



CANADIAN FOREST SERVICE

SPOTLIGHT

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Pushing the Heights of Building With Wood

The *National Building Code of Canada* (NBCC) currently restricts the widespread use of wood in buildings greater than four storeys. This has generally limited the use of wood in taller buildings in Canada.

Over the past few years, however, a number of innovative wood-based products and structural solutions have been developed and are now available for use in building construction. Linking scientific advances with technical expertise, these innovative products and solutions are helping to showcase the application, practicality and environmental benefits of using wood in various categories of building construction, including larger and taller wood buildings.

Facilitating the Use of Wood in Mid-rise Construction

The federal government is committed to improving the competitiveness of Canada's forest sector. Since 2007, it has supported the research and development of new wood-based products and structural solutions by making strategic investments in various programs aimed at fostering innovation in the sector. This research has been led by FPInnovations, Canada's national forest research institute.

This research has enabled the government to collaborate with the National Research Council (NRC), the Canadian Wood Council (CWC) and FPInnovations on a project focused on developing the technical information needed to support proposed changes to the NBCC because the NBCC currently restricts the height of wood frame construction to four storeys. This collaborative project involved evaluating fire, acoustics and building envelope performance of various wood-based building assemblies and systems, including conducting a series of tests of wood multi-storey buildings to evaluate their fire performance.

Proposed mid-rise amendments are likely to be reflected in the 2015 edition of the NBCC. In addition, technical information developed under this collaborative project has been used to support similar mid-rise amendments in provincial building codes.

Did You Know?

The Government of Canada continues to work with scientific experts and regulatory agencies on proposed amendments to the NBCC that will allow for the construction of mid-rise wood buildings across Canada. However, this is something that is already allowed in the provinces of British Columbia and Quebec and will soon also be permitted in Ontario. Combined, these three provinces represent the largest construction markets in Canada.

In 2009, the Government of British Columbia became the first Canadian jurisdiction to allow the construction of mid-rise residential wood structures of up to six storeys after it amended its provincial building code. The valuable knowledge and experience it gained through this process is being shared with the provinces of Ontario and Quebec, as well as the working groups discussing the proposed amendments to the NBCC.

More recently, following the announcement of its wood charter in the spring of 2013, Quebec became the second province in Canada to allow the construction of wood buildings of up to six storeys. The charter facilitates the increased use of wood in mid-rise construction within the province while the Quebec government works on officially amending its building code, something expected to be completed early in 2015.

In late September 2014, Ontario announced that it too would be amending its own building code to allow for the construction of wood buildings of up to six storeys in the province. These amendments are expected to be in effect by January 2015.

Finally, even the City of Calgary is embracing the mid-rise wood construction segment. On October 29, 2014, it announced it would begin to accept building permit applications for up to six-storey wood-frame structures using the alternative solutions process of the NBCC. This would allow builders to meet the minimum requirements of the *Alberta Building Code* until future amendments are made to the province's building code.

Funded by Natural Resources Canada's (NRCan's) *Expanding Market Opportunities* (EMO) program, this research project was conducted in partnership with the governments of British Columbia, Quebec and Ontario. Ultimately, research findings will help Canadian architects, engineers and builders design and build wood structures of up to six storeys in various occupancy categories (i.e. residential, commercial, mixed, light industrial).

Even Taller Wood Buildings?

Based on preliminary market and scientific analyses, there appears to be a market opportunity and appetite in the construction industry to use wood in buildings greater than 10 storeys, often referred to as tall wood buildings.

In addition, the prefabrication and ease of assembly of building components made with wood, coupled with wood's cost-effectiveness and environmental attributes, makes it well-suited for use in even bigger and taller buildings. This directly supports broader efforts by provincial and municipal governments to mitigate urban sprawl by encouraging developers to construct taller and denser buildings on undeveloped land.

Against this backdrop, NRCan collaborated with the CWC in the spring of 2013 to explore if stakeholders in the Canadian wood industry had an interest and a capacity to build wood buildings of 10 storeys or more. To test the use of wood in larger and taller wood buildings, and in keeping with this broad intent, NRCan launched a *Tall Wood Building Demonstration Initiative*.

The initiative, funded under the EMO program, builds on the success of the *Large-Scale Wood Demonstration* program delivered by NRCan between 2009 and 2011. Its goal is to help foster the commercial uptake of tall wood construction in Canada.



Design concept of a tall wood building (courtesy of CEI Architecture)

As a first step, the CWC launched a formal expression of interest (EOI) process, on behalf of NRCan, on May 6, 2013. The EOI identified Canadian real estate developers, designers and other organizations that were interested in designing and constructing wood buildings of 10 storeys or more. The constructed buildings would in turn help showcase the commercial viability of using innovative wood building solutions in high-rise construction, including new composite or hybrid construction methods.

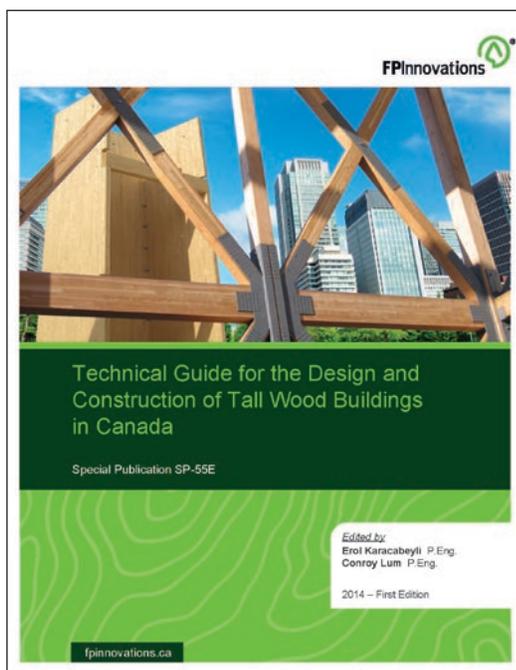
Eight proposals were received through the EOI process. They were ranked by a review panel comprised of practicing architects and engineers, forestry executives, and research professionals from across Canada. Three of the submitted proposals were shortlisted by the panel, and negotiations are currently underway with the proponents of these projects.

NRCan will invest a total of \$5 million to support these three proposed projects. The Binational Softwood Lumber Council is investing an additional \$1 million, while the provinces of British Columbia and Quebec will provide additional funding to the shortlisted projects in their respective provincial boundaries.

Technical Guide

In support of this initiative, NRCan's EMO program also provided funding to FPInnovations to develop the world's first technical guide on tall wood buildings. A tall wood building is defined as one whose height is significantly beyond the current limits of the NBCC and what was previously permitted with traditional sawn timber. The guide will help developers and other stakeholders design and construct tall wood buildings.

Developed in partnership with a group of more than 80 experts, the guide is designed to assist experienced design and construction teams to gain a better understanding of the unique elements and challenges that need to be taken into account when building high-rise wood structures in Canada.



Coupled with new or emerging scientific knowledge of wood-based building systems, it is hoped that it will form the basis of future revisions to the NBCC to allow for the construction of taller wood buildings across Canada.