Learning Objectives

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

1. Know which structural wood products are available for use in retail buildings
2. Understand advantages of structural wood products used in retail buildings
3. Compare structural wood products
4. Refer to specific applications of structural wood products when used in retail buildings

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### Why Are We Here?
- Share Ideas
- Open Doors to Communication
- Provoke Thought
- Begin a Dialogue
- Form a Relationship

### Audience
- Architects
- Engineers
- Specifiers
- Contractors
- Others

### Goal of This Presentation
Provide you with factual, accurate and objective information and examples so that you would consider using structural wood in future projects

### Interaction
“If you ask me a question I don’t know, I’m not going to answer”.

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### Why Wood
- Cost Effective
- Time Saving
- Readily Available
- National Labor Pool
- Easy to Customize and Work With
- Sustainable

### Sustainable Attributes
- Renewable & Bio based
- Low Embodied Energy (Solar)
- Absorbs CO2, Releases Oxygen
- Clean Production Process
- Thermally Superior
- Biodegradable

Source: ATHENA Sustainable Materials Institute www.athenasmi.ca
Wood - A Model of Sustainability

**From 1953 to 1997**
- Forest inventories grew 36% *
- Over 50 million wood-frame homes were built

* Source: U.S. Forest Service

Forest Facts
- 1/3 of the USA is forested or 750 million acres
- Only 250 million acres are open to logging
- About 2 Billion trees planted annually
- Annual timber growth exceeds harvest by 25%
- Canada has over 1 billion acres of forest
- Canada has 90% of their original forest
- USA has 70% of their original forest
- Annual timber harvests are below 2% of standing Inventory

Certification

**Wood is:**
- When purchased certified, the only construction material available that provides assurance of environmental responsibility regarding production.
- Why aren’t other materials required to be certified????

Structural Wood Products

- Engineered Wood Beams
- I-Joists
- Wood Trusses
- Dimensional Lumber
- Wall Panels
- Structural Insulated Panels - SIPS
- Post Frame Construction
- Cross Laminated Timber - CLT

Dropped LVL Beams
82’ Clear Span Roof Truss

Girder Truss Supporting Roof and Floor
28’ Clear Span Floor Truss

<table>
<thead>
<tr>
<th>TC Live</th>
<th>40.00 psf</th>
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<tbody>
<tr>
<td>TC Dead</td>
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</table>

Design: L=1.00, P=1.00
Rep Min. Load 1.15
O.C. Spacing 2'-0'-0
Design Spec: IBC-2006
Ground Snow: 30.00
TIE.5.7 -Segn 25069
24" Deep Floor Trusses and Flush LVL Plated Floor Truss Spans

Spans over 30’ are reasonable for commercial construction.

Hilton Garden Inn Milwaukee

Office Building Elgin
Environmentally Conscious Building Materials

Glulams:
- Roof Trusses & Purlins
- Floor Beams
- External Columns & Beams
- Stair Treads

Plywood:
- Roof, Floor & Wall Sheathing
- OSB:
  - Wall finish material w/ stain
Structural Insulated Panels

SIPs are composite, high performance, self-supporting, structural building panels with an insulating core of rigid foam and structural facings or skins, most commonly of 7/16” thick oriented strand board (OSB).

Combining the efficiency of panelization and accuracy of machine cut panels in creating 5 building elements all at once:

1) Structural Assembly for both gravity and lateral loads
2) Insulation
3) Air Barrier and Vapor Retarder
4) Wire chases included
5) Flat, Nailable Surfaces for interior and exterior finishes

Panel Thickness

- There are five nominal panel thicknesses.
- The core dimensions match dimensional 2x's:
  - 3 ½”, 5 ½”
  - 7 ¾”, 9 ¼”, 11 ¼”

R Values

<table>
<thead>
<tr>
<th>Core Thickness</th>
<th>R-Value at 75°</th>
<th>R-Value at 40°</th>
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<tbody>
<tr>
<td>3-1/2”</td>
<td>15</td>
<td>16</td>
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<td>5-1/2”</td>
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<tr>
<td>11-1/4”</td>
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</tbody>
</table>
SIPs and Commercial Applications

Design Advantages
• Integrated system
• Close tolerances
• Complex CNC cutting
• Large Spans
Post Frame Building System

- Sheathing
- Purlins
- Truss
- Wood Columns
- Wall Girts
- Alternative Post Foundations
New generation of lightweight and prefabricated systems

- Consists of wood strips (planks) stacked crosswise on top of each other (glued or nailed)
- Thicknesses of the panels vary from 50 to 600 mm

Cross-Laminated Timber

Advantages of CLT Panels

- Factory produced with high precision CNC machines
- Quick on-site assembly
  (One storey/week or less per avg. size floor plan)
  - Min site Noise (equipment/personal)
  - Min site Waste (high level of prefabrication)
  - Ideal for dense urban in-fill projects
  - Health and safety benefits

One of the most promising wood alternatives to concrete assemblies.
Benefits of CLT

- Speed of Erection
- Overall Performance
  - Seismic (no soft story)
  - Acoustic
  - Vibrations
  - Fire

Benefits of CLT

- Sustainable Benefits
  - Carbon footprint
  - Low embodied energy
  - Tight building envelope (high energy efficiency)
  - Little waste
  - Cost Competitive
Murray Grove – Mixed Use Timber

- London infill project
- 29 flats (mixed affordable and private)
- Ground floor office
- 4x less weight than precast concrete
- ~1/2 the construction time of precast concrete
- Saves 300 metric tons of CO2
- 21 years of energy usage for the building
- 9 stories built in 9 weeks

THE BRIEF Open Academy, Norwich – Largest CLT Structure

- 9,500 m² (102,257 ft²) secondary school
- 3500 m³ of timber
- 2700 tons of CO2 stored
- 10 years of energy usage for the building
- £20 million
- 17 weeks to construct

Murray Grove

- London infill project
- 29 flats (mixed affordable and private)
- Ground floor office
- 4x less weight than precast concrete
- ~1/2 the construction time of precast concrete
- Saves 300 metric tons of CO2
- 21 years of energy usage for the building
- 9 stories built in 9 weeks
Questions?
This concludes The American Institute of Architects Continuing Education Systems Course

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Resources

- aitc-glulam.org
- apawood.org
- nfba.org
- postframeadvantage.org
- sbcindustry.com
- sips.org
- woodworks.org