**STRUCTURAL**
- Strength
- Weight-strength ratio
- Ductile/Durable
- Dimensional
- Stability

**ENVIRONMENTAL**
- Sustainable/Renewable
- Low embodied energy
- Energy efficient

**AESTHETIC**
- Inspirational/Flexible/Creative
- Warmth/Beauty/Character

**SAFE**
- Fire resistant/Organic
- Non-volatile
- Seismically Resilient
SMALL LOGS
BIG OPPORTUNITIES
A SMALL COMPANY MAKING A BIG DIFFERENCE

Relationships
Innovation
People
Process
Leadership
Environment
HISTORY OF CLT

- Developed in Austria in the 1990’s and has been popular in Europe for over 25 years.
- ANSI/APA PRG 320-2012 Standard for Performance rated CLT
- Included in 2015 International Building Code (IBC)
WHAT IS CLT??

- Perpendicular layers of kiln dried lumber, glued and pressed.
- Plywood on Steroids
Production Method:
CLT MANUFACTURING

- Correct Ingredients
- Proper Sequence
- Suitable Environment
Quality Control
Scanning
Defect Removal
FINGER JOINTER

- Grecon-Dimter
- Vertical

Press

Saw
PLANER

REX
4 Head
STACKER

Minda
40’ and 12’
Comb-Lift
ADHESIVE

Single Part PUR
Non-toxic
Formaldehyde Free
2) Hydraulic Presses
• Clamshell Style
• 40’ x 12’
CNC

- Hundegger PBA
- Gantry Style
- 4 Head
- 5 Axis
ZERO WASTE

Shavings
Sawdust
Trim Ends
Bio Mass Furnace
CLT – MATERIAL PROPERTIES

DURABILITY
DIMENSIONAL STABILITY
SHEAR STRENGTH
SEISMIC RESILIENANCE
ACCOUSTICS
THERMAL CONDUCTANCE
AIR INFILTRATION
FIRE RESISTANCE
VAPOR DIFFUSION
MOISTURE MANAGEMENT
FIRE RESISTANCE

Fig. 20-4. After fire scene. Shows a wood beam supporting twisted steel I-beams. (Forest Products Laboratory)
CULTURAL BENEFITS OF CLT
CO2 REDUCTION

48M BF of CLT Represents 77,841 Metric Tons of Stored Carbon

30,118 Metric Tons of Avoided Green House Gas Emissions

Total Carbon Benefit of 107,959 Metric Tons of CO2 per Year

This is the Equivalent of Removing 20,620 Cars From Our Roadways Each Year
U.S. CO₂ Emissions by Sector

- Buildings 44.6% (2358 MMT CO₂e)
- Transportation 34.3% (1816 MMT CO₂e)
- Industry 21.1% (1116 MMT CO₂e)

Source: ©2013 2030, Inc. / Architecture 2030. All Rights Reserved.
48 Million Board Feet
Annual Production

Approximately 12,000
Logging Trucks

How much time does it take to regenerate 48M BF of wood fiber in North American Forests???

325 MINUTES
Wood is the Only Major Building Material That Grows Naturally and is Renewable

IT’S TIME TO CHANGE HOW WE THINK ABOUT OUR FORESTS!
ENERGY EFFICIENT

- Low Thermal Conductivity
- Minimal Air Infiltration
- Natural Moisture Management
- High Thermal Mass
- Zero Vapor Transfer
Based on 48M BF Annual Production

- Direct Jobs = 264
- Indirect Jobs = 264
- Worker Wages = $21,648,000.00
- Value of Benefits = $2,164,800.00
- Tax Revenue = $6,277,920.00
CLT CAN BUILD A STRONG ECONOMY
ONLY LIMITED BY YOUR IMAGINATION...

• Construction materials
• Wall panels
• Elevator shafts

• Industrial matting
• Bridges
• Decks and balconies
**Masonry (CMU) Elevator Shaft**

- **Size:** 7’0” x 10’0” x 41’0”
- **Fabrication Time:** 3-4 Week
- **Concrete:** 17 Cubic Yards
- **Rebar:** 3250 Linear Feet
- **Concrete Pours:** 8
- **Scaffold Sections:** 36
- **Inspections:** 8 (Every 5’)
- **Weather Impact:** Times and cost

**CLT Elevator Shaft**

- **Size:** 7’0” x 10’0” x 41’0”
- **Installation Time:** 1-2 Days
- **Panels:** 5
- **Crane:** 1
- **Screws:** 210 12”
- **Inspections:** 1
- **Weather Impact:** Minimized
Project: Candlewood Suites at Redstone Arsenal, Alabama

First full CLT building in US., Lend Lease
Completed 8/12/15
6 months after pad pour

- 92 Rooms
- 4 Floors

On-site framing labor was reduced by 43%
Potential increase in energy performance by 31%
“When we frame this out of wood or light gauge steel it would take 44 to 50 carpenters and now I’m down to 11 guys and a crane operator,” Bill Tobin.

- 58,000 square feet
- 1,557 CLT panels
Another Barn Raising

A few guys can do a lot in a few days
Q&A