Mass Timber and Innovative Wood Products

An interview with Lauren Redmore, Project Manager at Sierra Institute for Community and Environment

Mass timber is a technology and a building material. The phrase “mass timber” is originally derived from the German word “Massivholz.” The technology of mass timber is inspired by the widely used practice of heavy timber, or the process of making a log fit the specific shapes and needs of a building under construction. This practice popularized because it utilizes wide, thick and structurally sound materials to customize to the needs of a building. Heavy timber relies on the logging of large trees, but mass timber on the other hand was Europe’s response to the decreasing availability of large trees and the need to be more efficient with resources.

The first versions of mass timber utilized nail laminated techniques, and many buildings with nail laminated timber are still in use over a hundred years later. Mass timber can use lower grade lumber conjoined with other lower grade lumber to create thick, strong and structurally solid wooden building materials. Because of this possibility, mass timber offers us the opportunity to replace demand for high quality lumber with a market for lower value material, representing an important contribution towards a restoration economy.

Following the Great Chicago Fire in 1871, there was a pushback against the use of wood in taller buildings in the U.S., because of concerns for fire safety. Now that we have adapted a plethora of technologies to deal with fire threats (i.e. sprinkler systems) the question re-emerges: **why can’t we start using wood again?** Starting in the 1970s, mass timber technologies were developed and widely adopted in Europe. In more recent years, the technology has gained momentum in the U.S. There is adequate and unparalleled evidence that using wood is more sustainable, that it is a renewable source of material, and that it is more aesthetically pleasing within buildings.

We now have the ability to create mass timber panels that are 20 feet tall and beyond. It can be used in 18-story buildings per the new International Building Codes, and it is seismically sound and fire resistant. Mass timber is more fire-resistant than traditional wood framing, because the panels are a single piece, therefore they will char on the outside, but not catch fire as quickly as smaller pieces of wood. They are easy to manufacture to strict seismic codes and earthquake prone areas because wood is flexible and can remediate tensional stress more effectively. Additionally, a major benefit of reverting to mass timber technology is increased happiness. When inside of a building with visible wood, there are positive psychological impacts to the human brain, such as increased

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productivity in work environments, a sense of biophilia, and a more sensational connection to nature.

The dedicated interest in wood products is rampant across the US, but especially on the West Coast. Many builders in California, Oregon and Washington have adopted the mindset that not all wood products are created the same, and that in order to move towards sustainability, the use of mass timber must increase. Currently, California imports almost 70% of all wood products. When thinning occurs throughout the state, acres of wood are burned and regarded as biowaste. Instead, it is time for places to take charge of their own wood use. Those piles of burned low-grade trees could actually be implemented into really high valuable building materials using the techniques of mass timber. Mass timber represents a unique opportunity to add a lot of value to forest restoration material. We are starting to see the early stages of this critical work in action.

Colorado based company, **Timber Age**, is taking advantage of the opportunity that mass timber represents. Timber Age is using fuels reduction harvested timber from wildfire mitigation projects around the wildland urban interface in southwestern Colorado to produce Cross-Laminated Timber (CLT). CLT is made by gluing boards together in alternating layers at right angles to one another to create strong and sturdy building materials. Mass timber adds value to a material that would have struggled to find its place in the market, while simultaneously addressing some of climate change's biggest threats.

Wildfires, insect damage, and overgrowth allow forests to become a source of carbon emissions, rather than a sequestration of carbon as trees are fundamentally meant to do. Mass timber is an invitation to rethink the way carbon is accounted for in the forest industry. By deploying mass timber technology and materials, there is a full story of how building materials arrive on to a construction site, while also a sustainable and renewable approach to utilizing trees that would normally be blazed in a fire. Timber also doesn't release carbon when it's harvested, instead sequestering the gas inside lumber. The work that forest agencies, local governments, landowners, and stewards do to thin forests in preparation for fires have potential for reimagination with a mass timber approach - simply put - let's use the wood instead of waste it.

Nestled into a mountain valley of the North Cascades, the town of Darrington in Snohomish County, Washington has put this reimagination to the test. Darrington Mayor, Dan Rankin, is in the process of converting a 94-acre wooded lot into a timber innovation center. The center would focus on mass timber technology and production, creating over 100 jobs and promoting the educational and conservation efforts of mass timber. Rankin hopes to revitalize the timber economy in his rural town while creating awareness for this vital step towards a sustainable future. By sending the mass timber to urban cities around Washington for buildings, Rankin has identified a new niche, a "farm to table timber approach" to help shorten the divide between urban development and rural products. Mass timber is just another strong opportunity to bring the forest to the city. To learn more about the Darrington Timber innovation center, **read this article in the Daily Herald by Julia-Grace Sanders**.

In order to effectively create an industry for mass timber that will bring the forest to the city, there needs to be better alignment between economy, policy and action. Reinvestment is a critical step. There are 5 ways that reinvestment of resources could promote mass timber.

Wildfires spread easily through dense, unhealthy forests

1. Reinvest in educational models. In higher education, the field of "Wood Products Science" is not attracting young, innovative minds. There should be a greater shift to climate change language and a reimagination of this field. What about "Sustainable Natural Resources"?
2. Create high value and intentional forest sector jobs. Timber jobs are usually seen as low paid, desolate, and physically demanding. Mass timber requires distinct models for training people to do the work that is highly skilled and tactful while also maintaining a higher quality of life and fair pay.
3. Move from reactive to proactive forest management. Fighting wildfires is now a common necessity. Mass timber provides an opportunity for thinning the forests and science informed forest management to happen preemptively to wildfires and potentially decrease the devastating outcomes.
4. Reinvest in local collaborative efforts. There needs to be more incentives from state and federal agencies to allow companies, communities and individuals to experiment with moving ideas to products. Folks need to be empowered to innovate, and one important way to do that is create monetary incentives for this experimentation (i.e. US Forest Service Wood Innovation Grants, California XPrize).
5. Allow people the opportunity to experience what it feels like to walk into a mass timber building. When the government commits to building with mass timber, the general public will be able to experience biophilia for themselves. The simplest way to get people on board with mass timber is to give them the opportunity to touch and see a mass timber building.

Just as governments play critical roles to support the development of the mass timber industry, the forest sector itself can be an important part of the climate solution. With policy change, research, education, awareness, and investment this is possible. In addition to big agencies, local tribes, watershed councils, environmental NGOs, etc. also have a duty to help this sustainable, renewable and promising industry. If these groups have room for innovation, even on smaller budgets, there is a cost-effective tool to reimagine the use of wood products in buildings however small. **It is time that we all engage in this fundamental shift in how we think about the role of forest products as sustainable solutions. Mass timber gives us the opportunity to adapt to a changing climate by pushing the boundaries of forest management, science, and building and construction methods.**

For additional information and resources on mass timber, please visit WoodWorks.org

To locate the nearest mass timber building near you, visit https://www.woodworksinnovationnetwork.org/projects/

A modern sawmill can process much smaller trees more efficiently than ever before

CLT wall and roof panel being hoisted into place at California's first all CLT building in Quincy, CA