

MAINSTREAMING Mass Wood Construction

Lessons from Brock Commons

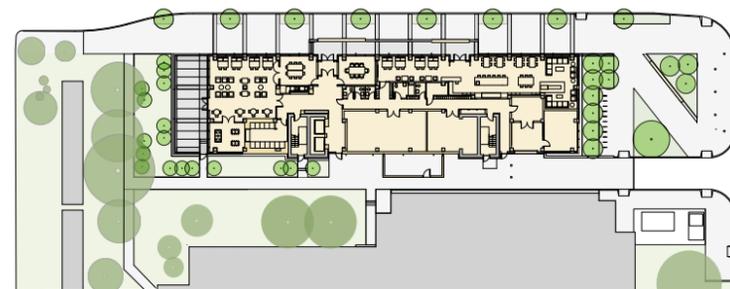
At 18 storeys and 53 metres in height, Brock Commons Tallwood House is a 404-bed student residence building located on The University of British Columbia Point Grey campus in Vancouver, that officially opened for students in July of 2017. The project is the first to be completed in Canada under the 2013 Tall Wood Building Demonstration Project Initiative sponsored by Natural Resources Canada.

By Russell Acton

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Brock Commons aspires to be a model for a future that features extraordinarily ordinary mass wood buildings that are quick, clean and cost effective to construct and which maximize carbon sequestration and the reduction of greenhouse gas emissions in cities.

The building is extraordinary for its height—which makes Brock Commons the world's current tallest mass timber tower—the building is also extraordinary for the speed at which its structure of glue laminated timber, cross laminated timber [CLT], and prefabricated facade went up in only 66 days. At 2,233 cubic metres, the building utilizes an extraordinary amount of timber that stores an impressive 1,753 metric tons of carbon dioxide and avoids the production of 679 metric tons of greenhouse gas emissions associated with a concrete equivalent. Another extraordinary achievement is that the innovative project demonstrates that a mass wood building can be comparable in cost to a traditional concrete building.



Ground Floor plan

To make the building possible the provincial government of British Columbia issued a site-specific regulation that allowed Brock Commons to use mass timber in a high-rise application, which resulted in a building that is even more resistant to fire than an equivalent concrete or steel tower. Key to receiving approvals and realizing economic viability for the timber tower was a 'keep it simple' design approach that makes the building appear ordinary—extraordinarily ordinary—through the encapsulation of the wood structure with gypsum board.

With all the attention the building has received from the architectural media, this 'ordinariness' has largely been overlooked. In fact, we have often been criticized for not exposing the wood, as if covering the structure with drywall was somehow dishonest.



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The truth is, had we tried to expose the wood, and prove its performance through fire-simulation modelling, the building could not have been built within the tight schedule or the available budget.

The research done for this project suggests that an exposed wood structure is more than twice the cost of an encapsulated one. However, the realities go beyond the straightforward comparison of structural costs to include the additional costs of running exposed services, and the kid-gloves handling required on site for any mass wood component that is also to be exposed as a finish material. The time and effort required upfront to achieve successful results also adds to the cost.

All this results in a premium few clients would be prepared to pay however committed to sustainability they might be. So common sense suggests that the interests of sustainability would be better served by mass wood buildings that are cost competitive, therefore more attractive and accessible to developers. With this affordable and replicable approach, we would be building far more mass wood buildings, using far more wood and storing far more carbon dioxide than would be achieved with the construction of fewer and more expensive, exposed wood solutions.

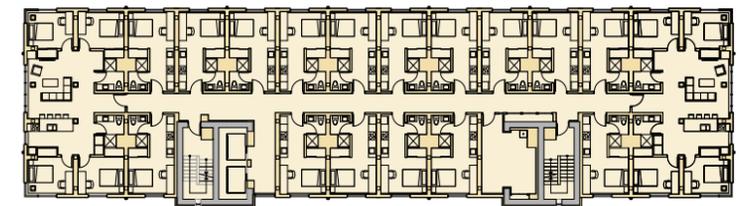
- 1 - Brock Commons Tallwood House at dusk.
 - 2 - Cross laminated timber canopy.
 - 3 - Mass wood installation and freestanding concrete cores.
- Credits: Acton Ostry Architects Inc. [1, 2], naturally:wood [3].



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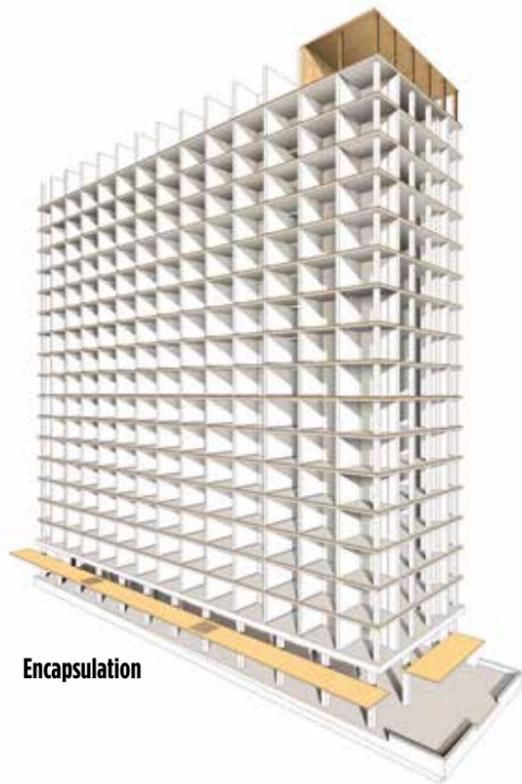


Floor plan

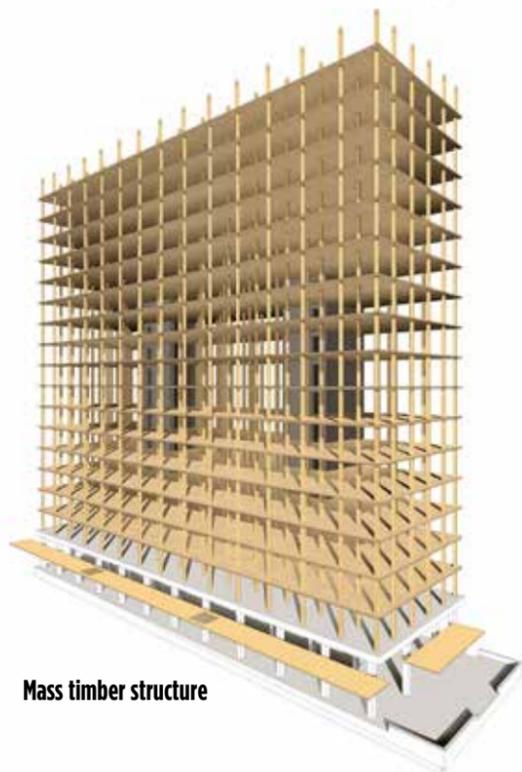
PROJECT CREDITS

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BUILDING SCIENCE RDH Building Science
MECHANICAL, ELECTRICAL & SUSTAINABILITY Stantec
MASS WOOD ERECTION Seagate Structures
MASS WOOD SUPPLY Structurlam
CONCRETE FORMWORK Whitewater Concrete Ltd.

VIRTUAL MODELLING Cadmakers Inc.
ENERGY MODELLING EnerSys Analytics Inc.
ACOUSTICS RWDI
LANDSCAPE Hapa Collaborative
CIVIL Kamps Engineering Limited
GEOTECHNICAL Geopacific Consultants Inc.
CONSTRUCTION MANAGEMENT Urban One Builders
DEVELOPMENT MANAGEMENT UBC Properties Trust
PHOTOS Michael Elkan [1, 2, 9, 10], KK Law [3, 4], Pollux Chung [5, 6], Steven Errico [8].



Encapsulation



Mass timber structure

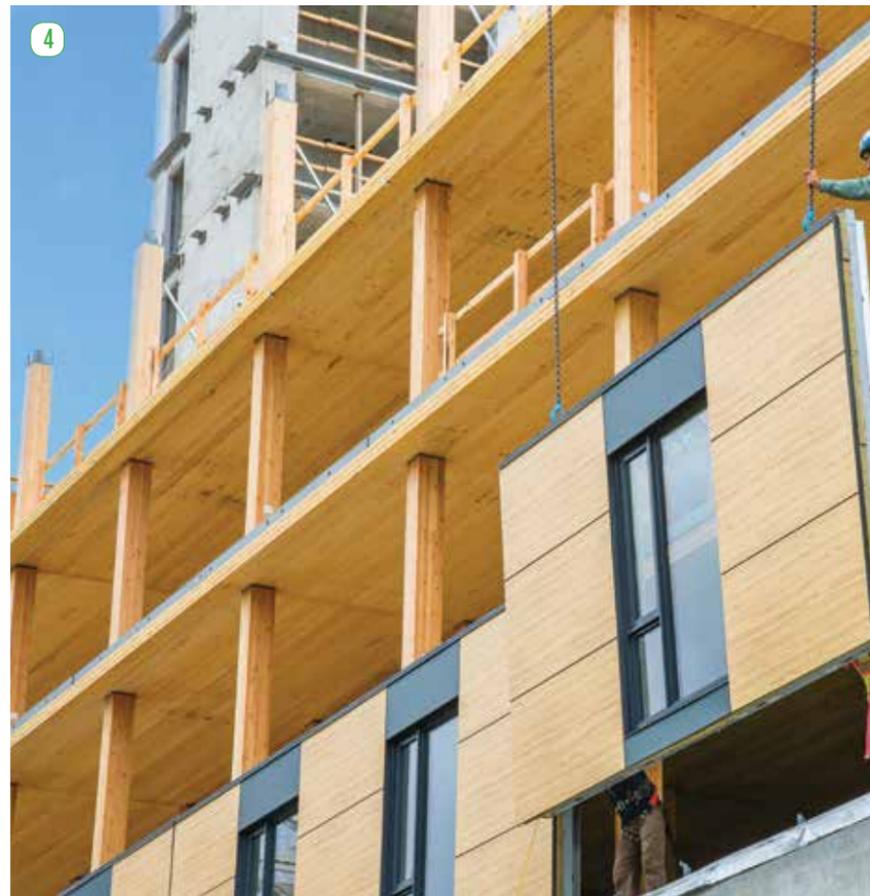
In this way, sustainability can be more effectively advanced through the construction of more encapsulated mass wood buildings at a lesser cost.

At Brock Commons, we were permitted by Code to expose the wood on the top floor, and to include a mass wood canopy, and we should be realistic in our expectations that, in a building like a student residence, this is really all that is appropriate. Exposing more would be asking for trouble in terms of vandalism and increased maintenance costs due to wear and tear.

In countries like Germany, Austria, Switzerland and the United Kingdom, where most of the world's mass wood buildings are being designed and constructed, it is relatively rare that the wood structure is left exposed, with the exception of a feature wall or ceiling. Frankly, this is what the market seems to want anyway. Most clients and building users don't want wood exposed everywhere - they prefer white or plain surfaces for the most part.

If we accept these realities, exposed wood buildings then become the rare, evocative showpieces they are intended to be, made possible by much higher budgets. Such feature buildings will most likely be limited to taller, image-conscious corporate buildings and public buildings such as libraries, community centres and possibly academic buildings, where the constant presence of people will provide a significant level of reassurance and security regarding vandalism concerns.

The use of exposed wood in such applications will likely be considered well worth the added expense in the long term. In most other building types, we must get past our fixation with philosophical posturing that the 'beauty' of exposed mass wood structures must be achieved at all costs, and instead focus on practicality and economy.



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4 - The prefabricated facade consists of steel stud framing with exterior sheathing, insulation and **Trespa® Meteon®** [distributed by **ATS-Sales**] for the rainscreen, attached with fiberglass **'Cascadia Clips'** which significantly reduce thermal bridging compared to a more traditional metal girt cladding system.

5 - Cross laminated timber canopy.

6 - Glulam post installation

7 - Exposed and encapsulated mass wood structure.

8 - Exposed wood structure at 18th floor amenity space.

9 - Wood finishes at 18th floor study space.

Credits: naturally:wood [4], Seagate Structures [5, 6], Acton Ostry Architects Inc. [2, 9, 10].

This is not to deny the unique visual quality that the strategic use of exposed wood can bring to a building, however, this is not the core concern of the mass market, any more than sustainability is. What they are interested in is the speed, the precision, and the cleanliness of the construction site. We achieved all of this at Brock Commons, and the experience will certainly influence the attitudes of the contractors and subtrades toward future mass wood projects.

These changing attitudes will also help to move mass wood technology forward, and so long as the wood option is cost-competitive — the current cost premium will inevitably lessen over time as the industry innovates, evolves and matures — the sustainable attributes of the material will be more widely available and include an environmental bonus of carbon sequestering and use of a renewable resource in the future growth of cities.

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