

## 2016 Toronto Wood Solutions Fair

# Presentation Abstracts

Thursday, November 17, 2016 (7:30 am to 4:30 pm)

Allstream Centre, Ballroom A | 105 Princes' Boulevard, Toronto, ON

### **Timber Engineering, Prefabrication, and the Return of Craft**

Lucas Epp, Head of Engineering, StructureCraft Builders

Timber Engineering | The redevelopment at the National Arts Centre in Ottawa (under construction) for Canada's 150th celebration in 2017 includes an impressive hybrid glulam-steel coffered roof structure. Conceived as prefabricated panels up to 60' long which incorporate acoustic, electrical, mechanical, and roofing all-in-one, this roof structure pushes the boundaries of service integration. Creative engineering solutions to address both structural and coordination challenges will be presented.

Prefabrication | Framework, North America's tallest all-wood building at 43m and 12 storeys, is pushing the boundary in timber engineering and prefabrication. With a post-tensioned CLT rocking wall core, and a significant proportion of the CLT floors and walls left exposed, this structure presents significant seismic and fire engineering challenges. Construction and detailing considerations for the structure will be presented, while exploring design for structural efficiency and cost effectiveness.

### **More with Less: Building with Cross Laminated Timber**

Jeff Morrow, Program Manager, Construction, Lend Lease

Cross Laminated Timber (CLT) is a material building technology that originated in Europe 20 years ago that is now making its way to North America. It has been described as 'plywood on steroids', where instead of 1/8" veneered layers of wood glued together, the layers are 1" thick and engineered into massive slabs of timber for walls, floors and roofs. A renewable and sustainable material, CLT has a lower carbon footprint than steel and concrete. This session will primarily focus on the successful implementation of CLT construction at a recently completed 4 story hotel at Redstone Arsenal, AL. The challenges, opportunities and benefits incorporating CLT into taller wood buildings will be discussed.

### **Structural Design and Optimization of Midrise Light Weight Wood Framed Buildings**

Michael Baldinelli, MESC., P.Eng., Principal, Large Buildings, Strik Baldinelli Moniz Structural Engineers

Light-weight wood framed (LWWF) construction has gained significant popularity over the past decade as a sustainable, cost-effective solution for low-rise multi-level buildings. More recently, the push has been to extend the use of LWWF to mid-rise construction for increased density on urban or rural projects. Over the past few years Strik Baldinelli Moniz (SBM) has completed the design of 4- Six Storey Wood Buildings in Ontario, with another 5 buildings in the design phase. To streamline the design process, SBM has developed a design program which takes into account the current OBC 2012 Code, Canadian Wood Design Manual 2014 Edition and Best Practices Guide from APEG BC, specifically for Six Storey Wood Framed Buildings. The presentation will highlight the design and analysis tools in combination with a unique optimization database that streamlines the design while minimizing material and labor costs on a job per job basis. The Optimization Tool takes into account 'local' wood panelization material and labor costs for a series of different shear wall assemblies. These wall assemblies are ranked and then selected by the program based on the least expensive option. The Optimization Tool ensures the most cost effective design has been met while maintaining all structural code requirements, the first in the industry.

## **The Mosaic Centre: More Than A Net-Zero Office Building**

Dennis Cuku, Co-Owner, Mosaic Centre for Conscious Community and Commerce

This session features the design of the Mosaic Centre for Conscious Community and Commerce project, a 30,000 sq. ft. mixed use commercial building in Edmonton, Alberta. The project began with the intention to create the ideal workplace for the Mosaic Family of Companies and the surrounding communities. It has transitioned into a grass roots movement—a complete re-envisioning of the way commercial construction is done and a design rethink of the spaces people work in. This project is currently completed construction and is 100% occupied. Some of the key features include:

- largest utilization of WestDek panel product to date
  - Hybrid steel-wood design to achieve “beauty” target
  - Integrated Project Delivery (IPD) contract between the team
  - furthest north net-zero operation building in the world
  - Targeting Living Building Challenge “Petal” & LEED Platinum certification
- The building material planned for the Mosaic Centre was thoroughly researched and ultimately selected for particular reasons. Materials were evaluated on a number of criteria: sustainable qualities, affordability and aesthetics. Topics that will be discussed in the presentation include:
- The simple business case for the Mosaic Centre: Lean construction frees up budget for Beauty + “Green”
  - How the structural materials were selected to meet the business case and project objectives
  - An introduction to the IPD system and why it was the key to project success
  - Lessons learned and operating data from the past 12 months

## **Off-Site Wood Construction: What, Why, How and the Future**

Randall Walter, AIA, LEED AP, Bensonwood

Due to skilled labor shortages, compressed schedules, and the potential for greater quality control, off-site wood construction has become increasingly popular. This presentation will cover the unique design and construction techniques associated with pre-fabricated and off-site panelized wood systems. An introduction to the different levels of off-site construction and review of associated products and services will be followed by a demonstration of cost and schedule benefits based on real-world projects. A step-by-step process will be presented for designers new to off-site construction, with information on how to find and utilize partners and resources, the integrated design process, and differences compared to traditional on-site methods. Trends and future projections for the use of off-site construction, as well as its advantages, will also be reviewed.

## **Bill Fisch Forest Stewardship and Education Centre: Living Building Challenge Design Comes to Life with Innovative Timber Solutions**

Daria Khachi, PEng, Principal, DIALOG and Charles Marshall, PEng LEED AP BC+C, Associate, Sustainable Design, DIALOG

The Bill Fisch Forest Stewardship Education Centre is a building that answers a question: what if a building could function, and thrive, like the forest that surrounds it. Like a forest, this building is designed to use only the clean solar energy and water that are provided by nature, and to reflect the unique habitat that surrounds it. Using innovative techniques of heavy timber construction, the building is a demonstration of wood as a construction material, and place where visitors can learn about forestry, stewardship, and the ecology. Daria Khachi and Charles Marshall from DIALOG will tell the story of this unique project and explain how it is a green, ‘Living Building’.

## **Find Your Design Inspiration: A Showcase of Wood Design Award Winners from 2015-16**

Marianne Berube, Executive Director, Ontario Wood *WORKS!* and Lynn Embury-Williams, Executive Director, Wood *WORKS!* BC

Find your design inspiration! This presentation will highlight award-winning projects from the Wood Design Award programs held across Canada and in the US in the past year. The projects featured in this presentation showcase innovative uses of wood in institutional, commercial and residential designs. Unique, one-of-a-kind buildings will be showcased, as will designs that can be easily and cost-effectively replicated.

## **We cover the comments! Or, how to respond to all the silly things people (and other industries) say about wood construction**

Lloyd Alter B.Arch, OAA, Design Editor, [www.treehugger.com](http://www.treehugger.com); Adjunct Professor, Ryerson University School of Interior Design

It is hard to believe that some people think that wood is new and different, but they do. We take a sometimes tongue-in-cheek look at what people are saying in comments (and Lloyd Alter has read a million of them) and how the industry can respond to the masonry and ready-mix industries that are spending millions on marketing to discredit wood.

## **Fire Resistance Tools and Information for Wood-Frame and Mass Timber Buildings**

Marc Alam, Technical Specialist – Fire Code & Standards, Canadian Wood Council

This seminar will discuss various sources of information and tools that may be used to develop solutions to meet the building code's fire-resistance rating requirements for buildings using lightweight wood-frame and mass timber construction, including the National Building Code 2015 revisions to the Component Additive Method; and, the new Annex B in CSA O86 Engineering Design in Wood, entitled "Fire resistance of large cross-section wood elements," for solid-sawn timber, glued-laminated timber (glulam) and structural composite lumber (SCL) in the 2014 edition, and cross-laminated timber (CLT) which was added in the 2016 CSA O86 Supplement.

## **Wood and Fiberglass Composite Bridges and Buildings**

Crawford Dewar, Manager of Engineering, Guardian Bridge Rapid Construction Inc.

Wood is often discounted by engineers when compared with concrete because of its brittle failure acting as a one-way plate, absence of composite action, and susceptibility to condition loads on bridges and buildings such as water penetration, relaxation and creep. It is compelling to consider wrapping wood with epoxy-reinforced fiberglass that encapsulates the wood. The result is a product at 590kg/m<sup>3</sup> at 800 MPa, that provides ductile failure, two-way plate action, full composite action, cantilevered sections of buildings, rigid slabs and double tees.

## **Western Red Cedar – Distinctive, Sustainable Design**

Jay Poppe, Cedar Specialist, Western Red Cedar Lumber Association

This presentation will include some information basic to lumber and forest products while it features the nature of the western red cedar lumber, the benefits unique to these products, and how they are appropriate for incorporation in any sustainable design. It will also touch on information about specifying western red cedar lumber grades, installation, and finishing. Forest certification will be discussed, as will reasons why using western red cedar affords your clients the best environmental and sustainable products for their design requirements.

## **Sound Insulation of Wood-Frame Multi-Storey Buildings**

André Rioux, VP Sales and Development, AcoustiTech

This presentation outlines basic acoustic principles and definitions, specifically the transfer of impact and airborne sounds in wood-frame buildings. Efficient means of acoustic insulation will be discussed using multiple case studies of recent floor-ceiling assemblies. This presentation will benefit any professional such as architects, designers, acoustic engineers, builders, general contractors interested and/or concerned with acoustic insulation of wood-frame buildings.

## **WoodWorks® Shearwalls Software – Part 1: Overview and Demonstration (note: tailored for design professionals performing lateral load analysis and design)**

Adam Robertson, M.A.Sc., P.Eng., Manager, Codes and Standards - Structural Engineering and Sustainability, Canadian Wood Council and Kevin Rocchi, M.A.Sc., P.Eng., Technical Services Specialist, Canadian Wood Council

Performing a complete lateral load analysis for a building is one of the most complex aspects of structural design. WoodWorks® Shearwalls software allows engineers to quickly generate wind and seismic loads according to the NBC 2010 and design wood-frame shearwalls according to CSA O86-09 or -14. Deflection of shearwalls and force distribution based on flexible and rigid diaphragm distribution methods are just some of the topics that will be discussed and demonstrated. Real-time demonstrations of creating models will also be presented.

Participants are welcome to download a free demo copy of the software from (<http://cwc.ca/woodworks-software/canadian-edition/downloads/>) should they wish to follow along during the design example.

## **WoodWorks® Shearwalls Software – Part 2: Advanced Topics (Note: Part 1 is not a prerequisite, but a working knowledge of the Shearwalls program is suggested; tailored for design professionals performing lateral load analysis and design)**

Adam Robertson, M.A.Sc., P.Eng., Manager, Codes and Standards - Structural Engineering and Sustainability, Canadian Wood Council and Kevin Rocchi, M.A.Sc., P.Eng., Technical Services Specialist, Canadian Wood Council

Tips and best practices for creating accurate and simple shearwall models will be discussed, including, structure blocks, standard walls, and extending walls upward. This session will also provide an overview of changes related to shearwall design which were implemented in the CSA O86-14. Review and application of advanced lateral load design topics such as, hold-down design and displacement, torsional analysis, structural irregularities, drag strut and mid-rise (four- to six-storey) design provisions will be provided.

Participants are welcome to download a free demo copy of the software from (<http://cwc.ca/woodworks-software/canadian-edition/downloads/>).

## **Overview of Changes to CSA O86-14- Update No.1: Cross Laminated Timber Provisions**

Jasmine B. Wang, Ph.D., P.Eng., Manager Codes & Standards - Structural Engineering, Canadian Wood Council

The Update No.1 to the 2014 edition of CSA O86 Standard Engineering Design in Wood was published in July 2016. The presentation gives an overview of the design provisions for Cross Laminated Timber (CLT) adopted in this Standard, covering the design of CLT in compression and out-of-plane bending applications, CLT as Lateral Load Resisting System, and connections in CLT and serviceability requirements.

**SB 12: A free tool to help comply with the 2017 prescriptive wall provisions**

Robert J. Jonkman, P.Eng. Director Codes and Standards - Structural Engineering, Canadian Wood Council

**Origine: A Tall Wood Demonstration Project**

Andre Huot, Nordic Structures

**Intelligent Building Systems: Gypsum Solutions for Multi-storey Wood-frame Construction**

Bob Hartogsveld, CertainTeed

