Current CLT Research and CLT Testing Capabilities at UMaine

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Presentation Summary

- Who are we?

- CLT Objectives for UMaine

- Recent CLT Research
  - Lumber/SCL Hybrid CLT
  - CLT in Blast Applications

- CLT Testing Capabilities

- Conclusion
ASCC - Introduction

- 100,000 ft² R&D facility
- Established in 1996 – Current lab opened 2000
- $125 million in contracts since 2001
- 68 full-time staff/faculty
- 30 graduate/100 undergraduate students
CLT – UMaine’s Objectives

• To become the leader in the region for CLT information, R&D, and commercialization facilitation.

• Coordinate efforts answering the important questions that a developer/investor needs answered when considering siting a CLT plant in Maine.

• Put our world-class, ISO 17025 accredited wood composites laboratory to work supporting the CLT industry.

• Educate students (e.g. engineers and wood scientists) that can support a CLT manufacturer in Maine
PRG-320

### Table A1. Allowable Design Properties for PRG 320 CLT (for use in the U.S.)

<table>
<thead>
<tr>
<th>CLT Grade</th>
<th>$F_{L0}$ (PSI)</th>
<th>$E_0$ (10^6 PSI)</th>
<th>$F_{L0}$ (PSI)</th>
<th>$F_{L0}$ (PSI)</th>
<th>$F_{L0}$ (PSI)</th>
<th>$F_{L0}$ (PSI)</th>
<th>$F_{L0}$ (PSI)</th>
<th>$F_{L0}$ (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>1,950</td>
<td>1.7</td>
<td>1,375</td>
<td>1,800</td>
<td>135</td>
<td>45</td>
<td>500</td>
<td>1.2</td>
</tr>
<tr>
<td>E2</td>
<td>1,650</td>
<td>1.5</td>
<td>1,020</td>
<td>1,700</td>
<td>180</td>
<td>60</td>
<td>525</td>
<td>1.4</td>
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<tr>
<td>E3</td>
<td>1,200</td>
<td>1.2</td>
<td>600</td>
<td>1,400</td>
<td>110</td>
<td>35</td>
<td>350</td>
<td>0.9</td>
</tr>
<tr>
<td>E4</td>
<td>1,550</td>
<td>1.7</td>
<td>1,375</td>
<td>1,800</td>
<td>175</td>
<td>55</td>
<td>575</td>
<td>1.4</td>
</tr>
<tr>
<td>V1</td>
<td>900</td>
<td>1.6</td>
<td>575</td>
<td>1,350</td>
<td>180</td>
<td>60</td>
<td>525</td>
<td>1.4</td>
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<tr>
<td>V2</td>
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<td>1.4</td>
<td>450</td>
<td>1,150</td>
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<tr>
<td>V3</td>
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<td>1.6</td>
<td>550</td>
<td>1,450</td>
<td>175</td>
<td>55</td>
<td>575</td>
<td>1.4</td>
</tr>
</tbody>
</table>

*E1: 1950f-1.7E Spruce-pine-fir MSR lumber in all parallel layers and No. 3 Spruce-pine-fir lumber in all perpendicular layers

*E2: 1650f-1.5E Douglas fir-Larch MSR lumber in all parallel layers and No. 3 Douglas fir-Larch lumber in all perpendicular layers

*E3: 1200f-1.2E Eastern Softwoods, Northern Species, or Western Woods MSR lumber in all parallel layers and No. 3 Eastern Softwoods, Northern Species, or Western Woods lumber in all perpendicular layers

*E4: 1950f-1.7E Southern pine MSR lumber in all parallel layers and No. 3 Southern pine lumber in all perpendicular layers

*V1: No. 2 Douglas fir-Larch lumber in all parallel layers and No. 3 Douglas fir-Larch lumber in all perpendicular layers

*V2: No. 1/No. 2 Spruce-pine-fir lumber in all parallel layers and No. 3 Spruce-pine-fir lumber in all perpendicular layers

*V3: No. 2 Southern pine lumber in all parallel layers and No. 3 Southern pine lumber in all perpendicular layers
Recent CLT Research at UMaine

• Hybrid SPF-s / LSL
  o SPF-s in Maine: 390 million BF in 2015
  o Laminated Strand Lumber
    Most massive timber product made in the U.S.?
  o Use two of Maine’s strengths: Solid sawn lumber & wood composites

• Blast resistant buildings (Woodworks)
SPFs/LSL Hybrid CLT

- Results summary
- 22% higher mean bending stress at failure when LSL used in the core
Blast Resistant CLT

- Interest in CLT hotels on Army bases with blast standards
Manufacturing Capabilities

- 4’ x 8’ Press
- 3’ x 3’ Press
- Roller coater
- Resin blenders
- Complete Strand Composites Pilot Line
- 90’ and 230’ Strong Floor
Testing Capabilities

• Testing of many aspects of CLT. Mechanical properties, adhesive durability, creep, etc...

• ISO 17025 Accredited Testing Laboratory
Conclusion

• CLT is a train that won’t stop moving.

• UMaine is committed to moving CLT technologies forward.

• Maine – Is it the right place for the next CLT plant in the U.S.?