CLT and Mass Timber

Opportunities for Southern Pine
Mass Timber Building Systems
What is Mass Timber

- CLT
- NLT
- DLT
- Glulam
- LVL
- Others
Our First SYP Full Size Panel
CLT
NLT
DLT
Glulam
Gaining the Attention

- Europe First
- Canada
- US (SC 2011 home at Hilton Head)
- Australia
- Japan
- Worldwide attention
The Sweet Spot

CLT and Mass Timber should be strongly considered when a project encounters 3 of these 4 conditions.
Tall Wood Buildings Old and New
Pilot Panel Manufacture

2x6 SYP No.2

Lumber planning
Pilot Panel Manufacture

Glue Application
Pilot Panel Manufacture

Hydraulic Press

4’x 8’ 3-ply CLT
CLT Fire Test

- 13 CLT panels of different layout configuration, adhesive type and w/ or w/o protection (gyp board) were sent to Forestry Lab for fire test.
Performance CLT Verification

- ANSI/APA published a standard for performance rated CLT: PRG-320

Required Test Values

<table>
<thead>
<tr>
<th>CLT Grades</th>
<th>$f_{L0}$ (psi)</th>
<th>$E_{L0}$ (10^3 psi)</th>
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<td>E1</td>
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<td>1.7</td>
<td>2,885</td>
<td>3,420</td>
<td>425</td>
<td>140</td>
</tr>
<tr>
<td>E2</td>
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<td>1.5</td>
<td>2,140</td>
<td>2,230</td>
<td>565</td>
<td>190</td>
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V3: Visual grade No.2/3
Southern Pine CLT
Rolling Shear Test

- Rolling shear test is required by PRG 320 document
- Center point loading following ASTM D198
- 36 specimen tested: in both major and minor strength direction
Bending Test

- Bending test is required by PRG 320 document
- Third point loading following ASTM D198
Hollow Core Floor Testing
Vibration Test
Blast Testing

https://www.youtube.com/watch?v=9o0u0WN3zIE
Katerra Seismic Testing @ UCSD

https://www.youtube.com/watch?v=c-CrDPyrxPQ
Ready for Fire Test
Post Fire
What Else Can It Do
Utility Mats
Barns and Factories
Tall Buildings
Short Buildings
Massive Buildings
Mass Timber

- Durability
- Systems Approach
- Awareness (Building Codes)
- Pre-Fabrication