UBC MASS TIMBER BUILDINGS

Leadership in Building with Wood

With the innovative use of mass timber in its academic and operational buildings, the University of British Columbia (UBC) is at the forefront of revitalizing wood construction. Integrating wood, a renewable material that stores carbon, into its buildings, reflects UBC's commitment to sustainability and pioneering new building technologies which expands the market for B.C. forest products.

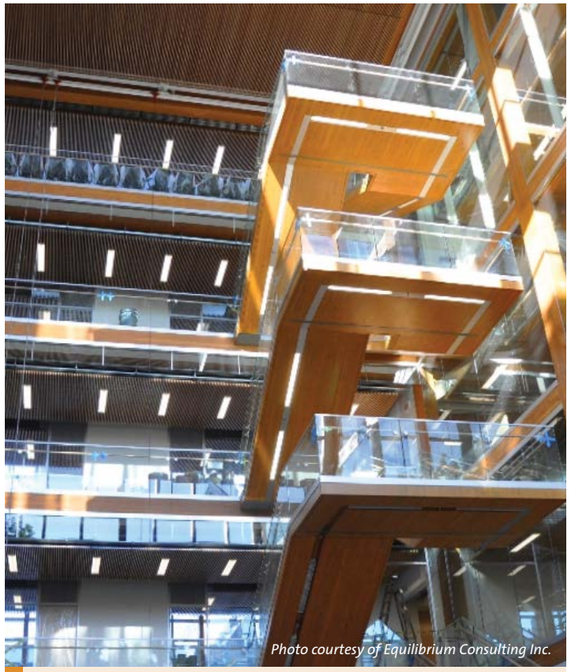


Photo courtesy of Equilibrium Consulting Inc.

① EARTH SCIENCES BUILDING

Features two five-storey wings connected by an atrium. The building incorporates extensive use of cross-laminated timber (CLT) as well as an innovative concrete/ laminated strand lumber(LSL) composite floor system. A free-floating cantilevered staircase built entirely of glue-laminated timber (glulam) connects all five levels; the first of its kind in the world.


Photo credit: Don Erhardt

⑨ BIOENERGY RESEARCH AND DEMONSTRATION FACILITY

Contains engineered wood products including CLT and glulam. Due to the size of the gasification system components and the restricted space of the location, the structure was constructed around and over the equipment– a benefit of using pre-fabricated timber panel systems.


Rendering courtesy of UBC and Acton Ostry Architects Inc.

⑧ BROCK COMMONS PHASE 1 STUDENT RESIDENCE

Mass timber hybrid structure comprised of 17 storeys of mass timber construction above one storey of concrete and two concrete stair cores. The floor structure is comprised of CLT panels which act as a two-way slab diaphragm, supported on glulam columns.

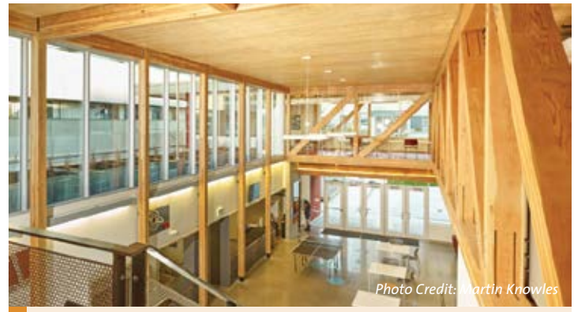
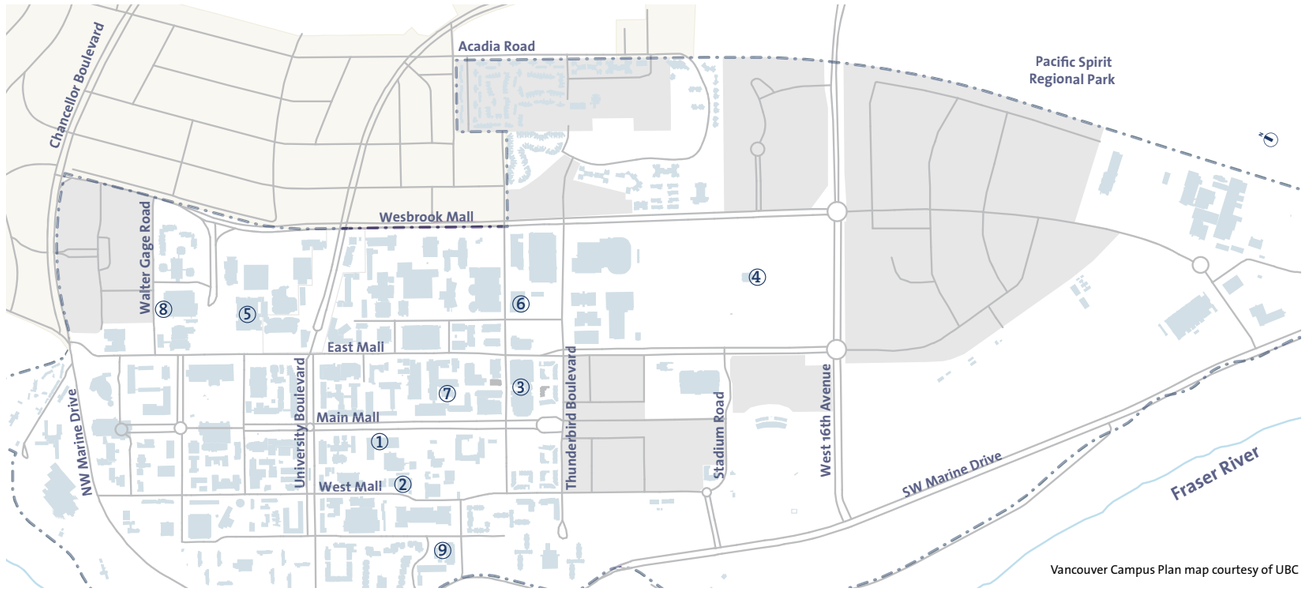


Photo Credit: Martin Knowles

⑦ ENGINEERING STUDENTS CENTRE

Composed primarily of a wood frame with a structural system of exposed glulam, steel and concrete. The exposed structural wood elements, such as NLT roof panels, cantilever well beyond the edge of the building envelope to provide highly visible connection details.



Vancouver Campus Plan map courtesy of UBC


Photo courtesy of UBC

⑥ CAMPUS ENERGY CENTRE (CEC)

An industrial building constructed with CLT panels and glulam. Highly visible connection and construction details. The CEC will be the primary energy source for a hot water district energy system, which also produces thermal energy.


Photo Credit: Don Erhardt

② CENTRE FOR INTERACTIVE RESEARCH ON SUSTAINABILITY (CIRS)

Commodity dimension lumber has been used to form nail-laminated timber (NLT) panels for both the floor and roof system of the building. Glulam beams and columns remain exposed within the building. The building envelope is partially detailed with laminated western red cedar panels.


Photo Credit: Don Erhardt

③ FOREST SCIENCES CENTRE

Parallel-strand lumber (PSL) beams and columns support a floor assembly of engineered wood joists and plywood sheathing topped with concrete. Glulam beams and columns support exposed wood trusses and I-beam roof in the processing centre, while the atrium showcases large PSL "trees" and walls lined with douglas-fir and bigleaf maple.


Photo courtesy of UBC

④ BASEBALL TRAINING CENTRE

A cost effective, simple design using readily available commodity wood materials and an innovative combination of a glulam / LSL composite. Mass timber is used in the batting cages and pitching area, while light wood framing is used for the small scale support and office spaces.


Photo Credit: Joost Bakker

⑤ NEW STUDENT UNION BUILDING (THE NEST)

Exposed wood, breathtaking views and the Nest Lounge characterize this space. Wood, structural steel and concrete were left exposed for the SUB's large open spaces. The east atrium features four-storey high, boomerang shaped glulam columns. The five-storey west atrium features a saw tooth roof of glulam trusses and CLT panels.

Mass Timber Products

Innovation and advancements in mass timber products and construction systems are enabling developers to build taller and larger with wood. Mass timber products are composed of wood veneers, lumber or strands bound together. Some of these products include glue-laminated timber (glulam), cross-laminated timber (CLT), parallel strand lumber (PSL), laminated strand lumber (LSL), and nail-laminated timber (NLT). The proven performance and safety of these products showcases the wide range of opportunities to build with wood.

Wood Is Responsible

Wood is a sustainable and versatile building material that stores, rather than emits, carbon dioxide for the life of the structure and beyond when wood fiber is recycled or reclaimed. In addition to wood's carbon storing properties, wood exhibits low embodied energy and requires less energy to manufacture compared to other building materials. [1]Using wood results in lower greenhouse gas emissions making it an energy-efficient and high-performance building material, especially where environmental objects are concerned.

The Hangar: UBCO Fitness & Wellness Centre

In addition to the mass timber buildings on UBC's Vancouver campus, the UBC Okanagan (UBCO) campus has developed new buildings with the same sustainability goals. The Hangar, UBCO's Fitness and Wellness Centre incorporated an innovative application of CLT. A series of curved ribs of CLT braced with rectangular panels of the same material create a lattice configuration which connect to glulam beams. The Hangar explores innovative approaches to CLT, using new jointing and detailing techniques to create a lightweight and efficient structure.

UBCO Fitness and Wellness Centre's egg-crate CLT structure is both lightweight and strong, inspired by the wing structure of balsa wood airplanes. Photo courtesy of Don Erhardt.

Brock Commons Phase 1 Student Residence is an innovative mass timber hybrid structure at the UBC. Image of construction progress July 2016. Photo Credit: KK Law

Wood Performs

Wood's structural performance capabilities make it appropriate for a broad range of applications – from small structures to larger and heavier framing systems used to build arenas, schools and other large buildings.

Building codes require all building systems to perform to the same level of safety, regardless of material used. Wood-frame and mass timber construction has a proven safety and performance record for a full range of conditions including fire, seismic and wind.

FOR MORE INFORMATION

This publication is produced 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 **www.cwc.ca**

For more information on mass timber and tall wood buildings in North America and around the world, visit **www.rethinkwood.com/tall-wood-mass-timber**

For more information on B.C. forests and products, and innovative use of wood in buildings, visit

naturallywood.com

Cover Photo: UBC Vancouver Campus. Photo Credit: Hover Collective. The wood grain featured at the top of this factsheet is Bigleaf Maple.

Endnotes: [1] Intergovernmental Panel on Climate Change Fourth Assessment Report 2007 www.ipcc.ch.