The Wood Revolution

Inspiring Architecture With Innovative Structural Systems

Presented by Lisa Podesto, PE
Senior Technical Director – Solutions Group
WoodWorks for Non-residential Construction
Learning Objectives

At the end of this program, participants will be able to:

1. Discuss new and innovative heavy timber and mass timber structural systems, and how they can be used as an expression of architecture.
2. Describe the carbon benefits of timber products.
3. Relate concepts of innovative wood building products and systems with their possible application and use in everyday structures.
4. Understand structural wood building design trends in Europe, the US and Canada.
Outline

• How you know we are amidst a Revolution?
• What is motivating the Revolution?
• Bringing Iconic Ideas to Every Day Projects
• The Future of Wood Construction
Outline

• How you know we are amidst a Revolution?
  • Review 6 Iconic Projects in 6 years
• What is motivating the Revolution?
• Bringing Iconic Ideas to Every Day Projects
• The Future of Wood Construction
Richmond Olympic Oval, Richmond, BC, Canada
Design Team: Cannon Design Architecture, Fast + Epp, Glotman Simpson
Photo Credit: Stephanie Tracey, Craig Carmichael, Jon Peschin, KK Law Creative, Ziggy Welsch
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The Cathedral of Christ The Light, Oakland, CA, USA
Design Team: Skidmore Owings & Merrill, Craig W. Harman, Webcore Buildiers
Photo Credit: Timothy Hursley, Cesar Rubio, and John Blaustein,
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Stadhaus, London, UK
Architect: Waugh Thistleton Architects
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Architect: Waugh Thistleton Architects
Photo credit: Waugh Thistleton Architects
Centre Pompidou Metz, Metz France
Design Team: Shigeru Ban Architects, Jean de Gastines Architects, ARUP
Photo Credit: ARUP
Centre Pompidou Metz, Metz France
Design Team: Shigeru Ban Architects, Jean de Gastines Architects, ARUP
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Metropol Parasol, Seville, Spain
Design Team: J. Mayer H. Architects, ARUP Consulting Engineers
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Metropol Parasol, Seville, Spain
Design Team: J. Mayer H. Architects, ARUP Consulting Engineers
Photo Credit: ARUP
Forte,’ Melbourne, Australia
Design Team: Lendlease
Photo Credit: Lendlease
Forte, Melbourne, Australia
Design Team: Lendlease
Photo Credit: Lendlease
Outline

• How you know we are amidst a Revolution?
• What is motivating the Revolution?
  • Sustainability
  • Cost/Speed
  • Technology
• Bringing Iconic Ideas to Every Day Projects
• The Future of Wood Construction
## Carbon Offsets

<table>
<thead>
<tr>
<th>Volume of wood used</th>
<th>4,755 m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon sequestered and stored (CO₂e)</td>
<td>3,771 metric tons</td>
</tr>
<tr>
<td>Avoided greenhouse gases (CO₂e)</td>
<td>8,021 metric tons</td>
</tr>
<tr>
<td>Total potential carbon benefit (CO₂e)</td>
<td>11,792 metric tons</td>
</tr>
</tbody>
</table>

Carbon savings from the choice of wood in this one building are equivalent to:

- 2,252 passenger vehicles off the road for a year
- Enough energy to operate a home for 1,002 years

### Stadhaus, London, UK
Architect: Waugh Thistleton Architects
Photo credit: Waugh Thistleton Architects

<table>
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<tr>
<th>Volume of wood used</th>
<th>950 m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon sequestered and stored (CO₂e)</td>
<td>760 metric tons</td>
</tr>
<tr>
<td>Avoided greenhouse gases (CO₂e)</td>
<td>320 metric tons</td>
</tr>
<tr>
<td>Total potential carbon benefit (CO₂e)</td>
<td>1,080 metric tons</td>
</tr>
</tbody>
</table>

**Carbon savings from the choice of wood in this one building are equivalent to:**

- 1,615 passenger vehicles off the road for a year
- Enough energy to operate a home for 803 years

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Material Impacts

BIP Computers, Santiago, Chile
Architect: Alberto Mozo
Photo credit: Alberto Mozo
Thermal Performance

Norwich Open Academy, Norfolk, England
Design Team: Sheppard Robson, Romboll uK
Photo credit: KLH
Renewability

Mayer Melnhof-Kaufmann Headquarters, Sankt Georgen im Attergau, Austria
Architect Hermann Kaufmann
Photo Credit: Hermann Kaufmann
Occupant Health & Material Technology

School for Mentally Handicapped, Germany
Architect: Despang Architecture
Photo Credit: Martin Despang
Material & Fabrication Technology

Sneek Bridge, Friesland, Netherlands
Architect: Achterbosch Architectuur and Onix
Photo Credit:
Pre-fabrication Technology

FMO Tapiola Building, Finland
Material and Fabrication Technology

Stadhaus, London, UK
Architect: Waugh Thistleton Architects
Photo credit: Waugh Thistleton Architects
Forte,’ Melbourne, Australia
Design Team: Lendlease
Photo Credit: Lendlease
Cost Benefits & Supplier Sophistication

The Cathedral of Christ The Light, Oakland, CA, USA
Design Team: Skidmore Owings & Merrill
Photo Credit: Timothy Hursley, Cesar Rubio, and John Blaustein
Stevenson London School, Richmond, BC, Canada
Design Team: McFarland Architecture, Fast + Epp Engineers
Photo Credit: Stephan Pasche
Arena Stage, Washington, DC
Architect: Bing Tom
Photo Credit: Nic Lehoux
Raleigh Durham Airport, North Carolina, USA
Architect: Fetress Architects, ARUP Engineers
Photo Credit: Nick Merrick, Hedrich Blessing, Brady Lambert, Jason Knowles
Simpson Strong Tie Demonstration Lab, Cal Poly San Luis Obispo Campus, CA
Design Team: Omni
Photo Credit: Josef Kaperovich
West Vancouver Aquatic Centre
Design Team: Hughes Condon Marler Architects, Fast and Epp Engineers
Photo Credit: Nic Leboux, Gary Otte, Martin Tessler
Malaspina Centre for Shellfish Research, Deep Bay, BC, Canada
Design Team: McFarland Marceau Architects, Fast + Epp
Photo Credit: Michael Elkan, Stephan Pasche
Richmond Olympic Oval, Richmond, BC, Canada
Design Team: Cannon Design Architecture, Fast + Epp, Glotman Simpson
Photo Credit: Stephany Tracey
Samuel Bridghouse Elementary School, Richmond BC, Canada
Design Team: Perkins + Will Canada, Fast + Epp
Photo Credit: Stephan Pasche
Ahmanson Founders Room, Santa Monica, CA, USA
Architect: Blezberg Architects
Photo Credit: Benny Chann, Fotoworks
Holzbau Sohm, Austria
Architect: Hermann Kaufmann
Photo Credit: Hermann Kaufmann
Yusuhara Wooden Bridge Museum, Japan
Architect: Kengo Kuma & Associates
Photo Credit:
Metropol Parasol, Seville, Spain
Design Team: J. Mayer H. Architects, ARUP Consulting Engineers
Photo Credit: ARUP
Nature Boardwalk at Lincoln Park Zoo, Chicago, IL, USA
Architect: Studio Gang Architects
Photo Credit: Beth Zacherle, Spirit of Space
Aqualux Hotel, Bardolino, Italy
Architect: Rama Architectura
Art Gallery of Ontario, Ontario, Canada
Design Team: Geary International, Halcrow Yolles, Equilibrium Engineers
Photo Credit: Sean Weaver, Image Resources
University of British Columbia Earth Science Bldg, BC, Canada
Design Team: Equilibrium, Perkins & Will
Photo Credit:
Outline

• How you know we are amidst a Revolution?
• What is motivating the Revolution?
• Bringing Iconic Ideas to Every Day Projects
• The Future of Wood Construction
Maximum Building Height by Regulation (Wood Frame Structures)

- Russia: 3 Storeys
- Finland: 4 Storeys
- Germany: <18m Escape Level
- Switzerland: 6 Storeys
- British Columbia: 6 Storeys Wood Frame
- Austria: <22m Escape Level
- United Kingdom: No Limit
- Norway: No Limit
- New Zealand: No Limit

References:
(Rhomburg 2010)

Tall Wood
SUMMARY REPORT:
SURVEY OF INTERNATIONAL TALL WOOD BUILDINGS

(MAY 2014)
Forté, Australia       LCT ONE, Austria       Bridport House, UK

Credits: Lend Lease; CREE GmbH; Karakusevic Carson Architects
Butler Brothers Building
Architect: Harry W. Jones
Renovated 1974
Bullitt Center, Seattle, WA, USA
Architect: Miller Hill Partnership
Photo Credit: Miller Hull Partnership
Library Square, British Columbia, Canada
JM Architects

Marseille, Seattle, WA, USA
PB Architects
Photo Credit: Matt Todd
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Questions?