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Cross Laminated Timber

By: John Matel, Virginia Tree Farm Foundation

You will be hearing a lot more about cross laminated timber (CLT). CLT is a building material for the future. This material can be used instead of steel or concrete to construct medium and high-rise buildings. It is the material that will make it possible to build cheaper, faster, and better using an ecologically positive product - wood.

Wood does not get the respect it deserves because it is too familiar. But take a close look at a piece of wood, notice its details, its natural attractiveness in sight, sound, feel, and smell. If we invented wood today, we would call it a hi-tech, composite material designed to be environmentally beneficial in production, beautiful in use, and benign in disposal.

What is CLT?

Cross laminated timber is made of wood, a product of our forests, with all the great attributes of wood. It sequesters CO₂, is lightweight, and easy to work. CLT is as strong as steel or concrete in many applications. How?

Timber is strong in compression, i.e. pushing down, but less in tension, i.e. spanning across. Trees are columns. They carry the heavy weight of the tree above to the ground below.

Cross laminated timber takes advantage of wood's strengths. It is made in panels, each made from three, five or seven, always odd numbered, layers of dimensional timber, with the grains crossed so that they have strength in compression AND in tension. They are cold pressed and glued into panels. It is revolutionary in that it replaces concrete and steel in spanning and structure with light weigh, environmentally friendly wood, that can be cut to order in a wood processing plant so that it can be assembled on site in a fraction of the time.

Where is CLT used?

CLT has been used for decades in Europe, Canada, and Australia. The world's tallest wooden building is eighteen story Brock Commons in British Columbia, but taller structures are planned in cities like London, Paris, and Montreal. CLT is only now starting to make an impact in the US, where building codes often treat CLT like mass timber and limit building height to six stories.

What about fire?

No building material can withstand hot fire. Steel bends and collapses. Concrete crumbles. Wood burns, but CLT does not burn easily or rapidly. It chars. (Try starting a campfire with only a match and big logs). Tests indicate that CLT panels will resist fire and collapse as long as concrete and steel, long enough for people to get out and the fire department to arrive. CLT has the additional advantage of being predictable, since CLT chars and burns at

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uniform rates. Steel and concrete bend or crumble causing structures to collapse more capriciously.



There are many opportunities for using cross laminated timber, from tall buildings (top) to BBQ grills (bottom). Photos by: John Matel, Virginia Tree Farm Foundation.

Do we have enough wood?

North American forests are growing robustly and have been for the last half century. It would take about six minutes for American forests to replace all the wood used in Brock Commons. In fact, our forests are TOO thick. CLT will allow us to clean up the forests and improve their health. I can see cities built of wood, each building holding carbon and improving our environment. Americans forests sequester about 12% of the CO₂ produced in the US by industry, cars and homes. Well-managed forests do it better, not only in the wood, but also in soils and underground. Now let's think about keeping that carbon in the wood in the buildings in our cities. Wood is good. CLT will let us use more of it.

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