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Above and **on the cover:**
Bigwin Island Club Cabins by MacKay-Lyons Sweetapple Architects Ltd.
PHOTOS: Doublespace Photography

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HOSPITALITY WORKS WITH WOOD

Building a Better Future

For the last issue's editorial, as I reflected on the chaotic events of 2020, "transforming the world" was on my mind. I had recently discovered Canadian architect Teresa Coady's new book, *Rebuilding Earth: Designing Ecoconscious Habitats for Humans* (published by North Atlantic Books), which explains her 12 Principles of Conscious Construction; a review was included in the "Inspiration Board."

To my surprise, a handwritten letter arrived a few months later. What caught my attention, besides the rarity of this event, was the story it contained. The writer explained that my column had offered "great encouragement for this old coot," and continued:

"About 40 years ago, I was put in a room with Ray Affleck [co-founder of Montreal-based architectural firm Arcop], with the assignment to change his design for a steel and concrete golf clubhouse into 'something that would suit.' Keeping with Ray's floorplan, 'we' came out with a wood-frame structure/cedar shingled. My grandfather used to tell me to make it look like it grew that way. . . . Well done, editor!"

Moments of encouragement and connection are a valuable commodity in these times. This summer, the magazine also received a Tabbie Award, placing fourth in the Top 25 Best Single Issues of international B2B publications. We may feature articles about wood buildings, but people are the real focus – those who design and create the structures, and ultimately, those who use them. The advancement of any industry relies on its creators and innovators – many of whom, of course, are women (see "Inspiration Board").

Last year, we decided this issue would feature the use of wood in the hospitality industry – and ironically, for most of this year, we faced months of travel restrictions. With border lockdowns still in effect, international travel is on hold – so hopefully, the feature about wood hotels (on p.20) offers a welcome escape.

Sharing stories and experiences is one of the joys of life. While we may not be able to partake in some of the adventures and connections we enjoyed pre-pandemic, we can still write letters, read magazines and build a better future.

Popi Bowman
Managing Editor

Wood Design & Building magazine invites you to submit your project for consideration and possible publication. We welcome contributed projects, bylined articles and letters to the editor, as well as comments or suggestions for improving our magazine. Please send your submissions to pbowman@dvtail.com.

inspiration BOARD

WHAT I'VE FALLEN FOR LATELY...

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WOMEN IN ARCHITECTURE

When they won the 2020 Pritzker Prize earlier this year, Irish architects Yvonne Farrell and Shelley McNamara, of Grafton Architects (founded in 1978), became the first female duo – and only the fourth and fifth women – to be honored by the award; Zaha Hadid was the first to win, in 2004.

A few years ago, the editor of the *Biographical Dictionary of Architects in Canada 1800-1950* discovered that the first Canadian woman to join the profession was Alice Charlotte Malhiot, who graduated from the University of Alberta in 1914 – almost 40 years after the first woman architect in the U.S. Before this discovery, Esther Marjorie Hill was credited as the first female architect in Canada; she graduated from the University of Toronto in 1920.

In the past 100 years, many things have changed – including the status of women. Today, a list of prominent women in architecture could fill a book, but as a start, here are just a few of the Canadians who make us proud:

Anne Carrier: Leading her eponymous firm in Quebec, Carrier designed the award-winning Opeongo Pavilion in the Mont Orford National Park.

Teresa Coady: The author is also the former president and founding partner of Vancouver-based B+H BuntingCoady, one of Canada's leading sustainable architectural design firms.

Shelley Craig: Craig founded Urban Arts Architecture with architect Jennifer Marshall in 2006. Their firm's Radium Hot Springs Community Centre and Library was one of the first DLT buildings in Canada. Ouri Scott is also a principal architect with the firm; she specializes in Indigenous design.

Heather Dubbeldam: Winner of the 2016 Professional Prix de Rome in Architecture, Dubbeldam is a LEED Accredited Professional and a member of both Sustainable Buildings Canada and the Canada Green Building Council. She founded her Toronto-based firm almost 20 years ago.

Meg Graham: In 2002, Graham founded Superkül with her husband. Best-known for residential work and sustainable design, the Toronto-based firm recently designed a prefabricated laneway home prototype that meets Passive House standards.

Johanna Hurme: One of the co-founders of 5468796 Architecture in Winnipeg, Hurme was shortlisted for the 2017 Moira Gemmill Prize for Emerging Architecture. The firm's upcoming, mixed-use 12-storey Inglewood project in Calgary features CLT and a wood diagrid structure.

Camille Mitchell: After nine years with KPMB in Toronto, Mitchell recently joined Gensler and she is an executive member of Building Equality in Architecture Toronto (BEAT), founded by Betsy Willamson (below).

Patricia Patkau: Since Patkau Architects was founded in 1978, the husband and wife team has designed some of Canada's most revered buildings that feature wood, including the award-winning Audain Art Museum. The 15-storey University of Toronto Academic Wood Tower, designed in partnership with MacLennan Jaunkalns Miller Architects (MJMA), will be one of North America's tallest timber buildings when it's completed.

Carol Phillips: A partner at Moriyama & Teshima Architects with more than 20 years of experience in the industry, Phillips is in charge of the upcoming 10-storey Arbour building for George Brown College, designed in partnership with Acton Ostry Architects.

Brigitte Shim: The co-founder of Shim-Sutcliffe Architects is one of Canada's most decorated architects, winning more than a dozen Governor General Awards. She is also a professor at the John H. Daniels Faculty of Architecture, Landscape, and Design for the University of Toronto.

Megan Torza: The only female partner/architect at multi-disciplinary design studio DTAH in Toronto, Torza has a strong interest in adaptive re-use and public projects.

Betsy Williamson: Since graduating with a master's degree from Harvard University, Williamson's projects have won many awards. Based in Toronto, the husband-wife team of Williamson Williamson Architects often features wood in their designs.

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Wood for Art's Sake

Wood is easy to work with and it has many functional properties, but its aesthetic qualities also are ideal for decorative objects. Not surprisingly, woodcarving is a tradition that is as old as humanity. For centuries, many cultures have used wood to create works of art and religious icons, such as some of the Buddha sculptures of early China. Carved wood panels and statues have been discovered in several Egyptian tombs, and many other civilizations have a long history of working with wood. The earliest known example of wood sculpture is the Shigir Idol, a Russian artifact that is more than 11,000 years old; the larch object is carved with patterns that could be symbolic, but their meaning is still unsolved. In Canada and Alaska, the Indigenous peoples of the Pacific Northwest carve cedar totem poles to depict mythology and family lineage, while most Polynesian cultures – including Hawaiians – have a similar art form. Whether an object is symbolic or simply decorative, when it's made with wood, it's timeless. Here are four modern examples that use wood to elevate art.

In White Rock, B.C., California-based artist Gordon Huether created **Rostrum**, a wood and stainless steel sculpture using locally sourced cedar blocks. The amphitheater-like installation takes its aesthetic cue from the landscape and architectural design of the site, a former lumber camp turned residential development. Night lighting is provided by 50 inset LED bulbs, embedded into the steel pipes. Fabricating and installing this 10,000-lb. sculpture, which measures 14 ft. tall by 14 ft. wide, required intensive collaboration between the artist and structural and civil engineers, the project development team and the landscape architect. In addition, a team with expertise in international transportation and heavy hauling was consulted to facilitate the successful installation.

An internationally recognized sculptor based in New York, Ursula von Rydingsvard creates large-scale abstract forms that resemble geological formations, giant vessels, elements of the body or walls that evoke her experience growing up in Nazi slave-labor and refugee camps. Her pieces are in many permanent collections, including New York's Metropolitan Museum of Art and Museum of Modern Art; **Luba** (shown) is displayed at the Storm King Art Center, an outdoor sculpture park covering hundreds of acres. Rydingsvard typically works with cedar (shipped from B.C.), composing her sculptures from networks of individual beams into which she and her team cut wedges, knobs and teeth using circular handsaws; the parts are glued and stacked together, and sometimes stained with pigments.

Canadian Indian Art offers one of the largest collections of West Coast Indigenous art, featuring dozens of artists from the Squamish Nation in B.C. A wide selection of wood carvings and other unique items can be purchased online. The **Sun Carrier Raven Bowl** (shown) by Jacob Lewis opens to reveal a hidden bowl; it is adorned with multiple inlaid paua shells from New Zealand. Lewis is a renowned artist who has been carving since childhood; his work has been displayed throughout North America. He uses yellow cedar to create complex designs, integrating the sun, ravens, eagles and other traditional symbolic images.

J. Paul Fennell began turning wood as a hobby in the 1970s while working as an engineer on the Apollo space program in California. **Mesquite Basket** (shown) is on display at the Smithsonian American Art Museum. Largely self-taught, his work focuses on hollow-turned vessels that are often inspired by "the natural world, family and architecture." Fennell's work explores texture, particularly his "pierced" pieces, in which he cuts out sections of wood to create forms that resemble intricate latticework. "My source of wood is salvaged from the local 'urban forest,' a resource that is amazingly diverse." His works are in many museum collections, including the Museum of Art & Design in New York, the Museum of Fine Arts in Boston and the Carnegie Museum of Art.

1. Rostrum
   by Gordon Huether
   Miramar Village/
   White Rock, BC
2. Luba
   by Ursula von Rydingsvard
   Storm King Art Center, NY
3. Sun Carrier Raven Bowl
   by Jacob Lewis
   Canadian Indian Art
   (online)
4. Mesquite Basket
   by J. Paul Fennell
   Smithsonian American
   Art Museum, DC

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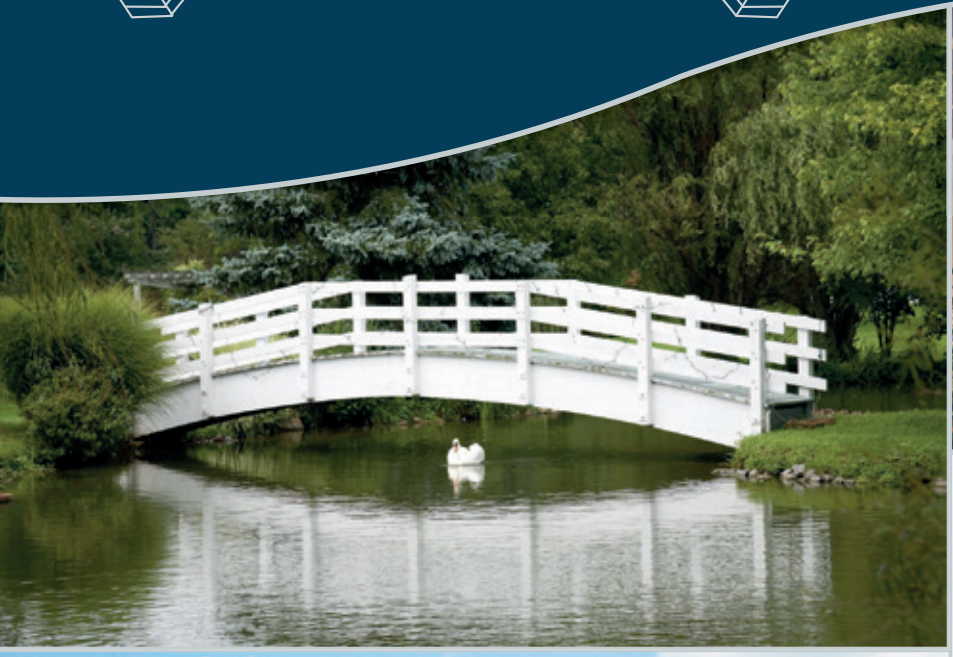

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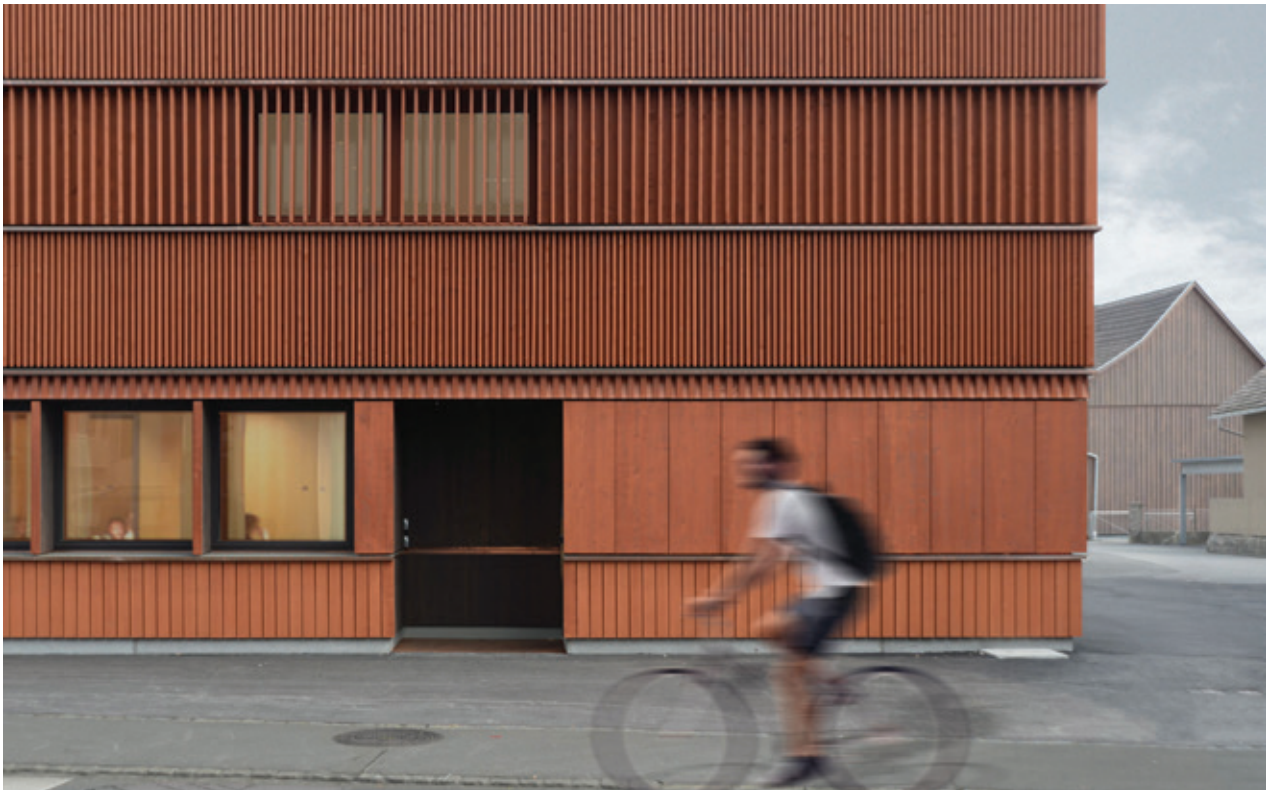
Hotel Jakarta

DREAMING OF INTERNATIONAL HOTELS

Several hospitality projects featuring wood can be found in this issue, but there are many others worth noting, including Amsterdam's modular, nine-storey Hotel Jakarta (designed by SeARCH Architects), which opened in 2018. With an enclosed, subtropical atrium garden, this structure is climate-neutral and predominantly wood. The luxury hotel is constructed of 176 room modules manufactured by Ursem, with a load-bearing wood structure, including CLT walls and roof; the flooring for the room modules is precast concrete.



THIS PAGE: Johann Hotel and Guesthouse

Fuchsegg Lodge

Shonai Hotel Suiden Terrasse

In Austria, two hospitality projects were completed recently by Ludescher + Lutz Architekten. The Johann Hotel and Guesthouse was completed in late 2018; both the interior and exterior are enhanced by wood. Fuchsegg Lodge is a cluster of six buildings including a sauna house, with a year-round outdoor pool. The interiors are finished in a variety of wood types: silver fir on the walls and ceilings, with ash, oak or maple on the floors.

In Japan, the Shonai Hotel Suiden Terrasse (designed by Shigeru Ban Architects) opened last year. Wood is an important element throughout the structure, reflecting its rural setting. The Communal Wing (lobby, restaurant and shared space), the Accommodation Wing (guest room buildings) and the Spa Wing are all two storeys, and aside from the foundation and cores, are constructed of timber; the Spa Wing has a roof composed of three layers of bent and laminated wood in a woven hexagonal pattern. Guest rooms are outfitted with wood paneling and built-in storage, as well as paper tube headboards and furniture. The hotel library is a warm, welcoming wood-finished space, outfitted with paper tube and wood furniture; the corrugated roof is constructed from 90 mm laminated larch panels (plus galvanized steel).

More international hotels are featured on p.20.

PROJECTS TO WATCH

Although the world is still adjusting to the "new normal," many mass timber buildings are well underway, and new projects have been announced. We can't fit them all here, so Projects to Watch are also featured in our e-newsletter; be sure to sign up at WoodDesignandBuilding.com.

NORTH AMERICA

- **Burnaby, BC:** A $115M, 12-storey mass timber student housing project with more than 260 self-contained studio apartments and 200 single-bedroom units (with shared communal kitchens and bathrooms) is being planned for the British Columbia Institute of Technology (BCIT), with construction expected to start in early 2022. The building will be designed to reflect Indigenous culture, with a medicinal garden and common spaces that support cultural activities. The building will more than double BCIT's student housing capacity. The province is contributing more than $100M towards the project. "Building these new homes is answering a call to action from students and communities to support innovation and create more affordable, cleaner and greener housing," said Melanie Mark, Minister of Advanced Education, Skills and Training. Funding student housing is part of the government's 10-year housing plan, Homes for BC, which includes a $1.9B investment to create more than 14,000 affordable rental homes for low- to moderate-income British Columbians.

- **North Vancouver:** Adera's second mass timber housing project, Crest, is nearing completion. Featuring 179 housing units (one to three bedrooms, some with roof decks), the six-storey structure is engineered to exceed current codes for sound transfer. Structurlam is the mass timber supplier.

- **Michigan**: The state's Department of Natural Resources (DNR) will utilize mass timber to build a $5M customer service center, featuring 10,000 sq.ft. of office space and a public community room. DNR-managed forests cover 4 million acres of land, and Michigan's forest industry is worth over $20B. The building design is expected to be unveiled by the end of 2020.

INTERNATIONAL

- **Australia:** Atlassian, a software company, is planning to build a 40-storey building in Sydney that could become the world's tallest hybrid mass timber building. A collaboration between New York's SHoP and Australia's BVN architecture firms, the structure will feature a steel and glass exterior, with solar panels and self-shading windows; it will be powered completely by renewable energy. The country has seen several mass timber projects come to fruition, including La Trobe University's $100M student housing development designed by Jackson Clements Burrows; the six-storey CLT/glulam project provides a mix of one-, four-, five- and six-bedroom apartments.

- **Monaco:** Designed by Bellecour Architectes, the 12-storey Carmelha Tower is a CLT-concrete hybrid featuring luxury apartments, scheduled for completion in 2022. It will be erected using Upbrella Construction's crane-free sheltering system, which uses elevator-type actuators to lift each floor into place under a pre-built roof. The Quebec-based firm recently implemented the same system in Montreal, when six storeys were added to the Hôtel Le Germain.

AN INNOVATION FOR TALL STRUCTURES

DIALOG recently revealed a hybrid 105-storey tower prototype that combines mass timber, steel and concrete to allow for supertall structures. The patent-pending Hybrid Timber Floor System (HTFS) is fire-safe and allows for open spans up to 12 m so it can be integrated into any building typology, while reducing the required structural support beams. Full-scale testing is expected to begin next year.

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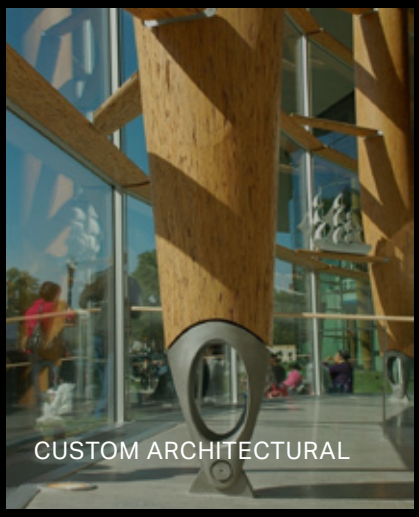

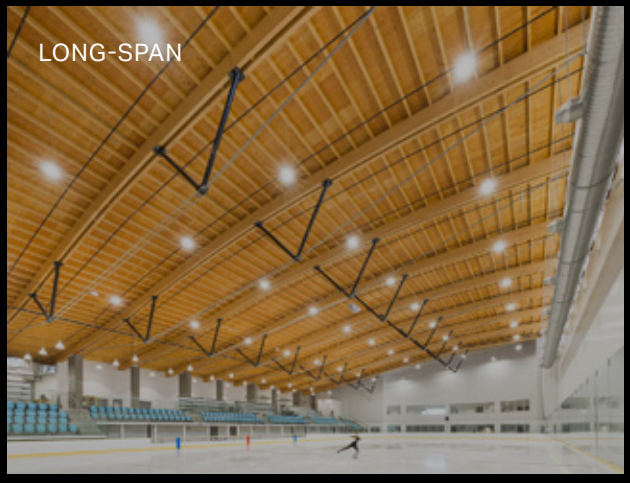

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Canada House at Killarney Lodge

Massive logs reflect traditional design and local materials, with modern application

Killarney, ON

Sjoerd Bos, Sansin's Managing Director

Canada House is a 34,000-sq.ft. facility, known as the largest log convention center in the world, which draws inspiration from the history of log construction in the Georgian Bay region of Ontario. The convention center is nestled in the pink granite of the La Cloche Mountains that embrace the charming, historic town of Killarney. The grand facility – which was custom built to a 200-year standard – offers eight meeting rooms, two banquet halls with a combined capacity of 370, a state-of-the-art fitness center, a fine-dining restaurant and a variety of configuration options.

The sprawling terrace enables a seamless transition between indoor and outdoor spaces.

The logs – the showcase of the structure – range from 18"-24" in diameter.

Wood is the focal point of every room in Canada House, including the stunning rotunda.

The owner, Holden Rhodes, was dedicated to utilizing the talents of local experts as much as possible and wanted to source the majority of the materials locally. The logs – the showcase of the structure – were required to be at least 18 inches in diameter, with some as big as 24 inches.

To pay homage to the First Nations history in and around Killarney, Rhodes worked with log crews in the Wikwemikong Unceded Indian Reserve to harvest over 170 tons of white pine logs for the project, ensuring the people of Wikwemikong became part of the history of the building. The remaining logs were sourced from Quebec. Structural wood – Douglas fir timbers for posts and beams – came from B.C., a trek of more than 1,800 miles.

Great care was taken to prepare the logs for construction. The logs were stripped of bark and seasoned for several weeks before being hand-shaped with a draw knife; then, they were preassembled at the builder's yard in a process that included tagging, numbering and disassembling the logs. Finally, the tagged logs were trucked to the construction site and assembled in what came to be referred to as a "ballet of cranes."

Rhodes put as much care into selecting the coating system for the wood as he did into sourcing the logs themselves. He wanted a sustainable finish that provided not only superior protection, but also the right aesthetics. Selecting finishes that were easy to maintain for years to come was also paramount to the decision to coat the wood with Sansin's waterborne finishes.

Sansin's deep penetrating wood finish provides the durability required, while allowing the natural character and beauty of the wood to shine through.

Canada House can accommodate 25–250 guests.

To learn more about Sansin, go to Sansin.com; for more about Canada House, visit Killarney.com.

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During construction, the logs were protected from UV, staining and discoloration with Sansin's Timber-Tec M-30. Sansin's waterborne Classic 1-2-3 system, the company's flagship log and timber finish system, was chosen to protect and beautify the enormous logs on the exterior. Sansin's Classic and Purity Floor, a gymnasium-grade modified waterborne urethane finish, were used to bring both warmth and vibrancy to the enormous logs and high ceilings inside the structure. Sansin's deep penetrating wood finish provides the durability required, while allowing the natural character and beauty of the wood to shine through.

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International Hotels Embracing Mass Timber

Joann Plockova

Magdalena Hotel

PHOTO: Casey Dunn

In the highly competitive hospitality industry, hotel brands are consistently looking for ways to stand out from the crowd. Today, with a growing number of examples, hotels around the world are turning to mass timber. Along with design versatility, the renewable material offers a lower carbon footprint and energy savings, noise and waste reduction and, cited as a main advantage, ease of use and faster construction time due to prefabrication of engineered wood. Lighter than other materials, but comparable in strength, mass timber offers durable design possibilities from warm modern looks to striking contemporary constructions.

The latest hotel from the design-driven Bunkhouse Group, the Austin, Texas–based **Magdalena Hotel** is the first mass timber boutique hotel in North America. Designed by Lake|Flato Architects, the 89-room hotel spans four buildings where open exterior walkways in wood double as communal outdoor space and overlook a lush courtyard with native flora and fauna and a sunken oxbow-shaped pool.

"The hotel architectural experience recalls the history and culture of Austin's lake houses built in the 1950s," says David Lake, principal at Lake|Flato, "and the timber frame expressed structure has the warmth of those lakeside houses."

Designed as deep porches, the open walkways are built from slatted Douglas fir panels supported by a glulam post and beam frame. Stained in a weathered-like coating to prevent color inconsistencies over the years, the gapped panels are exposed on both the floor and the ceiling for a distinctive design detail. Rooms are built from dowel-laminated timber (DLT) panels supported by prefabricated stick frame shear wall panels. With windows on two sides to allow ample daylight and cross breezes, the accommodations include custom built-in beds and desks in walnut.

Adina Apartment Hotel Melbourne Southbank

The project incorporates approximately 30,000 cu.ft. of wood. "We chose the mass timber approach because the system is prefabricated and quickly erected, in addition to being a low embodied carbon – light on the earth – and sustainable structural system," explains Lake. Timber frame walls, columns, porches and floors were designed, engineered, fabricated and erected by Vancouver-based StructureCraft "for a fixed price," says Lake. "The speed of erection was three months faster than concrete or steel composite, and the structural deck is exposed in the hotel rooms and porches to recall the charm of Austin lake houses."

In Alabama, the four-storey **Candlewood Suites at Redstone Arsenal** (completed in late 2015) was the first hotel in the U.S. to be built with CLT. Clad in a concrete brick veneer, the 62,688-sq.ft. project was completed 37 percent faster than similar hotels, thanks to the prefabrication of the panels and the ease of building with them. The 92-room hotel was followed by a second mid-size hotel built from CLT, the Candlewood Suites on Fort Durum, completed in the fall of 2018.

Meanwhile in Melbourne, the **Adina Apartment Hotel Melbourne Southbank** is set to bring Australia its first CLT high-rise hotel. An adaptive reuse project designed by Bates Smart, the 220-room hotel, including 70 studio apartment-style rooms, one and

Jo & Joe, Gentilly PHOTO: Takuji Shimmura

two-bedroom apartments, a gym, an indoor lap pool and meeting rooms, comprises an 11-storey timber extension set atop an adapted eight-floor commercial building in concrete below.

The concrete-framed building was designed to be able to support only six additional levels using the same type of frame. But, through the use of timber, which is "20 percent lighter than concrete," notes Julian Anderson, Bates Smart studio director, the team was able to meet the challenge of creating a taller extension that could accommodate the program.

Wrapped in a glass curtain wall that emphasizes its curvaceous form, the striking extension incorporated approximately 5,300 tons of CLT for its construction, which Anderson says will offset approximately 4,200 tons of CO_2 (the equivalent of the annual carbon emissions of 130 homes, according to Bates Smart). Designed to reflect the architecture, the hotel's interior includes curved walls and incorporates timber in the ground floor lobby and first floor – both lined with walnut battens.

In Europe, a number of projects put the continent at the forefront of the mass timber movement in the hospitality industry. Opened recently on the periphery of Paris' ring road, the flagship **Jo & Joe, Gentilly** is the first property from the Accor brand to be built with a wood structure.

Designed by Jean-Paul Viguier et Associés, the nine-level building (including basement level parking and the ground floor) features 85 rooms, a restaurant, private terraces and a garden courtyard. The exterior is clad in iridescent aluminum that shines gold by day and is

Sara Cultural Centre, Skellefteå IMAGES (above): White Arkitekter

illuminated with star-like lights at its top and ground level by night. Recipient of the low carbon footprint BBCA label (by the Association for Low Carbon Building Development) during its conception, the 75,350-sq.ft. hotel is a hybrid structure, with a concrete base topped by post and beam CLT construction starting at the first floor.

Manufactured by Spain-based EGOIN, "the raw material used for the panels comes from the surrounding forest, with 100 percent PEFC [Program for the Endorsement of Forest Certification]," says Viguier architect Sarah Le Guerinel, who was head of the project. The structure features LVL columns and glulam beams and lintels, with CLT panels to form exterior walls (140-mm thick), interior walls and partitions (100-mm thick) and floor slabs (ranging from 180-240 mm). "They provided fabrication and custom cutting of the CLT panels that were delivered directly on site for the floor slabs and delivered to the facade fabricator for the vertical panels," says Le Guerinel, who also notes that EGOIN is "the only manufacturer in southern Europe that can produce straight and curved beams up to 42 m long and 250 mm in width."

Low carbon emissions, noise pollution reduction and thermal insulation efficiency (15 times more than concrete) were among the reasons the team turned to CLT for the project. Public spaces and guest rooms, including private rooms, dorms and cabins, reference the construction material through furnishings made from multi ply plywood.

In Skellefteå, Sweden, where there is long tradition of timber building, the **Sara Cultural Centre, Skellefteå** includes an adjoined four-star hotel rising 20 storeys above the center's base. Through the 129,170-sq.ft. hotel's glazed facade, guests look out to expansive views and passersby can look into the tower's CLT construction, which stacks 13 CLT hotel modules on top of one

Long Beach Civic Center – Billie Jean King Main Library
PHOTO: Fotoworks/Benny Chan

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Sara Cultural Centre, Skellefteå

another in between two CLT elevator cores. "The entire construction [speaking of the center as a whole] is made in timber – everything from load-bearing columns and beams to shear walls and cores," says Robert Schmitz, architect and partner at White Arkitekter, which designed the approximately 325,000-sq.ft. project.

More than 350,000 cu.ft. of prefabricated CLT and almost 80,000 cu.ft. of glulam panels and beams were used for the center's construction. (The only exception is the basement, which used concrete.) Manufactured by Martinsons, the material is made from locally sourced spruce from sustainably managed forests within a 250-mile radius of the site.

With the spruce CLT exposed on walls and ceilings, the hotel's 205 guest rooms and suites are made by 3D modules, manufactured by Derome – located just 25 miles from the site. The modules come delivered with all interior fittings ready made.

Set to open in the third quarter of 2021, the Swedish hotel – which includes conference space, a restaurant and sky bar with a roof terrace, and a spa with an outdoor infinity pool – will surpass its Norwegian neighbor, the recently completed Mjøstårnet (featured in the Spring/Summer 2020 issue), which tops off at 18 storeys and used more than 123,000 cu.ft. of timber for its construction; the mixed-used tower's 72-room Wood Hotel spans from the eighth floor to the 11th and includes an apartment suite on the 15th floor.

Part of Vienna, Austria's HoHo Wien, a mixed-use project designed by RLP Rudiger Lainer + Partner and

HoHo Wien IMAGE: cetus Baudevelopment GmbH

HoHo Wien PHOTOS: cetus Baudevelopment GmbH

built from close to 75 percent timber, **HoHo Wien** – located on the ninth through the 22nd floors of the tallest tower – offers 143 rooms and serviced apartments featuring exposed structural spruce on walls and ceilings, with composite wood floors. Like Adina in Melbourne, the hotel is due to open this fall.

Although just the start of the hospitality industry's embrace of mass timber construction, these projects prove the material offers an exceptional opportunity for hotels to distinguish themselves. From time savings to environmental advantages, from design diversity to durability, the benefits of wood extend from hoteliers to guests who can experience the sight, scent and soothing qualities of this non-toxic, natural material.

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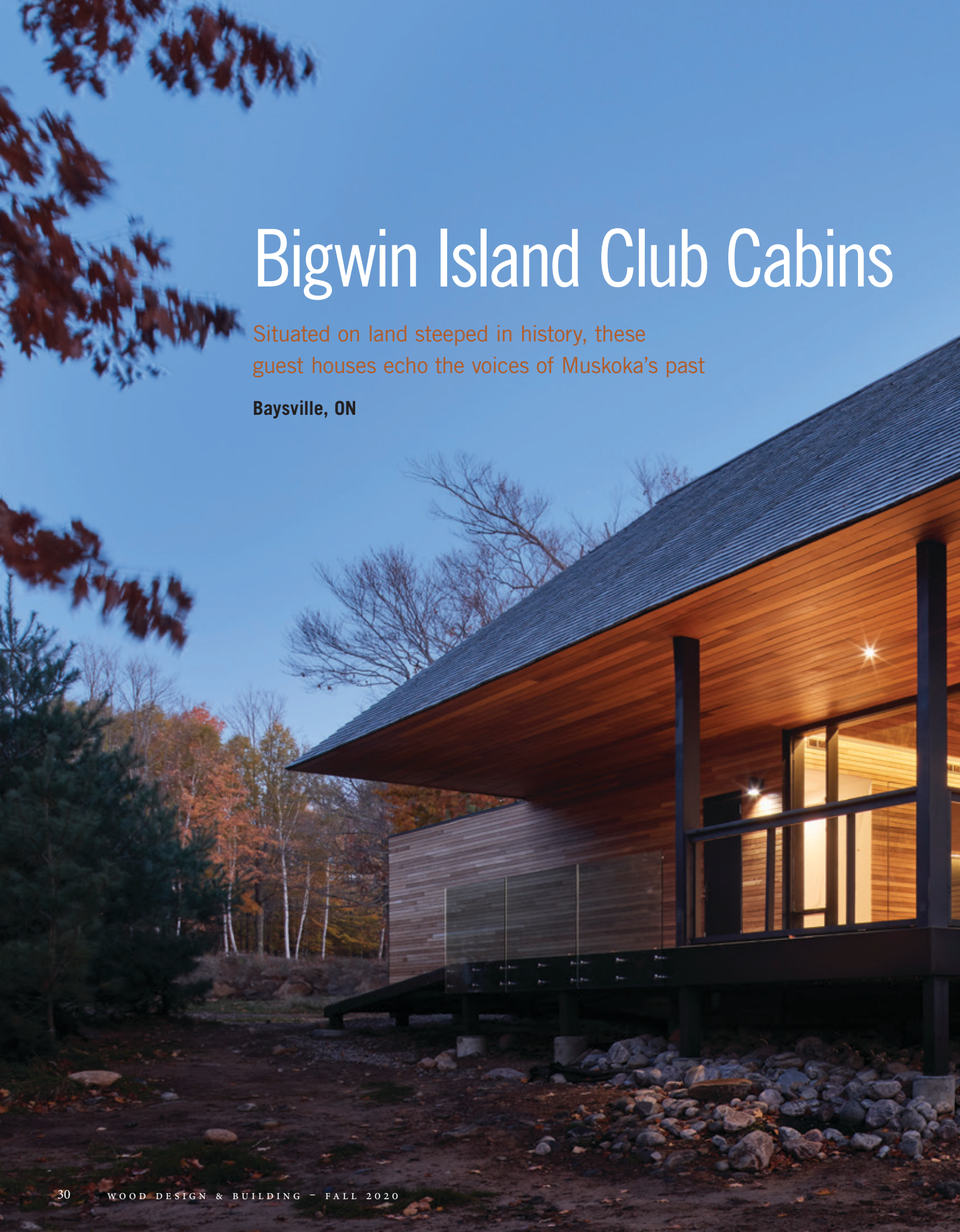
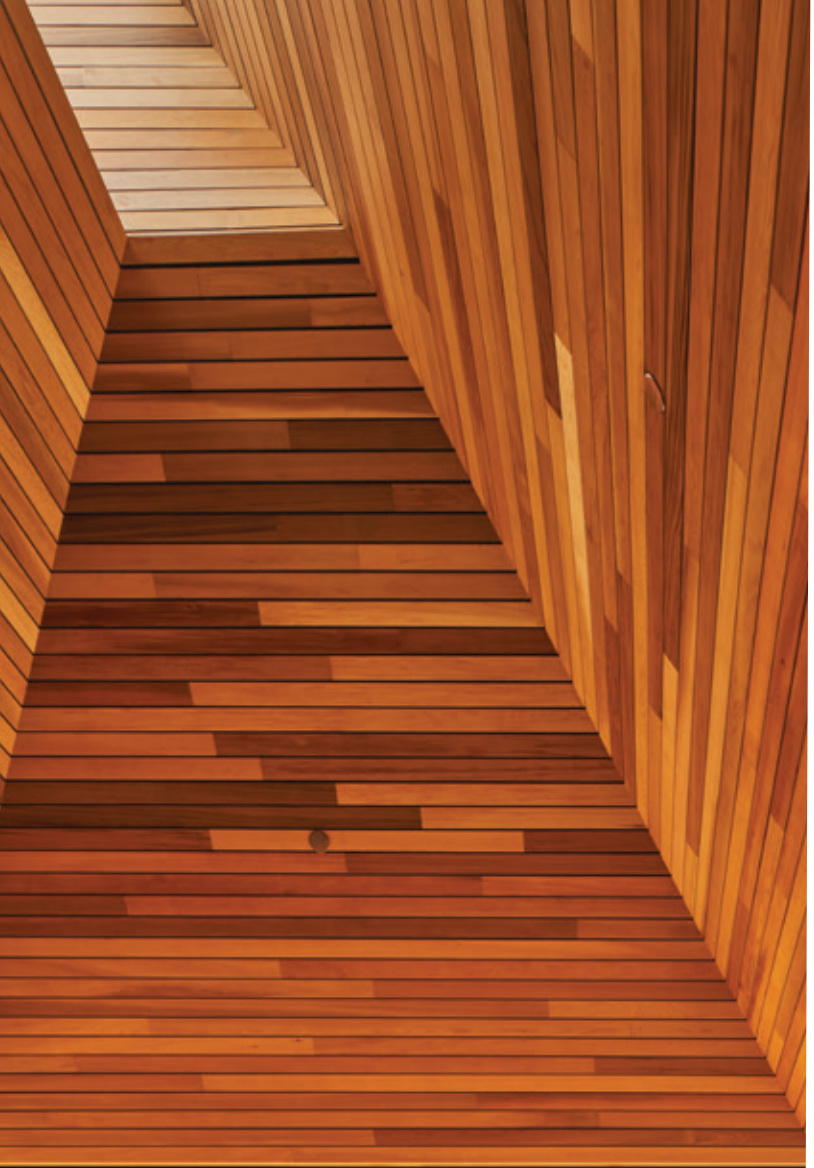
Bigwin Island Club Cabins

Situated on land steeped in history, these guest houses echo the voices of Muskoka's past

Baysville, ON





Designed by MacKay-Lyons Sweetapple Architects, winners of a 2017 Global Award for Sustainable Architecture and many other accolades, this project is inspired by its environment. The design process began by listening to the land – and on Bigwin Island, in Northern Ontario's Lake of Bays, there is a lot to hear. Named after Ojibway Chief John Bigwin, the island is a place of sacred significance for the region's Indigenous population. The first golf course on Bigwin Island was built in 1922, and for decades the island was the site of a glittering luxury resort, the summer home of Canadian industrial titans, Hollywood stars and even the Dutch royal family.

This development is part of a plan for the island's revitalization. The property owner rejected a proposed 150-room hotel in favor of 40 guest houses, ranging from 1,230 to 1,350 sq.ft. each, and launched a design competition for the project, inviting proposals from six Canadian architectural firms. The vision, laid out in the competition's design brief, was a project that would respect the island's history, the environment and the Muskoka region's distinctive architectural aesthetic, while also employing practical construction techniques and maximizing energy efficiency and sustainability.

At once familiar and experimental, respectful and assertive, and durable enough to stand up to the demanding climate of their location while elegantly referencing its heritage and beauty, the Bigwin Island Club Cabins offer a balanced, inventive and sustainable response to a complex architectural challenge. An important principle in practice for both the client and the architect is to touch the land lightly – to minimize disruption of the landscape. According to the firm, the island's deer are the real architects of the project. The cabins' sheltering Muskoka shingled roofs appear to float on the grazing line that the deer have created in the forest, affording views from the center of the island to the lake. This architecture strives to evoke a timeless, archetypal experience of dwelling in the forest.

Crafted from natural materials with a quietly assertive design, the cabins reference the big, sheltering roofs of Muskoka's historic cottages and boathouses, while also evoking the interior of a canoe without veering into kitsch. Each cabin is assembled from a simple kit of parts: a screened-in porch, a deck, a hearth, a great room, a sleeping box and a roof. An extruded box, clad in shiplapped wood, adjoins a glass pavilion holding an open-plan living and dining space, which is topped by a deep hip roof clad with cedar shingles. A geothermal heating system harvests heat from the lake and radiates it from the floors; in summer, a natural, passive ventilation system channels hot air up and away through the peaked roof.

The exterior is understated, and the interior is sensuously dramatic, airy and gracious, with the main living space of the pavilion rising to a peak. Shiplapped wood also lines the interior of the bedbox and hearth, enhancing the seamlessness between indoors and out. The room is naturally lit from above via a periscope window in the gable.

The ambition of this project transcends the individual guest houses. The buildings engage not only with the landscape, but with each other; they are sited in clusters, where their transparency and openness put them in conversational relationships. The spaces between them are small enough to allow neighbors to wave each other over, and some of the cabins encircle meadows ideally sized for cookouts and games.

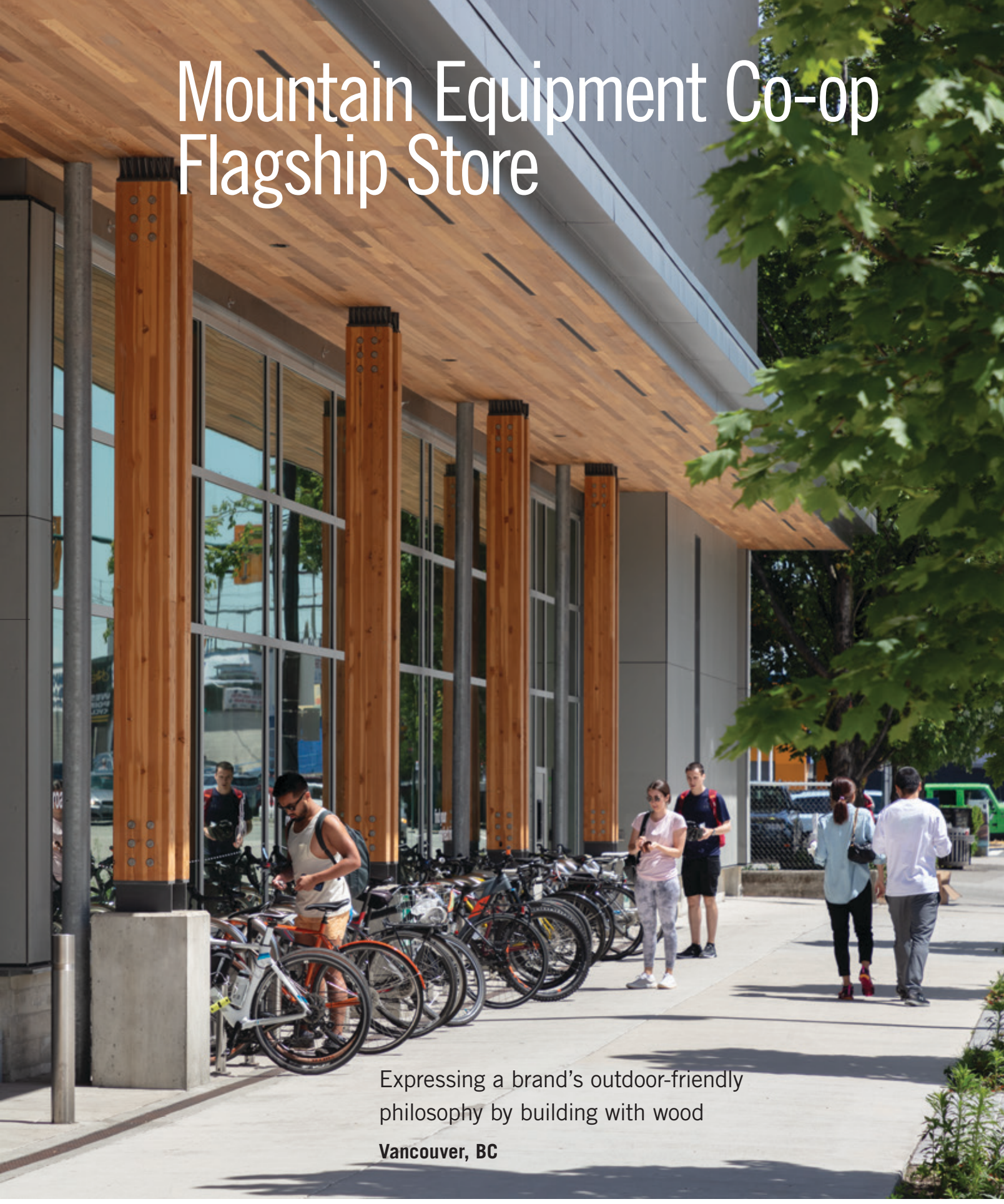
ARCHITECT
MacKay-Lyons Sweetapple Architects Ltd.
Halifax, NS

STRUCTURAL ENGINEER
Blackwell Structural Engineers
Toronto, ON

GENERAL CONTRACTOR
Greystone Construction
Huntsville, ON

PHOTOGRAPHY
Doublespace Photography
Toronto, ON

Mountain Equipment Co-op Flagship Store



Expressing a brand's outdoor-friendly philosophy by building with wood

Vancouver, BC

The Mountain Equipment Co-op (MEC) store in Vancouver, the birthplace of MEC, is the 10th and latest of a family of new locations across Canada completed over the past five years. When the Co-op chose to refresh its brand, integrating a new logo, the company also embarked on the creation of a distinct architecture for its buildings. The new stores adapt regionally while carrying common elements, identifying them as a cohesive expression of the MEC brand.

The latest store was envisioned to be a leader of the family, a flagship store expressing MEC's ideals and its focus on innovation. The three-storey mass timber building designed by Proscenium Architecture & Interiors (with interior retail design by Aedifica Architecture + Design) embodies MEC's signature green building agenda and acts as a gateway marker to the relatively new Olympic Village neighborhood.

The store has been designed to achieve a minimum of LEED Gold certification. A high-performance building that uses almost one-third less energy compared to standards set out by the national energy code, the building envelope provides thermal barriers of R50 and R40 for the roof and walls. Innovative wastewater technologies, such as waterless urinals and grey-water-fed toilets, reduce potable water use by depending on rainwater collected in cisterns, fed from a blue roof surrounded with sloping green roofs. Careful management of the building's stormwater runoff has resulted in a rainwater system designed to support local habitats through water quality, flow rate, volume and duration – contributing factors to the building's Salmon Safe certification. As part of the Olympic Village, the store was required to connect to the False Creek Neighbourhood Energy Utility (NEU), but – unlike most buildings in the area – MEC's efficiencies allow it to sell excess energy back to the system.

From client through consulting and construction teams, the project was conceived as MEC's third mass timber structure; not just for the beauty of wood but for timber's inherent sustainability. As a renewable, regional building material that comes with the added benefit of storing carbon and supporting reuse at the end of its life, wood construction dovetails neatly with MEC values. In the MEC Vancouver store, the wood

structure is fully expressed. Due to tall floor-to-floor heights, the glulam column and beam system emphasizes verticality in the spacious retail interiors as it draws the eye to the seven-ply CLT floor structure. At the heart of the space is a double-height atrium that connects the two retail levels via a feature stair that bridges the opening. Seismic resistance is furnished with raw steel brace frames displayed in series – standout curved forms in a predominantly rectilinear space, which are affectionately referred to by the project team as the Omega Braces. The use of raw steel is a thematic material expression utilized on the store's feature stair, and also at the majority of the new stores across the country.

The site and the zoning policies associated with the Olympic Village neighborhood strongly influenced the building's exterior expression. The junction where it's located is seen as a gateway to the neighborhood, and as such needed a marker that would distinctly identify this intersection. In addition, to add vibrancy to the street edge experience, it became apparent that there needed to be a visual connection between the pedestrian realm and the retail interior. This led to ground-floor transparency where traditionally a large-format store would be more inwardly focusing, eschewing perimeter glazing for wall shelving opportunities. Throughout the neighborhood, lanes are not treated as a traditional back-of-house experience; they are secondary streets and have residential townhomes fronting on them, with high-rise towers over top. The zoning policy also calls for physical midblock connections through the neighborhood, which presented challenges for a single-tenant retail floor.

These constraints essentially meant that all faces of the building, including the roof, would be highly visible; a typical back-of-house loading with a standard flat roof plane was not an option. Instead, ample ground-level glass at the street edge creates a visual connection to the store interior, expressing the mass timber structure. A generous wood soffit/column canopy runs the length of the building, marking the entry and utilizing an architectural language common to new MEC stores. An ombre wall system of bent metal discs creates an image of a B.C. mountain range anchoring the corner.

Where the building meets the sidewalk and integrated bike path, a linear Corten planter abuts the board-form concrete below the glass line; the lane elevation is treated with a system of stepping Corten planters and a vertical climbing screen/vine system. The building siding breaks in line with the neighboring through-block connection, axially aligning a vertical glass slot through the building to visually continue the urban design gesture and providing a dramatic glazed backdrop to the feature stair.

Exterior cladding materials are chosen to tie the building to other MEC stores and applied strategically to break up the massing of the second floor. The third-floor steps back along the south and north sides to create roof decks for the third-floor offices and a break in the street wall. The solid massing of the retail second floor reverts to glazed transparency for the third-floor offices, capped by the overhangs of the sloped wood structure of the roof.

MEC's goal for the building was to design a flagship store that captures the outdoor spirit at the heart of the MEC community. Due to its location adjacent to cycling paths, the running route of the seawall and available kayaking on False Creek, the store benefits from the energetic and active environment literally all around it. The architectural expression, with its sloping green roofs, blurring of the indoor-outdoor experience, tall wood structure and images of the mountains beyond speaks to MEC's outdoorsy spirit and acts as a perfect gateway and addition to the lively neighborhood.

CLIENT
Beedie Group
Vancouver, BC

ARCHITECT
Proscenium Architecture + Interiors
Vancouver, BC

STRUCTURAL CONSULTANT
Fast + Epp
Vancouver, BC

GENERAL CONTRACTOR
Heatherbrae Builders
Richmond, BC

PROJECT MANAGER
Green Building Consulting
Revelstoke, BC

RETAIL DESIGN
Aedifica Architecture + Design
Montreal, QC

PHOTOGRAPHY
Michael Elkan (exterior)
Vancouver, BC
Kori Chan (interior)
Vancouver, BC

PROJECT FACTS

Location
111 East 2nd Ave. (Olympic Village), Vancouver, B.C.

Parking
Three levels of below-grade parking for 148 cars, two class-B loading bays, one class-A loading bay

Bikes
129 stalls

Retail Space
Two levels of retail (43,000 sq.ft.); ground and second floor connected via an interior atrium and feature stair

Office
One level on third floor provides space for MEC store staff and two additional tenants

Building Size
61,679 sq.ft.

Construction
Concrete to grade, topped by three levels of mass timber (glulam columns/beams, CLT floors)

OTHER FEATURES

- Blue roof water retention for grey water system
- Innovative wastewater technologies including waterless urinals and grey water collection for reuse in the building's toilet system
- Connect to NEU but due to high efficiency sells excess energy to NEU
- Heat island effect minimized through extensive green roof implementation
- Exclusive use of low emitting materials for flooring systems, paints and coating, adhesives and sealants
- Provision of daylighting and views for both retail and office occupants
- Water-efficient landscaping strategies
- Electric vehicle charging stations and bike parking provided on site, adjacent to public transportation routes
- Green design targets better than LEED Gold; Salmon Safe designation

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IMAGE: Willow Creek Designs

Fast + Epp Home Office

A living laboratory to demonstrate seismic resilience

Paul Fast, P.Eng., Struct. Eng, P.E., FIStructE, IngKH (Germany)
Tobias Fast, P.Eng., P.E., M.A.Sc.

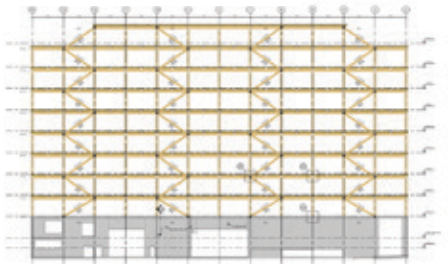
After spending most of its history in a two-storey, custom-built office block in Vancouver, B.C., Fast + Epp's rapid growth over the last few years sparked the decision to seek a new location. In view of the ever-increasing migration of people to the suburbs of Vancouver for lower housing costs, moving the office closer to a rapid transit nexus would ease transportation challenges for the firm's staff, so the company purchased a 12x37-m corner site a short walk from what promises to become one of Vancouver's busiest transportation hubs (where the SkyTrain will connect to the Broadway Subway, which started construction this year).

The Fast + Epp Home Office is scheduled for completion by the end of this year. Along with accommodating up to 80 employees, the building features a dedicated "living laboratory" to enable in-house destructive testing of connectors, 3D printing, prototype and mockup preparation, software development and material sample displays – which are all part of the firm's Concept Lab initiatives that have resulted in products including their Concept app and Timber Bay Design Tool.

With the firm's involvement in high-profile mass timber projects such as the 3-million-sq.ft. Walmart Home Office campus in Bentonville, Arkansas, and 10-storey Arbour at George Brown College in Toronto – along with a desire to push the design envelope on projects – Fast + Epp wanted to "walk the talk" when presented with the challenge of designing its headquarters. Considering Vancouver's location in a notoriously active seismic region, part of the "Ring of Fire," the new building also presented a prime opportunity to showcase and test contemporary hybrid mass timber office construction coupled with state-of-the-art seismic technology.

Advances in Seismic Engineering

The need for robust structural systems to resist a building's inertial forces induced by seismic ground motions has been pushed to the forefront of engineering design and building codes by the widespread damage witnessed in several notable earthquakes of recent history, starting with Northridge, California (1994) and Kobe, Japan (1995).



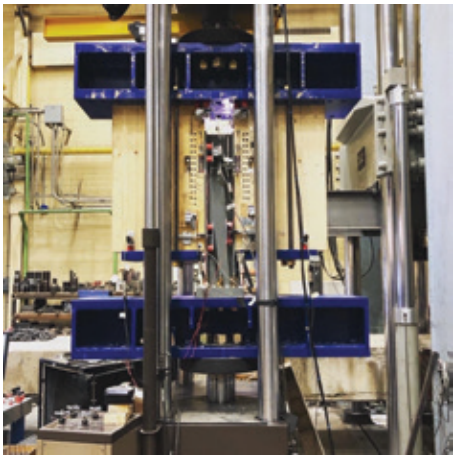
Glulam braced bays at the Fast + Epp headquarters in Vancouver

The devastation to supposedly modern, state-of-the-art structures seen in these quakes intensified the demand for research and development in the field of seismic engineering.

Mass timber applications are included among the engineering advances developed for building in high seismic zones. Timber has an excellent strength-to-weight ratio when compared to traditional construction materials, so its use in lateral force resisting systems is not out of place. CLT provides excellent in-plane shear capacity, making an ideal candidate for shear walls and diaphragms, while glulam sections can be used as beams, columns and diagonals in a braced bay assembly. Fast + Epp has participated in numerous research initiatives to test various mass timber lateral systems including novel energy-dissipating CLT shear wall hold-downs and CLT balloon-frame shear wall detailing. Lessons learned in the lab have resulted in several real-life applications of mass timber lateral systems, including multi-storey structures in both Vancouver and Toronto.

Currently, many buildings are designed with ductile earthquake-resisting lateral elements that experience large and permanent plastic deformation and damage during an extreme event. As demonstrated during the 2011 Christchurch earthquake in New Zealand, many buildings became uninhabitable due to ongoing safety concerns arising from permanent damage. Fortuitously, a presentation by Dr. Pierre Quenneville from the University of Auckland during Fast + Epp's design investigations led the design team to a solution that will be implemented for the first time in North America.

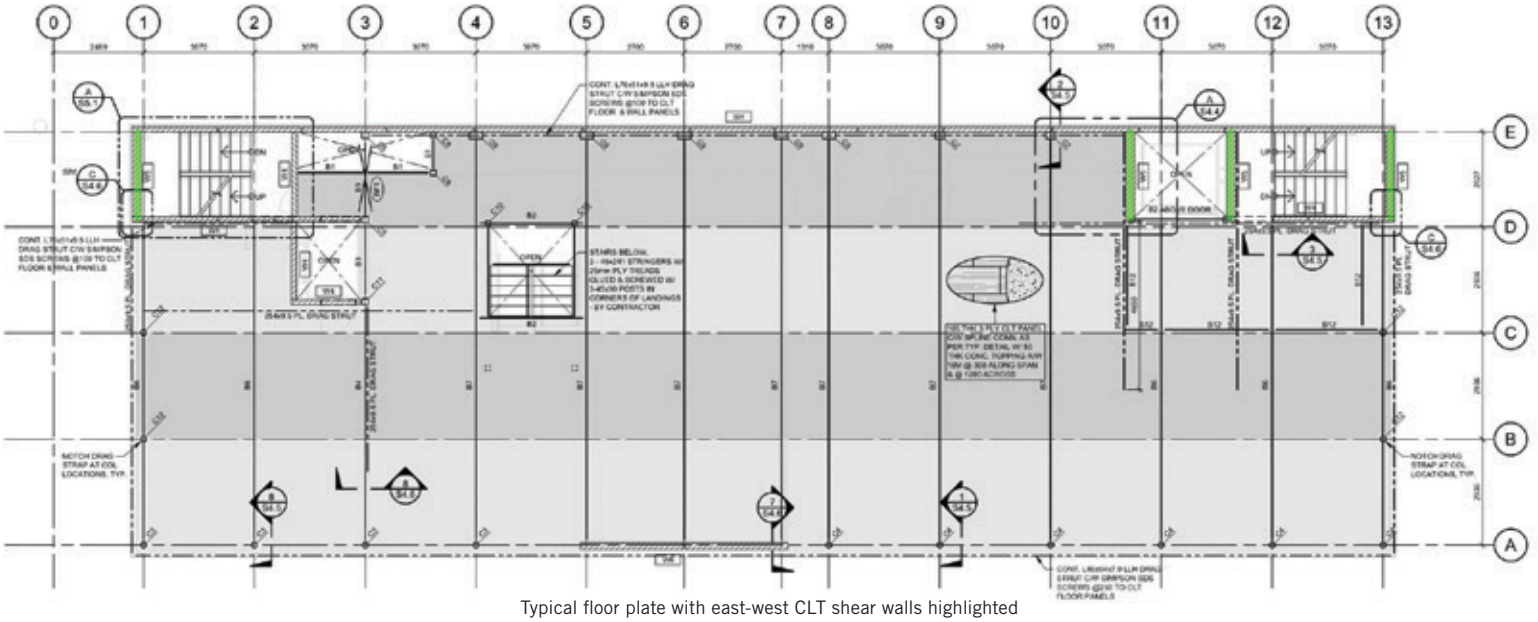
Key to modern seismic design philosophy is the concept of energy dissipation. Acceleration of the ground beneath a building creates a similar acceleration of the building mass above, resulting in lateral forces being imparted to the building's structural system. In high seismic regions, these forces are understandably large and will govern the size and spacing of the primary structural elements; to



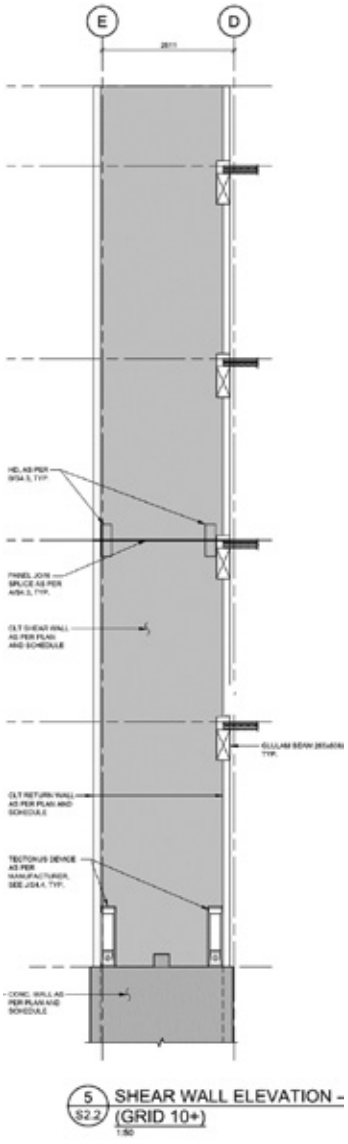
Testing of CLT shear wall connectors

reduce the seismic demand on a structure, a building can be designed to dissipate energy. Typically, this is achieved through yielding of steel elements (rebar yielding within concrete shear walls or steel connector yielding), as the material exhibits exceptional ability to undergo deformation without losing (and in some cases, actually increasing) strength. Steel connectors are often used to provide energy dissipation in timber lateral systems for the same reasons.

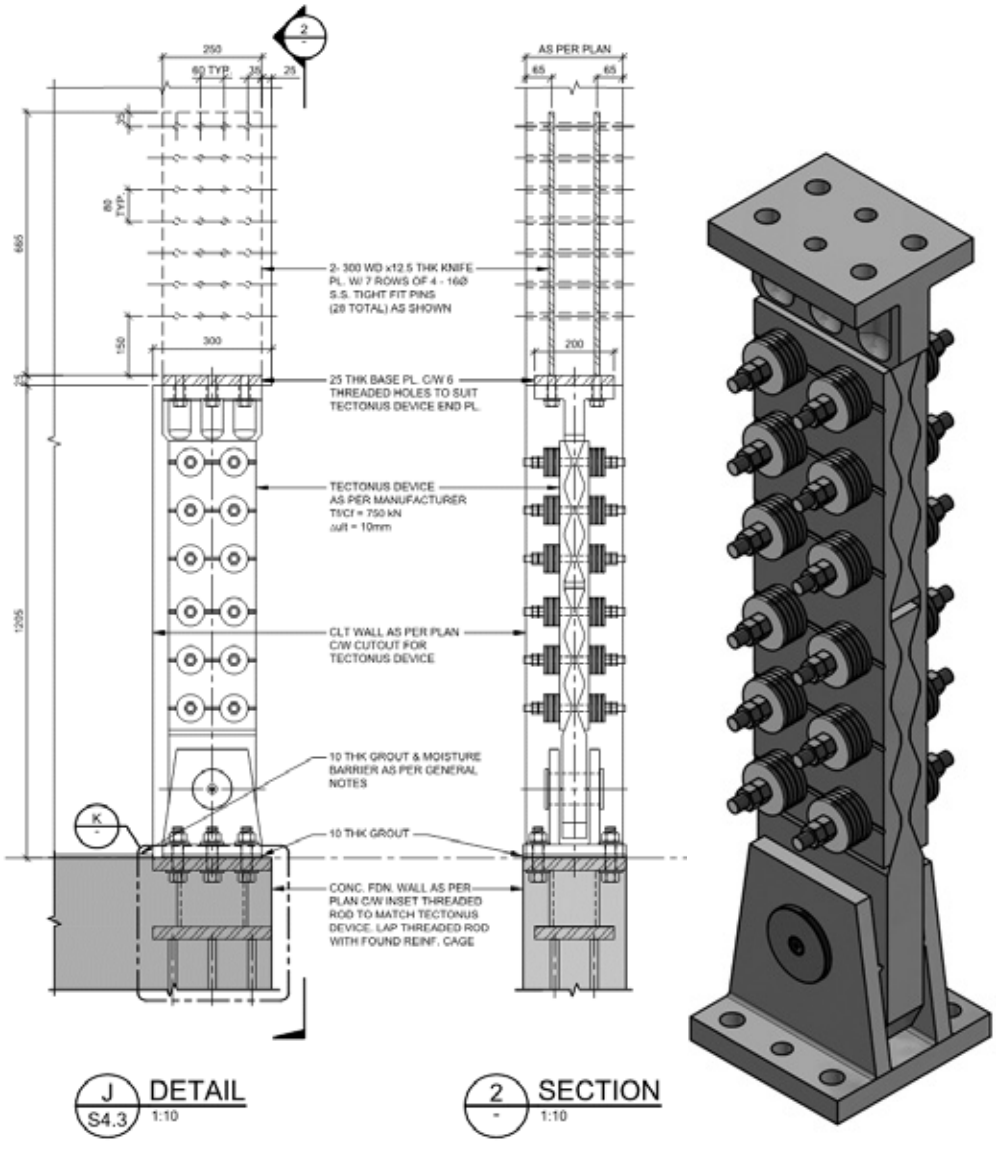
For its first application in North America, Tectonus devices are used at the bases of the building's CLT shear walls. Manufactured in New Zealand, these self-centering,



Typical floor plate with east-west CLT shear walls highlighted



Typical east-west shear wall with Tectonus hold-downs at each end



Typical Tectonus hold-down detail at base of CLT shear walls (left) and 3D view of individual Tectonus device (right)

spring-loaded metal brackets dissipate energy through friction and provide a restoring force to ensure the building has no permanent drift after an earthquake, and providing immediate post-disaster safety of the structure. The device consists of serrated steel side plates which are clamped to a central serrated plate with through-bolts and spring-loaded washers. As the shear wall rocks back and forth under seismic loading, the gapped top and bottom central plates travel through the saw-tooth profile, dissipating seismic energy through friction and compressing concave washers to store up spring energy which provides the restoring force.

Building Design & Construction Process

While having to shoehorn almost 16,150 sq.ft. of permissible area into a tight site was not without significant planning challenges, the design collaboration between Fast + Epp and f2a architecture yielded a four-storey building with generous daylighting at the north, south and west sides, ample balcony space arising from setbacks at the north and south ends of the fourth floor, a two-storey central atrium connecting the third and fourth floors, and a single-storey underground parking level. Given the site constraints and minimal laydown area, it was critical to prefabricate as many structural components as possible to facilitate a short, seamless erection period – one of the primary advantages of mass timber construction.

Many prefabricated timber and hybrid timber-steel panel options were considered for the floor construction, particularly solutions that would integrate and conceal mechanical and electrical components within the prefabricated assembly in a shop-controlled environment. In this instance, however, simplicity won out over complexity, and Fast + Epp elected to use glulam beams clear-spanning 12 m at 3 m spacing, that support CLT floor panels. In the spirit of the building becoming a living

laboratory, Fast + Epp reduced the size of the glulam beams to a 608 mm depth, satisfying safety requirements while pushing the limits on vibration performance. Typically, a disconnect between theoretical and real-life vibration characteristics is found; this was the firm's opportunity to carry out exhaustive testing to better understand these differences. A vibration testing program using accelerometers was established, knowing that there was a Plan B in place in the event performance was unsatisfactory.

The floor panels consist of three-ply CLT panels with a total thickness of 105 mm at levels two, three and four, and 87 mm at the roof. A non-composite 50 mm-thick concrete topping layer and 10 mm-thick acoustic mat is added on top of the CLT. Fire resistance of up to two hours is achieved by reinforcing the concrete topping and relying on the contribution of both CLT and topping. The underside of the CLT panels remains exposed in most of the desk areas, with mechanical ducts, sprinkler lines and electrical conduits strategically located to ensure a clean, tidy ceiling expression.

Tectonus hold-down at Fast + Epp Home Office in Vancouver, BC

At one end, the glulam beams are supported on steel columns. While glulam columns also were contemplated, larger sizes were required to achieve up to a two-hour fire rating at the ground floor; hence, intumescent-coated, round 168 mm-diameter steel columns were preferred. The steel not only lends a lighter feel to the space but also provides contrast to the generous amount of exposed timber surfaces. The opposite ends of the glulam beams are supported on glulam columns connected to a five-ply CLT firewall at the zero-lot line.

Lateral resistance to wind and seismic loading is provided by the 33 m-long CLT firewall in the north-south direction. The shorter east-west direction loading is resisted by a combination of four seven-ply CLT stair and elevator core walls, as well as a single steel brace frame. Due to constraints relating to door openings at the northern stair core, the steel brace is required in lieu of an additional CLT wall.

Tectonus devices waiting to receive the first CLT shear walls

The superstructure installation, which was completed this summer, highlighted the speed and efficiency of this construction typology as the four-storey structure was erected over a period of only four weeks. A single mobile crane and a crew of five carpenters were mobilized to install the mass timber structure on a site that had virtually no lay-down space and limited access, at a busy city intersection. Many building elements were prefabricated to facilitate quick installation: The Tectonus elements were embedded in the CLT shear walls, moisture barriers and insulation were preinstalled on all CLT exterior walls, and service penetrations through glulam beams were CNC-cut in the shop. Additionally, a 3D clash detection model, including all structural and glazing components, was built in Rhino3D to reduce potential site conflicts and facilitate the high level of prefabrication. To simplify construction and reduce costs, an aggressive approach to moisture management was adopted by preapplying a temporary moisture membrane to the roof panels only, with the understanding that the structure would only be exposed to rainy weather for a few short days during sunny summer weather. Some additional sanding and finishing will be required; however, this is often the case for exposed timber buildings.

The building also features electrochromic glass, a glazing technology that enables automatic tinting of windows based on roof-mounted weather sensors, substantially reducing cooling loads during warm summer periods. Each windowpane also can be manually controlled

Exposed floor beams at the CLT west feature wall during construction

via a smartphone, and video imagery can be displayed on the inside face of the glass without obscuring the view from outside.

The Living Lab Takes Shape

A willingness to treat the office headquarters as a workshop for all manner of building science topics has led this project to become a living laboratory. As the number of tests increased throughout the construction of the building, it became apparent that this type of engineering and building science testing could become a much more integrated part of the Fast + Epp business, resulting in the development of the 5,000-sq.ft. Concept Lab space to house research and development related to various aspects of mass timber construction.

For example, floor vibration is a complex issue that deserves close attention in mass timber construction due to the lighter floor build-up. Many variables affect floor vibration, including occupant perception, structural connections, office furniture and partitions, floor build-up and more, making it difficult to gain an accurate understanding of what the true in-situ performance of a system will be. To assess the various factors, Fast + Epp conducted an extensive sensitivity study including using accelerometers to test full-scale mock-ups and in-situ structure during separate construction stages (bare wood floor, wood floor with topping and wood floor with full interiors fit-out).

Preliminary results indicate that the economically designed lightweight floor performs much better once the vibration-mitigating factors are taken into account including actual connection stiffness, concrete topping stiffness and the testing of the system as a whole, rather than just a localized three-bay mock-up assembly. Should there be any localized areas with unacceptable vibration performance following final interior fit-out, tuned mass dampers consisting of steel plates will be installed to mitigate against this.

Acoustic testing will continue to assess the floor assembly, which consists of an exposed CLT soffit, 10 mm acoustic membrane, concrete topping and carpeting. Sensors also are being installed along the western exposure CLT feature wall to test the thermal performance of the building envelope system. In addition to ongoing vibration testing and analysis, the CLT wall structure also will undergo thermal performance testing.

While the process and implementation of new ideas and technologies simulate an experiment, this project fits well within Fast + Epp's culture, values and "fresh thinking" philosophy to push the design envelope.

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Hayward Field, University of Oregon.
SRG Partnership, Architects
Photography © Kevin Scott

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Wood WARE

Basking in *Basswood*

Doctors often prescribe sauna therapy to help patients recover from deep-tissue injuries, arthritis and other body pain; the problem is, many people are allergic to cedar, one of the most common woods used to build saunas.

About a decade ago, SaunaRay answered the call for toxin-free, non-allergenic infrared saunas. Based in Collingwood, Ontario, the company headquarters is a short drive from its wood supply. Each unit is hand-constructed of locally harvested basswood, a non-allergenic wood that's also used to make popsicle sticks and tongue depressors – which is "so soft it cuts like butter," says the company founder, Rodney Palmer. Basswood also grows to maturity in only seven years, so it's easily replenished.

The logs are individually selected, and then milled at the SaunaRay workshop. Standard sauna units are available in several sizes, from small enough for one to "family size" for four people, using high-quality stainless steel and ceramic far infrared heaters. With an emphasis on using all-natural materials, the saunas are assembled without toxic glues, chemicals or plastics of any kind. The wood is hand-finished with Canadian beeswax.

Instead of using steam or hot air to warm the body, an infrared sauna increases the body's core temperature from within. A variety of health benefits are credited to infrared exposure, from weight loss to increased collagen production. SaunaRay has constructed custom "athletic saunas" for hot yoga studios and larger, spa-like installations in residential projects for architects such as Hariri Pontarini; they've also shipped units internationally, including overseas.

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