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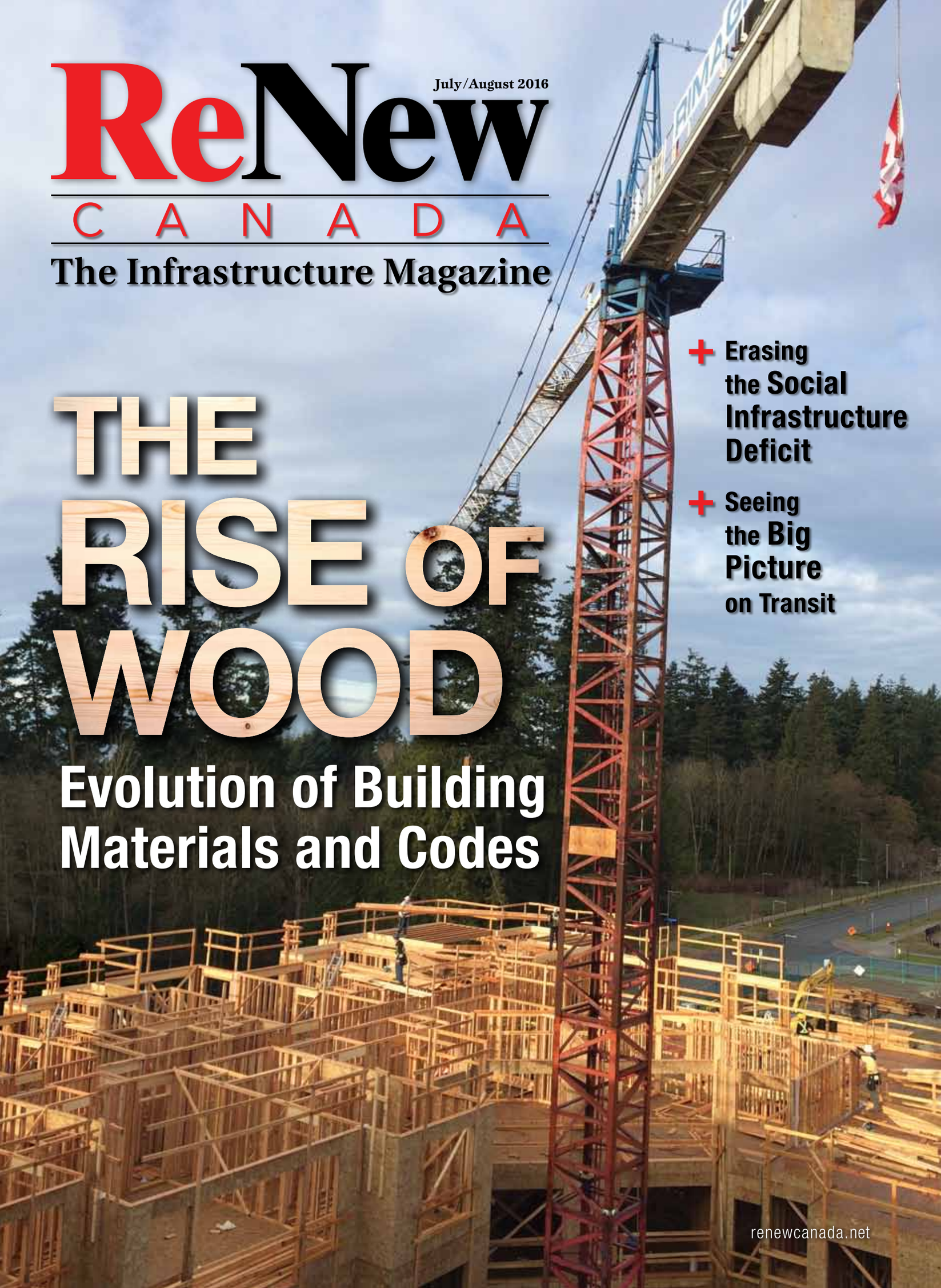

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THE RISE OF WOOD

Evolution of Building Materials and Codes

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All Photos: Quadrangle Architects/Marco VanderMaas

THE RISE OF WOOD

Changes to building codes across Canada have opened the door to mid-rise wood construction projects. In Ontario, builders and designers are taking notice.

By Don Procter

The six-storey residential wood mid-rise—approved under several provincial building codes in recent years—is poised to be a game changer for community planners across Canada, with British Columbia leading the way, industry experts say.

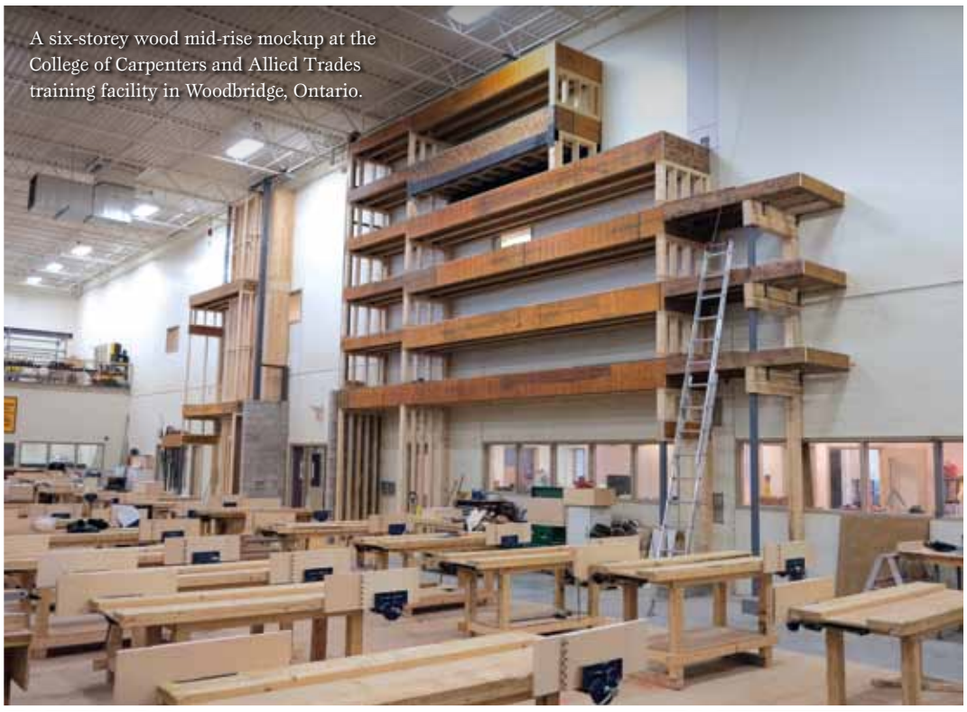
"What I like about these buildings is we can fill in underdeveloped areas with meaningful community-oriented, mixed-use buildings," said Marco VanderMaas, design director of Toronto-based Quadrangle Architects Ltd.

VanderMaas speaks from experience. Quadrangle was one of the pioneers in the development of the "stacked townhouse" (one unit built on top of another) that came to the fore in the 1990s. The approach revolutionized suburban community building and intensification, and architects like VanderMaas see wood mid-rises as a further evolution of that trend.

While tall concrete and steel residential towers are often suitable to high-density downtown neighborhoods, planners see the six-storey wood mid-rise as "a good fit" in lower-scale neighborhoods, says Steven Street, technical manager, Ontario WoodWORKS program, which supports the new building form.

The proof is in B.C. where more than 200 mid-rise wood projects have been built or are under construction since building code changes in 2009. "They are high enough to get the density you want, but they are also low enough for the sun to come into the street. They give you a community feel," explains Street.

(Left and Bottom-right) A community of wood-constructed multiunit residential complexes within Vancouver's Westbrook Village at the University of British Columbia.



A six-storey wood mid-rise mockup at the College of Carpenters and Allied Trades training facility in Woodbridge, Ontario.

Carbon storage in a box

The wood mid-rise also meets sustainable building design practices. A renewable resource, the wood used in buildings stores or sequesters carbon for at least the life of the building, and potentially beyond is properly recycled.

Ontario WoodWORKS recently organized a tour of B.C. projects and an engineered wood manufacturing plant for Ontario builders and designers. Mid-rise wood construction was approved under Ontario's Building Code in 2015.

Among those on the B.C. tour was Durval Terciera, a representative of Carpenters District Council of Ontario (CDCO) and of Carpenters Loc. 1030 (residential framing carpenters). He calls the tour, which is held annually, a "learning ground" for carpenters, builders and project owners.

"I think every single developer in Ontario that wants to get into this (mid-rise wood) field should go to B.C. and look at what they are doing," he says.

Terciera said even experienced framers need training because the materials and methods of assembly are different from two- to four-storey wood frame construction.

"We have a collective agreement for mid-rise wood and we are meeting with some developers in the industry." Members of Carpenters Loc. 1030 are helping erect a wood mid-rise in Grimsby, Ont.

Not your average wood structure

Unlike lowrises, such as detached and semi-detached homes and townhouses, wood six-storey projects require additional wood framing members and lateral bracing, which results in tighter cavity walls that provide less space for insulation. To meet energy-efficiency requirements builders on the West Coast had to rethink the way they build wood frame residential—often turning to exterior insulation or deeper 2-by-8 wall systems for the solution.

The six-storey mid-rise has other construction details atypical of lowrise wood construction as well. "You have six storeys of deadload to support, so the fastening requirements—even the temporary requirements—have to be more stringent," explains Bruce Cameron, director of business development of Ball Construction based in

Credit: Quadrangle Architects/Andrew Foote

Marco VanderMaas of Quandrangle Architects walks the floor of the College of Carpenters and Allied Trades training facility in Woodbridge, Ontario.

Kitchener-Waterloo. "Almost anyone can frame a two or three-storey townhouse but the sophistication of the framing in a six-storey building is much higher."

To educate and train carpenters and consultants in best practices, Carpenters Loc. 27's College of Carpenters and Allied Trades (CCAT) in Vaughan, Ont., has invested in a six-storey wood mockup or training module which even includes a wood elevator shaft.

Quadrangle Architects and MSE structural engineers designed the mockup, which is based on a prototype of a panelized wood apartment building the firms had designed a few years ago in anticipation of the Ontario building code change, says VanderMaas. "At first we thought we would do one or two floors but Tony Currie (program director, CCAT) said by making it a full six storeys the apprentices could connect with what they were working on as being a real building."

The architect adds that the mockup can also be used by other industry trades and consultants to develop best practices "that will be unique to Ontario." The design and installation of the building envelope is a case in point. "It is definitely a more sophisticated way of building. You have to follow drawings more closely so the interaction between trades and professionals is important."

Buildings worth mocking

At Quadrangle, architects encourage clients and builders to do mockups to resolve issues and make improvements prior to actual construction, said VanderMaas.

CLT and mass timber doesn't stop at six-storey buildings. A 14-storey woodrise has been built in Quebec, and in Vancouver, an 18-storey building is underway

Terciera says every foreman on a wood mid-rise site should at the very least have training on the mockup. "You have to understand how to build it beforehand. You can't expect to learn on site."

Mid-rise wood framing is being incorporated into the curriculum for intermediate level apprentices at CCAT. But education on wood mid-rise doesn't stop at carpenter apprentices, says Mike Yorke, president, Carpenters Loc. 27. "We want to bring architects, engineers, suppliers (manufacturers) and city building inspectors here to show them how all of the components go together to make a proper installation. It gives a comfort level to the buyers of construction that this type of project can be undertaken in a safe, productive and efficient manner."

Yorke says the new industry "opens a lot of doors" to Canadian wood manufacturers to produce more "high-end manufacturing, whether it is CLT (cross-laminated timber), wood laminations or high-end joinery."

Six is a floor, not a ceiling

The use of CLT and mass timber doesn't stop at six-storey buildings. A 14-storey woodrise has been built in Quebec, and in Vancouver, an 18-storey building is underway.

Yorke points out that while builders in Ontario have shown a strong interest in the new building type, they need reassurance that the trades are capable of building it.

Ball Construction's Cameron says he wasn't aware of the mockup, but he sees its merit. "You can go and watch (how-to) videos, but there is no replacement for actually seeing something real."

Executives at Ball Construction see the wood mid-rise in the builder's future. Cameron says because wood is not as temperature sensitive as concrete, it is suited to construction in winter. "Northern Ontario might be a strong opportunity," he says.

The fact is, economies of scale work against concrete construction for mid-rise buildings. And while steel is less expensive than concrete, it requires more trades than wood construction and materials are less accessible than wood, says WoodWORKS' Street.

Street adds one further reason wood mid-rise construction is gaining hold in Ontario: The province has a pool of carpenters and other skilled workers readily available to build them.

Will it catch on in Ontario like it has in B.C.? "I really see big growth in Ontario," says Terciera. "It will be more affordable to buy a unit because it is faster to build and more economical to build than concrete (or steel)."

From VanderMaas's perspective, building code changes created an opportunity to bring diversity and mixed use to more communities. Based on acceptance so far, he predicts that in five years wood mid-rise construction will become a standard way of building.

Don Procter is a writer with Carpenters Loc. 27.