The Innovation & Making Hub for the College of Engineering

Mass Timber Enhancing Project Goals

- Building as a teaching tool
- Forward-looking design
- Real-life engineering problems
- A toolbox for all scales of making
- Pedagogy of innovative thinking
- Innovation in construction technology
- High visibility with energy efficiency

Engineer’s Toolbox
A Toolbox for all Scales of Making

Large open column-free build spaces

Flexibility & adaptability of use

Aspirational design elements as a teaching tool

Environment for cornerstone to capstone engineering

Design from concept to industry partnership
Timber Curtain Wall

4.5

2' - 11"  

- Factory Attached Vertical Timber Mullion Extension
- Factory Mullion Extension Connection to be a concealed connection glued & screwed with No. 8 wood-plugs. See AL2Y and Plans for locations.
- Backer Rod & Sealant

- Continuous 1X2 Angle finished on exposed surfaces & attached to CA-4 Mullion.
- Continuous Steel Angle Pour Stop

- Lateral Average Connector: Steel Knife Plate Connector located in slot in Wood Mullion, size to be engineered with CR System
- Painted Continuous Steel Angle color to be reviewed and approved by Architect.
- Upright Sprinkler, aligned with Mullion
Thermal Performance & Comfort

**ALUMINUM + TRIPLE GLAZING**

- $U = 0.25$

**TIMBER + TRIPLE GLAZING**

- $U = 0.14$

**TIMBER + DOUBLE GLAZING**

- $U = 0.22$

Expanded comfort zone to 3’ 6”
Performance Based Embodied Carbon Savings

Global Warming Potential

- Traditional Curtain Wall
- Timber Curtain Wall

47% Reduction

Global Warming Potential

- Aluminum
- Timber

kgCO₂eq

Glazing System  Aluminum CW  Timber CW
Wood Palette

History of Making

- Heavy timber industrial mill buildings with large open interior floor plans
- Industrial use of wood flooring for durability

Targeted Embodied Carbon Reduction

Health & Wellness of Occupants

Biophilic Benefits

Beauty
Hybrid Structure

- **High Bay:** REINFORCED CMU & STEEL FRAMING
- **Roof:** STEEL DECK & STEEL FRAMING
- **Levels 1, 2, 3, 4:** CLT DECK ON STEEL FRAMING
- **Basement:** CONCRETE FOUNDATION & SLAB ON GRADE

32'

54.6'
Competitive Bidding Considerations

- CLT species, stress grade, panel size & thickness, ANSI/APA PRG 320 certification
- Glulam options compatible with timber curtain wall
- Responsibly sourced wood availability from different manufacturers
- Factory vs. field applied sealant for moisture mitigation depending on manufacturer
- Acoustic floor assembly options with equal performance and dimensions
Floor Assembly

Availability of wet vs. dry acoustic assemblies

Concrete vs. gypcrete

Finish floor subfloor requirements

Acoustic performance and dimensional variability in products

Performance-based concrete topping (low embodied carbon)

Adequate depth for floor boxes and conduit
Intersection of CLT & Steel
Bidding the Packages

Cross Laminated Timber:
1) Packaging CLT with Structural Steel
2) Pre-Qualification Process
3) Pre-Bid and Scope Review Meetings
4) Education of All Trades

Timber Curtainwall:
1) Packaging with all glazing
2) Locked into local, small firm

V. PROJECT OVERVIEW / DRAWINGS AND SPECIFICATIONS

- Cross-Laminated Timber Decking
  - No permanent markings on the bottom
  - Approved hangers only
  - Remove water
  - All penetrations need to be approved by the CLT Engineer
  - Will receive a concrete topping slab
  - THIS IS A FINISHED PRODUCT AND WILL BE EXPOSED FROM BELOW
Pre-Construction Phase

Cross Laminated Timber:

1) Immediate vendor buy-in

2) Pre-Construction / Pre-Installation Meetings
   1) During MEP coordination
   2) Prior to manufacturing
   3) Factory visit (attempted)
   4) Prior to shipping
Pre-Construction Phase

Timber Curtainwall:

1) Immediate vendor buy-in

2) Pre-Construction / Pre-Installation Meetings
   1) Prior to steel installation
   2) Before material release
   3) Factory visit
Installation of CLT

1) Moisture Management Plan
   a) Develop
   b) Maintain
   c) Lessons Learned
      i) Review every condition
      ii) Adjust to site conditions

2) Ease of Installation
   a) Quick learning curve

3) Open Communication
   a) “Lean” problem solving

4) Preservation of CLT Underside
QUESTIONS
This concludes The American Institute of Architects Continuing Education Systems Course

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