DESIGN ENGAGEMENT: BUILDING THE TEAM AND MANAGING THE DESIGN

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Building the Team

Considerations:

- Procurement method
- Design phase
- $\hfill\square$ Team experience with mass timber
- Understanding of current code
- $\hfill\square$ Has a decision on the use of mass timber been made?

Design-Assist Subcontractors:

- □ Mass timber supplier
- Mass timber erector
- MEP subcontractors



Structure Comparison

Concept Pricing Considerations:

- Construction type
- □ Fire resistance rating
- □ Floor-to-floor height
- □ Structural grid & column spacing
- □ Transfer slab/beams (i.e. U/G parking)
- □ Lateral resistance frame & shear walls
- □ Foundation sizing & type
- □ Interior finishes
- Core & shell vs. fully built-out
- □ LEED/sustainability requirements
- Construction duration



Impact of Construction Type

Location of Event Space	Rooftop	1 st Floor
Construction Type	III-A	III-B
Assembly Group	A-3	A-3
Fire Resistive Rating	1-Hr	Not required
Connections	Concealed	Exposed
CLT Panel Thickness	5-Ply	3-Ply
Superstructure Cost/SF	\$65/SF	\$53/SF



Impact of Construction Type

	Office & Residential	Office Only
Floors	9-stories	8-stories
Building Height	92'-6"	80'-6"
Construction Type	IV-B	IV-C
Occupancy	B & R-2	В
Fire Resistive Rating	2-Hr	2-Hr
Exposed Ceilings	30%	100%
Connections	Concealed	Concealed
CLT Panel Thickness	5-Ply	3-Ply
Superstructure Cost/SF	\$77/SF	\$62/SF



Supply Chain



Manufacturer Selection

- Domestic vs. International Sourcing
- □ Varying Panel Fabrication Size Limits
- Engineering Support
- Panel Width Shipping Constraints Land vs. Sea
- Proximity to Jobsite / Shipping Costs
- □ Supplier Only vs. Turn-Key
- □ Sustainability FSC vs. SFI Certification
- Aesthetic Considerations
- Wood Species & Stains



Procurement Best Practices



Early Go/No-Go Decision on Mass Timber Design-assist involvement □ Early supplier selection vs. competitive bid Optimize structural grid with supplier input □ Maximize time for design coordination □ Shop drawing release □ MEP coordination Fabrication lead time □ Constructability reviews Transfer of Revit model to contractor



Construction Tolerances



Dissimilar structural material tolerances

- Allowable tolerances ACI, AISC
- Steel: +/- 1/2"
- Concrete: 1/4" in 10 ft., up to 1'
- Mass Timber: 1/16"

Quality Control

- Build tolerance into the interface detail
- Base plate layout & verification
- Overlay field scan with 3D model



MEP Coordination





Raised Access Flooring

Overhead Routing w/ Soffits



Case Study: Wood Innovation & Design Center



Case Study: CSU Pavilion at Laurel Village

1st CLT project in Colorado (2014) LEED Platinum certification

No topping slabs at floor assembly
Rigid insulation at roof assembly
Long span, exposed ceilings
Extensive use of mockups





Case Study: Burwell Center

Challenge: No exposed conduit!

- Well defined space programming
- Originally explored access flooring
- □ 3" topping slabs at floor & roof assembly
- □ 3D model <u>ALL</u> conduit
- Penetration overlay with CLT shop drawings
- □ Strategic placement of soffits & ceilings
- Topping slab reinforcing



MEP Coordination: Best Practices

- □ Identify aesthetic MEP routing goals early
- Determine extent of flexibility required
- Early transfer of REVIT model
- Prioritize MEP penetration coordination
- □ Consolidate MEP in soffits/ceilings
- Maximize shop penetrations made with CNC machine in factory
- □ Minimize field penetrations



Critical Early Design Decisions

- □ Structure type
- □ Structural grid
- □ Select mass timber supplier
- Building height
- Construction type
- □ Fire Resistance Rating
- Occupancy Classification
- □ MEP systems
- □ MEP routing goals
- □ Floor-to-floor height



Thank you!

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