The new Brock Commons student residence at the University of British Columbia will be the tallest contemporary mass timber building in the world when finished this May. The term “mass timber” or “mass wood” covers an array of approaches, usually referring to a structural system combining engineered wood columns and floor slabs. In Canada, the most commonly referenced technical innovation, and one of the ones behind Brock Commons’ structure, is the cross-laminated timber (CLT) slab, available in a variety of thicknesses for different span requirements.

While Brock Commons’ height will unquestionably get the lion’s share of attention after its completion, that’s not the most interesting thing about the building for architects. Rather, it is the fact that, on typical floors, the wood is not visible.

Acton Ostry Architects principal Russell Acton, FRAIC, the lead designer of Brock Commons, has lectured widely on the project. When he talks to architectural audiences, he is inevitably asked: “why didn’t you expose the wood?” The answer is that the wood structure has been encapsulated in drywall and concrete topping to ensure efficient code compliance.

This pragmatic approach was a response to achieving quick approvals, and as an associated outcome, addressed perceptual challenges in terms of fire safety. In fact, the historic (and completely understandable) fear of fire in wood frame buildings is dramatically less relevant to mass timber. During a fire, the outside surface of a thick wood member chars while protecting a structural core of unburnt wood. As building codes develop, it is likely that the testing of mass wood assemblies will assist authorities to better understand the inherent fire resistance of mass timber, and potentially reduce the need for encapsulation, provided that a sacrificial layer of wood char is provided in its place.

However, we are not there yet. For Acton, the conservative approach chosen for Brock Commons may help lead to a future where the use of CLT is more commonplace. Brock Commons models a way that multi-residential builders can use CLT as an affordable and efficient means of building development projects, the vast majority of which are created without the involvement of architects. Acton sees a future of “mass wood for the masses.”

Broad adoption of mass wood structures, whether tall or not, would be a sustainability win. Advocates such as Vancouver architect Michael Green, FRAIC, an early leader in promoting mass timber, argue that the carbon sequestering properties of mass wood confer an extraordinary environmental benefit. According to a 2014 article in the Journal of Sustainable Forestry, substituting wood for current construction materials could save 14 to 31 percent of global carbon dioxide emissions.
Seventeen storeys of Brock Commons are built with a hybrid structure that includes prefabricated glulam columns and CLT floor slabs. The structure was erected at a rate of two floors per week. Above, clockwise from top left: Prefabricated façade panels, including windows, helped speed the construction process; glulam columns are tilted into place on a CLT floor slab; a typical floor, as seen before the glulam and CLT were encapsulated with drywall to facilitate the approvals process.
Skeptics note that a substantive transformation of building construction would require a strong global culture of sustainable forest management. Although there are important examples of responsible forestry around the world, there are far more examples of short-term cut-and-run management of the world’s trees. Nonetheless, the lightness of mass timber, its ability to reduce the emissions generated by concrete and steel production and construction where appropriate, and the opportunity to nurture an advanced Canadian wood industry are all clear benefits.

Green also speaks with passion about the visual warmth of wood, and people’s visceral pleasure in wood as an emblem of the natural world.1 For him, the inherent fire safety advantages are as yet under-recognized by building code officials, and the visibility of the wood bones of a mass timber building is a central benefit.

A related debate in the global tall wood movement is about how much of the structure can efficiently be built in wood, whether exposed or not. Paul Fast of Fast + Epp, the structural engineers for Brock Commons, believes in optimized solutions that maximize the benefits of each material. For example, he notes that the decision to use steel studs in Brock Commons’ envelope was related to lightness, consistency and the accuracy of the precut perforations.

More serious was the decision to have a concrete core as opposed to a wood core. There was a precedent for a wood core: the Wood Innovation Design Centre in Prince George, B.C. (by MGA with structural engineer Equilibrium) has one. But for UBC, Acton Ostry and their Austrian advising architect, Hermann Kaufmann, determined that the most important contribution to advancing the use of mass timber was in having a completed building delivered on-time and on-budget. The unknowns in having a “purist” wood structure, including the core, outweighed the advantages. A particular risk was the potential delay in building approval.

For Acton and Kaufmann, “the evolution of tall wood buildings is in its infancy; over time, small advances will lead to big changes.”

It would be a great win if mass wood products were both visually celebrated and the go-to for the unadventurous spec builder. Ultimately, the question “why didn’t you expose the wood?” speaks to architects’ strong bias towards the visual—but it avoids the central question of how to best make tall wood buildings commonplace. No one ever asks why you can’t see the 2x4s in conventional wood frame construction.

If the completion of Brock Commons sets the stage for an equally tall—or taller—mass wood building that has no concrete above the ground level, and where the structural material is visible throughout, that would be a positive milestone. If that future pure wood tower gets built in Canada, so much the better.

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2 www.ted.com/talks/michael_green_why_we_should_build_wooden_skyscrapers
The building is a hybrid wood-concrete structure, combining glulam wood columns and CLT floorplates with a concrete core. The small sizes of the housing units allowed for a highly repetitive structural grid of 4 metres by 2.85 metres. The short structural spans allow for the CLT to span in two directions in lieu of beams. The 5-ply, 169 millimetre thick CLT panels are 2.85 metres wide and 6, 8, 10 or 12 metres long. Columns are 265 x 265 mm glue laminated Douglas Fir to level nine, and 265 x 215 mm for the upper levels. The roof structure is steel.

BUILDING ENVELOPE: Composed of steel stud-framed prefabricated panels. The panels include the windows and are clad in wood pattern Trespa, manufactured with 70 percent wood fibre and thermosetting resins.