TALL MASS TIMBER
TEAMWORK MAKES THE DREAM WORK

- Rethink project organization + teams
- Schematic design considerations
- Collaboration with the suppliers and builders
- Seismic Considerations
- Codes
TRADITIONAL

DESIGN

- ARCHITECTURE
  - STRUCTURE
  - MEP
  - CODE

CONSTRUCTION

- CONTRACTOR
- SUPPLIER
Different Materials
Different Tolerances
Different Markets
Sizes Available

<table>
<thead>
<tr>
<th>Material</th>
<th>Available Thickness (mm)</th>
<th>Available Thickness (in)</th>
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</thead>
<tbody>
<tr>
<td>Brisco</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>LSL</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>LVL</td>
<td>75</td>
<td>3</td>
</tr>
<tr>
<td>CLT</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>GLT</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>NLT</td>
<td>300</td>
<td>12</td>
</tr>
</tbody>
</table>
Gridlines need to match panel availability!
Floor types

**Post and Beam**
Efficient for:
- Beam spans up to 30’
- Slab spans up to 20’

**Post and Slab Band**
Efficient for:
- Beam spans up to 20’
  (longer if composite)

**Flat Slab**
Efficient for:
- Column spacing up to 12’

Column spacing decreases
Structure depth decreases
Modern Connections
Modern Connections
COLLABORATION WITH SUPPLIERS AND BUILDERS
Design for Manufacturing
Design for Transportation
Design for Installation
SEISMIC CONSIDERATIONS
ASCE 7-16

- No addition of mass timber lateral system into table 12.2-1
Options

- Concrete cores
- CLT walls
- Braced Frames
Options

- Concrete cores
- CLT walls (Usually)
- Braced Frames
CONCRETE CORES
BRACED FRAMES
STEEL EBFS
<table>
<thead>
<tr>
<th></th>
<th>Concrete Core</th>
<th>CLT shear walls</th>
<th>BRBs or Eccentrically Braced Frames</th>
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<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>😞</td>
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<tr>
<td><strong>Time</strong></td>
<td>😞</td>
<td>😊</td>
<td>😊</td>
</tr>
<tr>
<td><strong>Quality / Prefab</strong></td>
<td>😞</td>
<td>😊</td>
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<td><strong>Code</strong></td>
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<td><strong>Ductility</strong></td>
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</table>
Diaphragms

- Concrete topping
- Untopped CLT
- Rigid / Flexible assumptions
transfer at podium

- These buildings are NOT light frame where transfers are common
- Transferring the lateral system is costly and inefficient
  - Uneven distribution of lateral loads
  - Deep transfer beams
TALLER WOOD CONSIDERATIONS
Vibration due to wind

- Lightweight building with low damping → vibration challenge
- Added damping might be necessary at taller heights
Shrinkage and Creep

- Consider interface between wood + lateral system
- Short term: elastic shortening while building is loaded
- Long term: creep and shrinkage
Fire

- Structural consideration of fire
  - ASCE 7-16 Appendix E: Performance-based fire design
  - NDS Chapter 16 – fire design of wood members
  - AWC Technical Report 10 – expansion and examples
QUESTIONS?

ILANA DANZIG
ilana@aspectengineers.com