

FAST + EPP HEADQUARTERS

DEMONSTRATING THE
BENEFITS OF MASS TIMBER

When an internationally-regarded Vancouver-based engineering firm needed a new head office, it made sense that they would apply the same fresh thinking to its design as they do to the state-of-the-art projects on which they consult. The four-storey building will feature an exposed hybrid mass timber structure and leading-edge seismic design technology. The result will be a mass timber building that the broader construction and design industry can learn from, all the while offering an inspiring, light-filled workspace, complemented with the warmth of wood.



Project Overview

With six global offices and growing, structural engineering firm Fast + Epp needed more space for their Vancouver-based headquarters. Internationally recognized for a portfolio of expressive hybrid wood structures, they decided to build a new headquarters that would serve as a showcase of what is possible with mass timber construction and design.

By using mass timber, this project benefits from the material's sustainable merits and lower carbon footprint, something the City of Vancouver is focusing on in their Climate Emergency Action Plan.

The project will use prefabricated mass timber components, offering strength and structural simplicity, while helping decrease construction time. Speedy prefabricated construction methods will benefit the busy neighbourhood near Vancouver's Broadway-City Hall Skytrain Station, reducing noise, job waste and traffic disruption.

The prefabricated wood members will be tightly-fit and precise to ensure energy efficiency. Because they naturally reflect the beauty of wood, the mass timber panels and beams will be left exposed, eliminating the need for additional interior finishes. Along with these features, visible wood in the workplace is proving to offer potential biophilic and stress-reducing benefits.

Fast + Epp will lease out the first floor and a portion of the second floor of the new four-storey building, leaving the remainder of the space for their own engineering teams. Floors three and four will be connected by an open atrium to help connect the staff; the atrium will also serve as a lunchroom and gathering space for special events. The design incorporates exterior patios on both the north and south sides of the fourth level, providing additional work and event space.

LOCATION

Vancouver, British Columbia

SIZE

1,600 m²

COMPLETION

2020

ARCHITECT

f2a architecture ltd.

STRUCTURAL ENGINEER

Fast + Epp

CODE CONSULTANT

GHL Code Consultants Ltd.

TIMBER SUPPLIERS

Structurlam Mass Timber Corporation and Western Archrib

TIMBER INSTALLER

Seagate Mass Timber

EARTHQUAKE DEVICES

Tectonus

When building their own headquarters, Fast + Epp wanted to showcase the same structural innovations and technologies which are at the forefront of what they do as a firm. Referring to the building as 'a love letter to ourselves', the design team wanted this project to demonstrate just what mass timber can do—to show how an attractive, well-designed mass timber building can be constructed quickly, efficiently and cost effectively.



Photo courtesy of Fast + Epp

Structure+Design

The building's superstructure will include a mix of mass timber and steel columns with steel brace frames. Glue-laminated (glulam) beams, spanning 12 metres, will be decked with cross-laminated timber (CLT) panels; the long spans allow fewer columns for a more flexible interior space.

Four unique design features set this building apart:

- 1. Lateral shear walls:** Fast + Epp incorporated Tectonus devices, earthquake-resistance building technology from New Zealand, which use patented friction dampers to anchor the CLT shear walls and help the building self-center during an earthquake. The structure was designed with one storey of underground parking topped by a post-tensioned slab at grade. All the gravity and lateral elements of the wood structure transfer load directly on the concrete parking structure walls and columns below. Since the mass timber system is lighter in weight than a concrete building, this reduces seismic and gravity loads to the foundation. While the advanced lateral elements are more typical of those found in buildings which must remain operational immediately after seismic events, the investment signifies their commitment to safe, high-performance building structures.
- 2. Prefabricated CLT firewall:** Per code, zero-lot-line exterior walls cannot be combustible, but, working with code consultant GHL, Fast + Epp designed an innovative solution using a CLT firewall prefabricated with fire-resistant exterior finishes. The wall can be easily lifted into place, simplifying construction in tight urban spaces.
- 3. Vibration control:** Vibration control is important to occupant comfort, especially in multi-storey office buildings. To help their new headquarters serve as a living laboratory, Fast + Epp will use vibration sensor equipment to evaluate the vibration performance of the long-span mass timber floor system at various stages through construction and occupancy. They will share results with the broader engineering community to improve understanding about how mass timber floors behave when it comes to vibration performance.
- 4. 3D modeling and analysis:** During design, Fast + Epp made extensive use of structural modeling software, including a tool used for 3D multistorey building analysis, visualization and design, and a tool used for 3D analysis with specific add-on features to model CLT.

Products+Systems

The structure uses a hybrid mass timber and steel building system, with CLT shear walls, glulam beams and columns, steel columns and brace frames. The floors will be CLT panels with concrete topping; roof panels will also be CLT.

Cross-laminated timber

CLT is an engineered mass timber product made by layering dimension lumber (usually three, five, or seven layers) at right angles to one another; the lumber layers are then glued to form structural panels. Cross-lamination provides strength and dimensional stability, making the panels suitable for a variety of applications, including lateral systems.



Glue-laminated timber

Glulam is made by bonding dimension lumber together with durable, moisture-resistant adhesives. The grain of the wood laminations runs parallel with the length of the member, giving glulam beams the ability to span large, open spaces with minimal deflection.



A Sustainable Choice

Fast + Epp wanted a purpose-built structure that would give them flexibility as they continue to grow, and so took a holistic approach to design that kept material economy and energy use at the forefront.

The project will look to source materials locally, supporting the local economy and reducing the carbon emissions of transportation. British Columbia and Canada continue to lead the world in sustainable forest management and forest certification. Wood is unique in its ability to store carbon; as a result, mass timber structures provide advantages over steel and concrete in terms of carbon sequestration and lower greenhouse gas impacts from production.

In addition to the use of wood, the project contains several other energy-saving initiatives including electro-chromatic glazing. This remote-controlled, variable-tint glazing system controls sunlight and optimizes shading, which will help further reduce energy costs and improve occupant comfort. Overall, the wood used in the project will provide a net CO₂ benefit of 314 metric tonnes, equal to the carbon sequestered by more than 5,000 tree seedlings grown for 10 years.



Michael Elkan Photography, courtesy Fast + Epp

FOR MORE INFORMATION

This profile is published by Forestry Innovation Investment, the Government of British Columbia's market development agency for forest products.

For more information on building with wood in Canada and the National Building Code visit cwc.ca.

For more examples of innovative wood building projects throughout British Columbia, visit:

naturallywood.com

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