white pine, Douglas fir and spruce, with some beetle kill pine, give the house a forest scent. The material catches and bounces light around the rooms. "I see this as a quintessential Northwest material," says Jones.

As a kid, Jones grew up outside Bellingham, walked to school through the woods under a canopy of fir trees and vacationed in a couple of "super humble" cabins on Orcas Island clad inside and out in wood. The experience led her to dream of a house for her family that felt like a beach house or cabin—"a fun house we can relax in," she says. "This CLT material was the perfect expression of my vision."

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IN TUKWILA, PROJECT FEAST HELPS REFUGEE WOMEN GAIN A Foothold THROUGH FOOD

BY PAULA BOCK

PHOTOS BY DANNY NGAN

When Taghreed Ibrahim juices a lemon, its tangy scent transports her from the cramped galley kitchen in her Kent apartment back to Iraq, age 5, making lemon and cardamom *Shakar Lama* cookies with her mom in an airy villa built by her dad, a carpenter like his father before him.

Oh, the softness of flour mixed with butter and her mother's voice; the sweet anticipation of relatives gathering. For generations they lived in Dhi Qar province, southern Iraq, heartland of ancient Sumerian civilization. Every day, before high heat, ladies with baskets of fish on their heads would walk house to house peddling catch pulled from the Euphrates River.

It was 1982, before the Iran-Iraq War ended, before Saddam Hussein's Ba'ath Party strengthened its hold in the south forcing Ibrahim's family to flee to Baghdad. By 2006, when Ibrahim was 31, Baghdad, too, became

unbearable: no electricity, unrelenting 122-degree heat, dozens of dead bodies in the streets every night.

Ibrahim had married a college classmate, Mohammed Ismail, a graphic designer who worked with a U.S.-backed television station. One by one, his journalist friends were killed—then bullets hit his car. Colleagues said something about ISIS. In fear, Ibrahim's family hid in different houses until her husband was transferred to Dubai. Ibrahim and their young son sought refuge with an aunt in Egypt, then went to Dubai when their visas came through.

Oddly, it was in air-conditioned Dubai, safe from Baghdad's snipers and suicide bombers, that depression hit. Ibrahim was lonely, home all day with the couple's two small sons while her husband worked past midnight. "I missed my mom so much," Ibrahim says. She tried medicine, herbs and meditation but was still unable to sleep. "My mom told me: 'Do what you love!'" So late into the night, Ibrahim baked hundreds of cookies. "I have this amazing feeling when I put something in the oven," she says, "The smells: cardamom, rose water, orange blossom. Makes me feel like home."

I MET IBRAHIM at Tukwila Community Center during a summer cooking demo by Project Feast, a nonprofit that provides commercial kitchen training and pathways for refugees to find sustainable employment in the food industry. Crisp and professional in signature black-and-white aprons, five refugee cooks led us through the intricacies of preparing *pico de gallo* with fresh lime juice, deep red *borscht*, *jollof* rice with chicken, beef *tibs* redolent with Berbere spice; *znoud el sitt*—a flaky, cream-filled pastry swooning with rosewater. It was one of the most diverse and delicious meals of my life.

The cooks hailed from Mexico, Ukraine, Ghana, Eritrea and Iraq, their backstories as complex as the dishes they shared. One woman, who fled war in Eritrea, learned to make the spicy stew over a wood fire at age nine. Another, Inna Stetsenko, ran a family restaurant in Donetsk that was lost when the city spiraled into lawlessness.

Last year, the Office of the United Nations High Commissioner for Refugees counted 60 million people uprooted from their countries by persecution, war or violence—the most ever in the history of human migration. Of those, 70,000 landed in America, including nearly