THE NEW WOOD MID-RISE OPPORTUNITY

Facts about the safety and sustainability of building with wood

Over the course of the coming year, changes will be recommended around the way Canadian homes and businesses are constructed. Panels of experts have spent countless hours over the last five years reviewing the hundreds of chapters and pages which make up the National Building Code of Canada (NBCC). Through the lengthy review process, professionals representing a wide range of sectors have provided input that will form the basis of changes in the next version of the Code. One change that many in the building industry are keenly anticipating is the modernization of the Code to go beyond four storeys to allow **up to six-storey wood-frame and massive timber mid-rise building construction**[1].

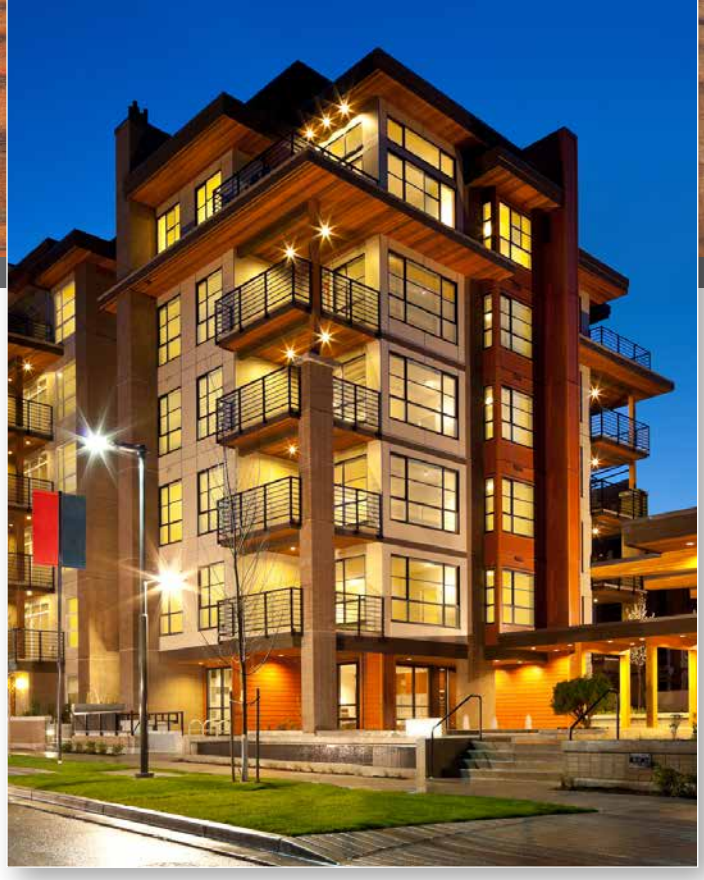
The recommended shift to higher wood mid-rise construction is based on a number of important factors. These include:

- better recognition of the design properties of wood products;
- improvements in wood-based building science and use of sprinkler systems;
- the need for lower cost, building-code-compliant construction options, leading to increased home affordability; and
- the fact that wood is a renewable product that will reduce the environmental impact of buildings.

The National Building Code of Canada: Continually reviewing and improving building safety for Canadians

Direction and oversight of the development of the National Building Code of Canada is provided by the Canadian Commission on Building and Fire Codes (CCBFC), an independent committee of volunteers who represent a broad group of stakeholders and technical experts, including building materials experts, established by the National Research Council of Canada.

[1]While some provincial and regional jurisdictions in Canada have already approved an increase to six-storey wood construction, the NBCC has not yet been modernized to incorporate this change.



The Sail Building, Wesbrook, University of British Columbia, Vancouver, B.C. Photo: Raef Grohne, used by permission of Adera Development Corporation

Wood: Safe. Strong. Sophisticated.

Updating the National Building Code to allow up to six-storey light wood-frame construction will lead to…

- **Safe, building-code-compliant homes and commercial spaces**
- **Increased construction choices and opportunity for innovative design**
- **Increased affordability**
- **Reduced environmental impact**

The commission recommends improvements based on their independent, consensus-based, and rigorous review of the facts. No change to the National Building Code of Canada gets made unless the Commission is satisfied the health and safety of Canadians is protected.

Canadian Wood Council / Conseil canadien du bois

Making good choices – wood is a favoured construction material

Building with wood in Canada is a tradition as old as the country itself. In fact, when Canada came into being on July 1, 1867, the de Gannes-Cosby house in Annapolis Royal, Nova Scotia, had already been standing for 159 years. Built entirely of wood in 1708, the house, which is in the Canadian Register of Historic Places, is a testament to the strength and durability of wood as a building material.

As with many aspects of our daily lives over the years, good planning and advancements in technology have enhanced wood's innumerable advantages. Whether as a stand-alone product for use in construction or as part of an engineered product, wood is being re-discovered by architects, engineers and builders for its structural and aesthetic attributes. This re-discovery has led over the past 10 years to a renaissance for wood products and, more importantly, resulted in new construction options for **five- and six-storey wood mid-rise buildings that can cost up to 15% less to build** than comparable buildings made of alternative materials. Lower costs mean significant savings can be passed on to Canadians making a new home purchase or using the space for commercial purposes.

Important as lower cost may be, an increasing area of concern for both consumers and developers lies in the desire to respect key principles of sustainability. **One of wood's greatest advantages is its inherent renewability**. Wood is the only major building material that grows naturally and is capable of being regenerated in a human-life time frame. In addition, this country now boasts an enviable record with regard to forest use. Canada has more certified forest area than any other country in the world, and our forest management practices – including laws which ensure harvested areas are promptly regenerated – means that our rate of deforestation is virtually zero.

Why Build With Wood?

"Allowing for six-storey wood-frame construction will help unlock the immense potential in neighbourhoods that have underutilized land on major avenues and corridors."

Bryan Tuckey, President and CEO, BILD Toronto

"Building mid-rise housing becomes more expensive when you go above four storeys because you [currently] have to use materials like concrete and steel."

Leith Moore, President, Ontario Home Builders' Association and Vice President, Development, Sorbara Development Group

"We saved 12% on construction costs of $40 million. That's not pocket change, it's $4.8 million."

Dana Westermark, of Oris Development Corp., developer of the Remy Project, a six-storey wood-frame development in Richmond, B.C.

Library Square, Kamloops, B.C.
Photo used by permission of naturally:wood

Earth Science Building, University of British Columbia, Vancouver, B.C.
Photo: Werner Hofstätter, used by permission of WoodWORKS! BC

Wood construction and fire – new, even safer design standards

The Model National Building Code of Canada requires all buildings to perform to the same level of health and safety, regardless of the material used in construction. This means that **wood mid-rise buildings must meet the same NBCC objectives and functional requirements as buildings constructed of any other structural material**, including steel, concrete, or new composite materials.

In the case of mid-rise buildings, several proposed changes to the National Building Code are designed to further reduce the risks posed by fire. These include:

- increased use of automatic sprinklers in concealed areas in residential buildings;
- increased use of sprinklers on balconies;
- greater water supply for firefighting purposes;
- non-combustible exterior cladding of 5th and 6th floors; and
- 25% of the exterior perimeter of the building must face a street or streets.

Wood building systems (floors, walls and roofs constructed of lumber and/or engineered wood elements) must be designed to perform well under fire conditions, meeting or exceeding NBCC fire resistance (ratings) requirements. To this end, for over 50 years, the Canadian wood products industry has participated in and supported various codes, standards and research activities involving fire safety and education in partnership with national and international codes and standards, and research organizations.

All of the valuable lessons learned from the industry's ongoing contributions to fire safety study are brought to bear on successive wood product developments and wood building designs.

The majority of safety measures help protect completed buildings, but all buildings are at risk during the construction phase, no matter the material used. Therefore all construction material sectors have a role to play in working with the building industry to continually improve the safety of buildings under construction. For example, the Canadian Wood Council has developed province-specific technical notes for builders and designers on fire safety and security for construction sites, to reinforce the importance of compliance with regulations. As well, the 2015 Model Fire Code will have specific changes focused on five- and six-storey wood mid-rise buildings including the requirement for fencing to prevent unauthorized access, control of combustible material storage and ignition sources, 24-hour site supervision and ensuring adequate water supply for firefighters.

Once completed, code-conforming wood mid-rise multi-family buildings meet the health and safety objectives of the Code, including those related to fire safety.

Installing water pipes in the Wood Innovation and Design Centre, in Prince George, B.C. A new report has found that the fire safety of buildings is directly related to fire safety systems, such as sprinklers, rather than the materials used in construction. Photo used by permission of naturally:wood

The Facts About Fire in Residential Construction in B.C.

The February 2014 report *"Fire Outcomes in Residential Fires by General Construction Type,"* (Garis & Clare) released by the University of the Fraser Valley (UFV) in British Columbia, shows that the **fire safety of buildings has more to do with effective fire safety systems, such as working smoke alarms and complete automatic sprinkler protection, than with their construction materials**. This challenges the general belief that completed buildings built predominantly with steel or concrete are significantly safer in a fire than those with built predominantly with wood.

"The report doesn't favour one building type over another – if anything, it shows the value of sprinklers and smoke alarms in protecting lives and property in all types of buildings," says Len Garis, City of Surrey, B.C. Fire Chief and University of Fraser Valley adjunct professor.

Canada's evolution towards building taller with wood

While the CCBFC finalizes its deliberations on the proposed adoption of up to six-storey wood-frame construction in the National Building Code of Canada, it will be, in this instance, playing catch-up with some jurisdictions which are already convinced of the viability of mid-rise construction. Taller wood mid-rise buildings are a proven success in Canada, and are increasingly seen as a desirable commodity in countries around the world.

The province of British Columbia has led the move to mid-rise construction, incorporating changes to the B.C. Building Code in 2009. To date, **more than 250 five- or six-storey wood buildings have been completed or are currently being designed or under construction in the province**, but B.C. is not alone. The province of Quebec in 2013 adopted its Charte du Bois which includes the new opportunity for five- and six-storey wood mid-rise buildings in its building code.

There are many factors which have led to the formulation of such policies. In virtually all regions of the country, **wood can be locally sourced, and is typically more economical to install** – just two factors which lead to its lower cost. Beyond this, building with wood can take place year-round, in almost any climate. Contractors who are experienced in working with wood are readily available and wood's design flexibility makes it suitable for a wide range of building types and applications – both structurally and aesthetically.

Wood and the future of building – meeting the 2030 Challenge

Architects in North America are among the greatest champions of greenhouse gas (GHG) reduction goals, and many are actively innovating and incorporating green building strategies as part of a commitment to meet Architecture 2030's global "2030 Challenge" – whereby new building designs are challenged to be carbon-neutral.

This means architects and other like-minded professionals across the spectrum of the construction sector are seeking materials and advanced building systems which provide the greatest possible 'green' advantages. Many of those professionals see the increased use of wood to be one of the most important options in achieving Challenge goals, thanks to technical work which has been done, effectively quantifying the positive benefits which wood represents. Architecture Canada, which represents over 4,500 members, has endorsed this North American initiative.

A National Building Code recommendation to permit five- and six-storey mid-rise buildings would provide architects and others with expanded choice, in terms of materials and building systems. It also creates new opportunities for developers to deliver projects that best suit their green vision and designs.

Reduced Impact

Recognized through Life Cycle Assessment (LCA) studies, wood products have less embodied energy, are responsible for lower air and water pollution, and have a lighter carbon footprint than other commonly used building materials.

While forest certification addresses forest management practices and the balance of environmental, social and economic values, Environmental Product Declarations (EPDs) communicate environmental impact information.

Responsibly-managed forests can maximize the amount of carbon stored over the long term, and manufacturing wood into products requires far less energy than other materials. In turn, wood buildings can require less energy to construct and operate over time. Design optimization, use of recovered wood and specifying that job site waste is separated and taken to a local recovery centre are all ways to reduce, re-use and recycle. **www.rethinkwood.com**

As our understanding of the benefits of building with wood continue to grow, the rationale for allowing wood mid-rise construction across the country is clear. The recommended changes to the 2015 National Building Code of Canada reflect new advances in wood science, engineering, and building technology. Requirements around fire safety and structural strength – as well as resistance to earthquakes and wind – have all been addressed by relevant committees of the Canadian Commission on Building and Fire Codes.

After years of study by technical professionals and building material experts, and with support from research organizations such as the National Research Council and FPInnovations, the ability to enjoy the many advantages of wood mid-rise construction should be extended to all Canadians.