

Fast + Epp

MOUNTAIN EQUIPMENT CO-OP HEAD OFFICE

Vancouver, British Columbia



75-Word Summary

The new 4-storey 110,000 sq. ft. head office for Mountain Equipment Co-op features a central atrium space for gathering, open offices to encourage collaboration, an abundance of daylight and fresh air, extensive green roof and exposed wood structure on the interior. Constructed with over one million board feet of timber, glulam beams and columns support solid sawn lumber floor panels, creating a warm visual aesthetic.

Project Highlights

Innovation

Mountain Equipment Co-op, one of Canada's premier retailers, has a new head office in the False Creek Flats area of Vancouver. Founded in 1971, the co-op has over 4 million members and exceeded \$300 million in sales in 2013.

Wood has played an important role in MEC's previous projects. New retail stores in Ottawa, Burlington, and North Vancouver all incorporated heavy timber, in some cases salvaged from existing buildings. In keeping with this trend, and as part of a desire to provide a warm aesthetic to the interior spaces, wood became the material of choice for their new office. Other key characteristics of the building include:

- A 110,000-square-foot space that houses 300 employees across multiple departments, including product development, finance, human resources, information technology, and a service centre.
- Two narrow floor plates, one 4-storey's tall and the other 3-storey's tall that intersect at a 40-degree angle. The intersection creates a central atrium inside the building, and the 3-storey wing houses a rooftop garden.
- A timber and steel hybrid structure, in contrast to the cast-in-place concrete buildings that are more typical for mid-rise commercial construction in Vancouver. This choice of materials was driven by multiple factors, including MEC's commitment to sustainable building strategies and its goal to create an inspiring work environment for its employees.

A non-traditional combination of structural systems required a "first principles" approach to the design and detailing of this unique building.

- Glulam beams and columns and solid, nail-laminated timber floor panels make up the majority of the structure. Wherever possible, these elements are left exposed to view.
- With heavy timber to resist gravity loads, the structure relies on steel buckling-restrained braced frames to resist lateral loads rather than a more traditional shear wall system. The majority of office spaces are open in plan, with extensive glazing at the perimeter to maximize daylight. In cases such as these, walls are often provided at the mechanical cores. However, in this case, ventilation of the building uses three central "wind towers" to collect air, which is then supplied to the building through plenum spaces. The large openings required above the floor diaphragm to feed these plenums prohibited the use of solid walls at the wind towers.

Complexity

Nail-laminated timber (NLT) constructed by placing dimensional lumber (in this case 2x8s and 2x10s) on edge and nailing them together into a solid deck, is a very simple structural system. It was common in warehouse construction at the turn of the 20th century but has since fallen out of favour. The use of NLT floors for this building presented three major technical hurdles:

- The development of NLT specifications. Currently, there are no industry standard specifications or design guides for NLT floors. Great care was taken to properly document both the structural and the aesthetic requirements for the finished product. These specifications helped ensure a fair tender process and provided a baseline for quality control during construction.
- The design of the NLT floor diaphragm and its interface with the steel lateral system. Modern building codes in high-seismic regions like Vancouver encourage designs that provide an energy-dissipating fuse (in this case the steel braces), with other elements such as the floor diaphragm intended to remain elastic. In light-frame wood buildings, plywood sheathing over wood joists creates a flexible diaphragm, but in this case, the floor is expected to behave more rigidly. The floors were designed with sufficient reinforcing and redundancy to ensure they meet the intent of the code.
- Temporary protection of the wood during construction. Vancouver's wet climate is a particular challenge for wood structures. NLT panels were pre-fabricated off site and craned into place to speed up erection. Temporary coverings also played an important role.

Social and/or Economic Benefits

To capitalize on the success of this project, the Canadian Wood Council funded a study to demonstrate the cost-competitiveness of wood structures; it is also contributing to the development of an NLT design guide. These documents have the potential to make a significant impact on the mid-rise construction market in British Columbia and beyond, encouraging owners and developers to choose sustainable materials such as wood.

The CWC's cost study, conducted by a team including Fast + Epp, was a comprehensive look at how the MEC building would compare to a similar building constructed with structural steel or reinforced concrete. The study considered not only the cost of the structure, but associated impacts on the cost of other systems such as envelope, M&E, and finishes, as well as the impact on construction time and soft costs such as insurance. Although many owners perceive wood to be a more expensive structural system, the CWC's study actually shows that wood can be cost-competitive with steel and concrete when considered as part of a total construction budget.

Fast + Epp also currently have a proposal before the CWC to develop industry standards for NLT. While cross-laminated timber (CLT), glulam, and other engineered wood products are well-documented in the Canadian wood codes and suppliers' literature, little information is available for NLT. The current lack of universal standards and design examples is an impediment to NLT's adoption on a wider scale.

Environmental Benefits

The design team targeted LEED Gold as a minimum standard, though the final review and designation is still in progress. Many aspects of the design targeted LEED Platinum standards.

The choice of wood as the primary structural material helped minimize the embodied energy of the construction materials. The entire structure contains more than one million board feet of lumber, enough to cover an NHL rink with a volume of wood over five and a half feet high. By this measure, we believe the building to be one of the largest wood structures in the province.

Other portions of the structure were designed in response to the sustainability goals of the overall design. As described above, the choice of lateral system was integral to providing an energy-efficient ventilation system for the building. Designing the floor system in a way to eliminate perimeter beams allowed glazing heights to be maximized, providing daylight to the interior spaces.

Meeting Client's Needs

MEC's goal was to create an inspiring workplace that would allow its employees to do their best work. These values contributed to every aspect of the design: a central atrium space for gathering, open offices to encourage collaboration, natural building materials, an abundance of daylight and fresh air, energy and water efficiency. The design team elicited feedback from MEC employees throughout the design process, refining elements in response to their needs.

Using a more traditional metric, the building was completed on time and on budget, even in spite of excavation difficulties at the start of construction that created delays and unexpected costs.



Photo 1: Final construction at entry, south east façade.



Photo 2: North facing view from Great Northern Way.



Photo 3: East façade bordering future Skytrain corridor.

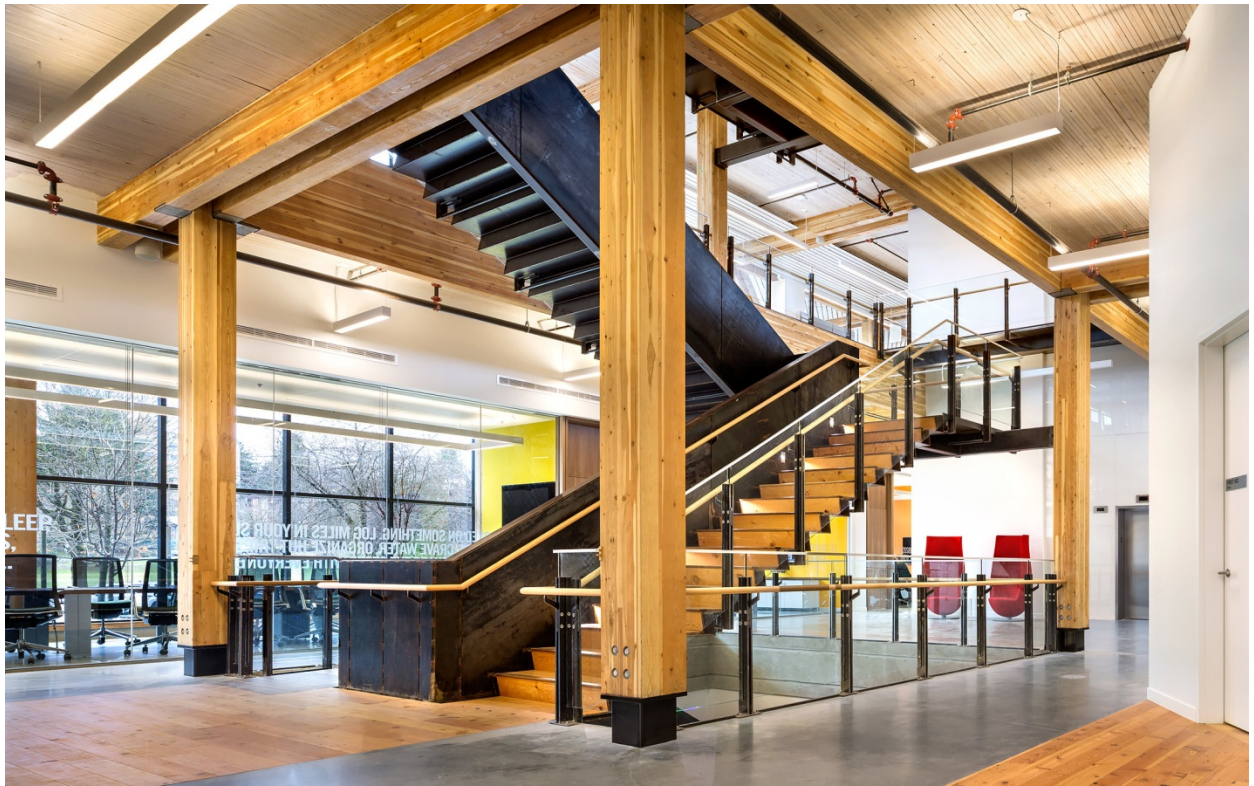


Photo 4: Atrium stair at main level.



Photo 5: Front entry reception.



Photo 6: Solid wood panel construction.



Photo 7: Mass timber floor framing in progress.



Photo 8: Cantilevered floor framing over bike path.