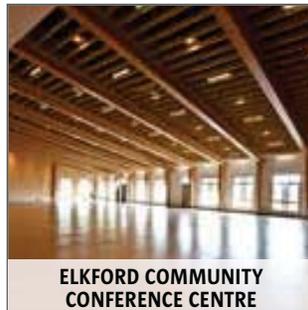


# 21<sup>st</sup> Century Wood Design, Building and Construction Solutions

## A primer for contractors and builders

A new generation of wood building products, systems and techniques has come of age, making bigger, taller and more complex wood buildings possible.



## Letter from the Executive Director



*Lynn Embury-Williams,  
Executive Director,  
Wood WORKS! BC*

A new generation of wood building products, systems and techniques are being used in increasing numbers and types of buildings. Whether a modified post-and-beam technique based on engineered wood products, mass timber construction, or a modified light-frame system using traditional wood products, we are seeing great possibilities for wood using both standard dimension lumber as well as mass timber panels and other engineered wood products and systems. Advanced technology and modern building codes are also expanding the use and opportunities for wood in construction.

These solutions are being embraced by building and design professionals, demanding an increasing level of product expertise and knowledge. Wood *WORKS!* BC is your resource, and can connect you with construction professionals, manufacturers and others who will help you build with wood for tomorrow.

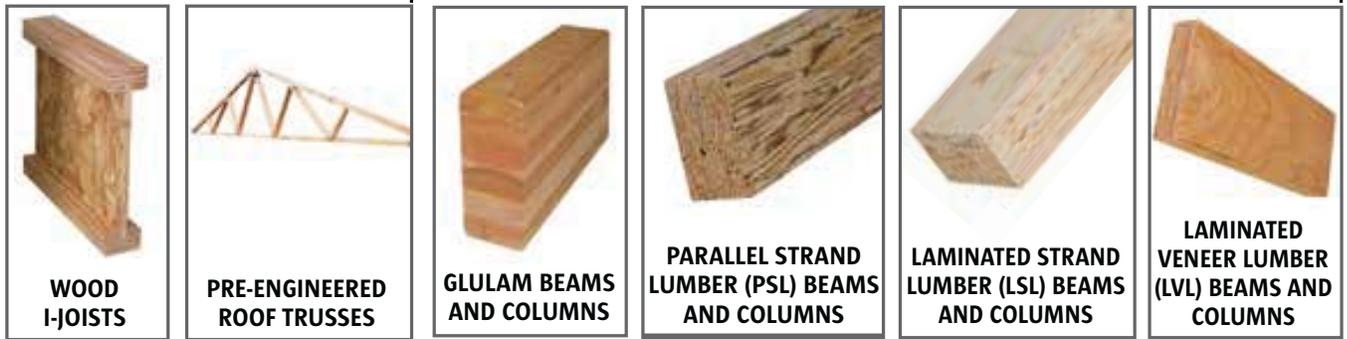


## Engineered wood products

Engineered wood products include wood I-joists, pre-engineered roof trusses, glulam, parallel strand lumber, laminated strand lumber and laminated veneer lumber. These products can be found in both residential mid-rise construction as well as commercial projects, and are being used in new and innovative ways as part of mass timber panel systems.

### TRADITIONAL EWPs

### BEAMS AND COLUMNS



### MASS TIMBER PANEL SYSTEMS

Mass timber panel systems are very large and complete wall, floor, core and roof sections made from either traditional wood products or engineered wood products and are used in a variety of building types and sizes. They offer significant benefits in terms of fire, acoustic, seismic and structural performance, scale possibilities, rigidity, stability and construction efficiency.



Building codes require all building systems to perform to the same level of safety, regardless of the material used in construction. Wood meets and in some cases exceeds code requirements.

## Mid-rise construction – surging in BC

Modern six-storey light-frame wood construction incorporates highly-detailed, researched and safe construction solutions. Since the BC Building Code was revised in 2009, permitting six-storey light-frame wood residential construction, developers, contractors and builders have seen a surge in this type of construction activity. There are now more than 150 projects in various stages of planning, construction and finishing in BC. Changes to the 2015 National Building Code of Canada are expected to be adopted, which will permit mid-rise construction in Canada, bringing the code more closely in line with those of other international jurisdictions, such as California, Washington and Oregon, which have permitted similar opportunities for developers for more than a decade.

Mid-rise building solutions currently being developed and refined in BC can help create more sustainable communities and affordable housing solutions that will positively change the face of our cities. With concrete and steel structures predominating in our urban centres for most of the 20th century, it is easy to forget that wood was once the material of choice for mid-rise construction. In the historic cores of our cities, heavy timber post-and-beam office and warehouse buildings, some more than 100 years old, still stand as testimony to the durability and strength of wood, and connect us with the story of our province.



## What kind of changes are we seeing with light-frame wood construction?



Light-frame wood construction has long been a mainstay of the construction and design industries for small commercial and residential buildings. Now, new materials, innovative engineering solutions and off-site prefabrication have substantially increased the quality and sophistication of light-frame wood construction, adding strength, accuracy and precision to the list of benefits. For the most part, these changes have been unobtrusive, hidden away within wall, floor and roof assemblies, but collectively, their impact has been profound. In this new generation of wood buildings, diversity is the key, with different technologies proving successful according to the scale, type and location of specific building projects. The engineering technology being applied in the province is positioning BC at the forefront of the North American wood-frame construction industry.

## Why are designers specifying engineered wood products, mass timber panel systems, and generally, more wood in construction?

With growing pressure to reduce the carbon footprint of the built environment, both public and private sector decision-makers are challenging architects and designers to balance functionality and cost objectives with a reduced environmental impact. They are turning to engineered wood products and mass timber panel systems to help achieve that balance.

As concerns about climate change escalate, wood is re-emerging as the material of choice for construction of both residential and commercial buildings. The environmental benefits of wood are well-documented and include the long-term storage of carbon dioxide sequestered by growing trees, the low embodied energy required to process wood and the life cycle benefits that result from these properties.

Mass timber panel systems and other engineered wood products can replace steel and concrete. They are high strength, dimensionally-stable, lighter, sustainable, aesthetically-pleasing and cost-effective. Prefabrication means they save time and construction costs with rapid installation. (Did you know that the nine-storey Forte Building in Australia was erected in just 10 weeks?)

The result: significant benefits in terms of structural performance, scale possibilities and construction efficiency.

Call Wood *WORKS!* BC today to get your questions about wood answered, and learn how wood can enhance your next project. Our knowledgeable technical advisors are in constant contact with the design and construction communities and have well established contacts in all facets of wood construction and can quickly steer you in the right direction.

## Inspired by WOOD! Let us help you achieve your aspirations by:

- enhancing your team's vision of a **Structural or Architectural Wood Signature**;
- increasing your team's knowledge of wood's **Environmental Performance**;
- helping you to choose the right **Engineered Wood Product** for the job;
- guiding you through the latest **Structural Wood Systems** including the growing interest in **Mass Timber Panel Systems**;
- informing you on what is available in **New Innovative Wood Connections**;
- assisting your staff in detailing your wood structure to maximize its **Durability by Design**;
- engaging our resources to help meet or exceed requirements in **Building Codes**;
- seeking our expertise on **Mid-rise Construction**.



# Wood *WORKS!* BC is your resource for wood use in building and design

Wood *WORKS!* BC is a national industry-led program of the Canadian Wood Council. Our goal is to support innovation and provide leadership on the use of wood and wood products by inspiring, supporting, educating and recognizing building and design professionals involved with commercial, institutional and industrial construction projects.

Wood *WORKS!* BC is proud to provide technical support in pursuit of practical, efficient, versatile and cost-effective building and design solutions through the use of wood, the most sustainable, natural and renewable building material on Earth.



## All about wood – from wood champions and leaders in design and construction

“I love wood for its exceptional quality, beauty, universal application, and the value it has held throughout the evolution of mankind. But I use wood because it is here – it is the most abundant, readily available material throughout BC with the ability to meet almost all of our building needs. We just need to learn how. Wood *WORKS!* BC is a great resource for designers, builders and architects.”

*Lubor Trubka,  
Lubor Trubka Associates Architect*

“Our firm has done two mid-rise buildings with wood frame construction. There’s no doubt that wood is best suited to mid-rise buildings. It’s most economical, most versatile and most green. We’re going to see more buildings in wood at this height, so gaining expertise in the various products, techniques and solutions is essential for builders.”

*Adam Weir,  
Project Manager, Adera Development*

“Wood and mass timber products certainly require a different expertise, but the avenues for learning are readily available and growing along with the incredible building opportunities. It’s essential for us to gather knowledge and expertise, as wood is now so widely used and very much a contemporary building material. It’s a much easier and efficient material than concrete work. The benefits of wood in construction include being easier to modify, a cleaner and quieter erection, fewer health risks for workers, a tighter tolerance and a more comfortable surface to work in during construction. These are exciting times for wood as we are learning and exploring its potential and seeing that the possibilities are almost limitless.”

*John Boys,  
Log Builder and Timber Framer, Nicola Logworks*

“Globally, we are re-defining the capabilities of the oldest and only renewable construction material we have: wood. Recent technological advances have clearly repositioned wood as a hi-tech material, providing us with more design flexibility and more economical solutions than ever before. As engineers and architects, this broadens our ability to create incredible structures while choosing a material that is beautiful and culturally meaningful, but also results in a significantly lower impact on our built environment.”

*Eric Karsh, MEng, PEng, StructEng, MIStructE, Ing,  
Principal, Equilibrium Consulting Inc.*

“Code changes allowing construction of mid-rise buildings have expanded the possibilities for wood use, engineered wood products and wood in general, which gives contractors and builders more options. The results are more innovative and complex structures, more pedestrian-friendly projects and more cost-effective projects.”

*Casey VanDongen,  
President, Tri City Canada Inc.*

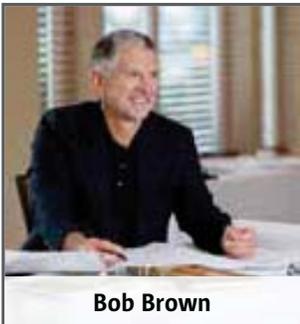
“Since building our new wood arena, we have constructed a new pool building and our Spirit Square downtown in wood timber frame. The wood has enhanced our community and is contributing to building a wood culture in our community. It has been inspirational, as now commercial buildings are embracing the beauty and benefits of wood. Buildings such as the Royal York Golf Course, the new Bottle Depot, commercial facades, and now a huge expansion to Shepherds Hardware with a new garden centre are all buildings that reflect our “wood culture”, our history and our values which has brought great pride to our community.”

*Chris Pieper,  
Mayor of Armstrong*

## Ask a Technical Advisor

**Question:** Where can I get help understanding the BC Building Code and the ongoing changes that are affecting how we can use wood?

**Answer:** Wood *WORKS!* BC Technical Advisor Bob Brown is a seasoned Building Official who can help you work through the regulatory process including the ongoing code changes and alternative solutions you may be facing with your local building department.



**Bob Brown**

### **Bob Brown, Wood *WORKS!* BC Technical Advisor**

Bob is a Registered Building Official and Journeyman Carpenter with over 30 years' experience in BC's construction industry. He began working for local government in 2003 and led a municipal building, bylaw, and business licencing department for six years.

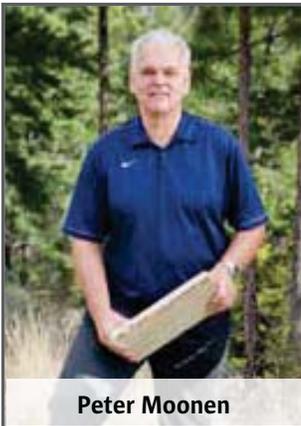
Bob's experience as a builder, developer, and government official has given him a practical and balanced approach to the BC Building Code and regulatory system. He joined the Wood *WORKS!* team in 2012 and continues to work as a senior building official on an auxiliary basis. Bob provides code information, technical support, and helps promote the innovative use of wood and wood products in construction.



*Wood *WORKS!* BC technical advisor Bob Brown (L) in a recent meeting with City of Vancouver building code officials and a delegation of Japanese government building experts. The meeting was about the alternative solution process found in the BC Building Code and the Vancouver Building Bylaw. The Japanese delegates wanted to know how the City of Vancouver administered this process and what challenges they had encountered in doing so. Bob also discussed changes expected at the National Building Code level that will affect wood use in construction in BC and Canada.*

**Question:** How can I take advantage of wood to enhance the sustainability and performance attributes of my project?

**Answer:** Increasingly, building regulations, customers and designers are expecting better performance and lower environmental impact from construction. Wood *WORKS!* BC can work with your team to identify new construction methods and new products to both increase the energy performance of a building while demonstrating lower overall environmental impact over the short-, medium- or long-term. Peter can assist specifiers and designers with understanding how and why wood's environmental attributes can play a role in enhancing sustainable design.



**Peter Moonen**

**Peter Moonen, Leader, Sustainable Building Coalition, Canadian Wood Council**

Peter works to assist designers and builders in understanding how to use wood to enhance environmental performance and reduce the ecological footprint of buildings. He regularly presents on achieving greater sustainability to various local, Canadian and international groups. He is also a Canadian representative at the UN Timber Committee and a reviewer specializing in wood and the green economy for the Forest Products Annual Market Review published by the United Nations Timber and Forestry section with special emphasis on the role of wood in the green economy, including green design.

In addition to a degree in Marine Biology and Zoology, Peter studied forestry at UBC and Journalism and Public Affairs in Alberta.

**Question:** How can we extend the life of a wood application that will be exposed to the elements?

**Answer:** Durability by Design is the most effective long term solution for exposed wood applications. While solutions can be found in both a coating and species selection, embedding durability into the design process is the best answer.



**Bill Billups**

**Bill Billups, Wood *WORKS!* BC Technical Advisor**

Bill Billups has been a technical advisor for Wood *WORKS!* BC for the past 13 years. He comes from the heavy timber / engineered wood products side of the wood industry where he has over 20 years of experience dealing with EWPs, specifically glued laminated timbers.

He focuses on assisting owners in both the public and private sectors who want to include wood content in their project, with writing their Expression of Interests (EOIs) and Request for Proposals (RFPs). Once the design team is engaged, he offers his experience on durability by design, the design and detailing of wood connections, coatings and treatments, and project specifications. Bill is also involved with Wood *WORKS!* BC workshops and in-house seminars for architects, engineers and technologists.

**Question:** How can I maximize my profit margins in condo development while adhering to the high demand for sustainable construction?

**Answer:** By engaging the Wood *WORKS!* BC technical team early in the design of your next mid-rise project to learn how to design and construct light-wood framed systems up to 6 storeys cost effectively while maintaining both quality of construction and fire safety during the construction phase.



Sukh Johal

**Sukh Johal, Wood *WORKS!* BC Technical Advisor**

Sukh Johal is a double graduate from BCIT with diplomas in both Structural Engineering (1987) and Business Administration (1992). He also holds a Masters of Business Administration degree in International Business.

Sukh is also the Wood *WORKS!* BC team technical leader on mid-rise construction where his skills, extensive network base and knowledge of glulam, I- joists, structural composite lumber, and pre-manufactured truss (open web floor trusses as well as pitched roof trusses) are in demand by developers and owners undertaking mid-rise projects – now numbering over 150 in BC.

Sukh also has experience and understanding in the design and supply of engineered wood component products.

**Question:** Where can I learn more about constructing with these new mass timber panel systems?

**Answer:** The Canadian Wood Council's (CWC's) technical team works closely with Wood *WORKS!* BC technical advisors to get your sustainability, structural design, durability, building code and fire safety questions answered. We can connect you with construction professionals and suppliers that have experience and expertise with mass timber. We also have workshops and tours of completed projects available where you can gain confidence in this new way of building.



CWC Technical Team

**CWC's technical team is here to help you.**

For almost half a century, the Canadian Wood Council has been the trusted source of reference for architects, engineers and building and design professionals who believe in the benefits of wood as a natural and renewable building material. The CWC offers a number of resources on wood products including case studies, software, educational events, online tools and a help desk.



**WOODWORKS!**  
Program of the Canadian Wood Council

Canadian Wood Council    Conseil canadien du bois



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