Schedule Management

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Learning Objectives

Schedule
Design Completion
• Speed of design completion needs to consider time for constructability review and adjustments.
• Ideally, the project delivery method allows to bring on structural + MEPF trade partners prior to design completion
• If project delivery method does not allow for early constructability review, budget more time for RFIs and shop drawings
• Example of constructability feedback: Designing to accommodate tolerances of concrete/steel. Many times, a ½” gap between steel/concrete and CLT is acceptable for clearance reasons but we have had bearing issues in the past and giving an inch of play on each side should be our goal going forward.
• Basis of design must consider that Manufacture availability is ranging 3-10 months out, a sole source design could delay the project schedule
• Consider time for 3rd party fire / code review and adjustments

Trade Coordination
• Other structural trades must have shop drawings and corresponding 3D model approved / “locked” for fabrication before timber detailing starts – or risk rework
• The MEPF model sign off procedure needs to be completed with a finish to finish relationship with mass timber shop drawing review, assuming “as late as possible”
• The goal is that coordination is occurring 3-6 months earlier in the project than conventional practice – this is a big shift

Procurement
• AEC team should plan for a big push to get through shop drawing review
• Lingering questions from shop drawing review could drag on for weeks or months if not addressed definitively
• Duration from shop drawings to production start varies by supplier
• Reconcile truck loading with construction sequence to reduce time for intermittent handling

Construction
• Logistics, laydown space, truck flow is critical to speed of installation. Tight sites and a lack of access to the crane dramatically decreases workflow and increases crew size. Space for crane and at minimum 1 truck in swing radius is needed.
• Best timing for construction is during dry months (varies by region) this timing is influenced by items 1, 2, 3 above
• Advancing of permeant lateral system to stabilize frame as soon as possible and shorten duration of temporary bracing
• Prepare follow-on trades to take advantage of swift structure installation
• Install roof as quickly as possible
TRADE PARTNER SELECTION

When do you bring on a vendor or subcontractor?
Project Award and Design Completion

2020

Jan 1 100% Design Development (or 50% CDs)

Feb 12 - Feb 13 Award Mass Timber Package

Mar 12 - Mar 13 Deposit Payment Due
Selecting a Trade Partner

Trade Partner Options

• Vendor Only
• Turnkey Provider
SHOP DRAWING PROCESS

How much time will it take to get from here to fabrication-level 3D model?
<table>
<thead>
<tr>
<th>Date Range</th>
<th>Activity Description</th>
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<tbody>
<tr>
<td>Feb 12 - Apr 9</td>
<td>Geometry Modeling</td>
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<tr>
<td>Feb 12 - Mar 25</td>
<td>Fabrication-Ready Steel/Concrete Model (Lateral System)</td>
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<td>Slab Edge</td>
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<tr>
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• Geometry Model

• Architectural Intent?

• Where is the CLT Edge?

• Importance of a Slab Plan
Constructability Feedback

W18x86 Typ. Condition

Flange Width = 11.1"

Maximum Tolerance Gap = 1.25"
Governed by Bearing
Minimum Tolerance Gap TBD

Screw to CLT Panel
Edge Minimum

Screw Tolerance

Hole to edge of beam
minimum distance

Minimum Bearing
Requirement

Typical Spline Connection per 1/S-801 not required at
least-west end of CLT panels where occurs over WF
beam, ref 2/S-801.
Early Award Trade Packages

- Coordination is occurring 3-6 months earlier in the project than conventional practice. This is a big shift.
- All factory penetrations must be finalized during the shop drawings process.
MEPF Coordination for Prefabrication

MEPF model sign off procedure needs to be completed with a finish to finish relationship with mass timber shop drawing review, assuming “as late as possible”
RFIs Take Time
• Types of RFIs Include:
  • Geometry Based Questions
  • Discrepancies between Structural and Architectural
  • Fire Related RFIs
  • Finishes Related RFIs
How long will it take for materials to arrive on site?
Procurement Schedule

2020

Apr 1 - Sep 22: Procurement

Apr 1 - May 15: Single Piece Shop Drawings

May 18 - Aug 28: Manufacturing and Fabrication

Jul 20 - Sep 22: Delivery to Staging Area
Single Piece Detailing
Shop Drawing Review

Review

• AEC team should plan for a big push to get through shop drawing review
• Lingering questions from shop drawing review could drag on for weeks or months if not addressed definitively
Project Phasing & Sequencing

- Reconcile truck loading with construction sequence to reduce time for intermittent handling
- Consider project phasing for large floor-plate (25,000+ SF) buildings
Material Lead Time

- For small (<50,000 SF) projects, RFI and shop drawing process consumes the bulk of material lead time.
- For large (>100,000 SF) projects, production duration begins to exceed shop drawing duration.
- Material Lead Time is a function of how developed and detailed the drawings are.
- Larger projects must be procured earlier, especially if there are production constraints. Plan to stockpile material.
CONSTRUCTION

How fast can we build?
Off-Site Storage

Temporary local storage and local delivery of materials

Proper protection of material

Proper documentation of material hand-off via BIM 360 Field Checklists
Truck Flow

Logistics, laydown space, truck flow is critical to speed of installation.

Tight sites and a lack of access to the crane dramatically decreases workflow and increases crew size.

Space for crane and at minimum 1 truck in swing radius is needed.
Productivity is based on piece count
More pieces = Longer Install Duration
Different suppliers manufacture panels of different lengths
A job may have 80 CLT panels with Supplier X, and 140 CLT panels with Supplier Y.
Advancing of permeant lateral system to stabilize frame as soon as possible and shorten duration of temporary bracing.
Early Move-In for Follow-On Trades

- Prepare follow-on trades to take advantage of swift structure installation
Install roof as quickly as possible
This concludes The American Institute of Architects Continuing Education Systems Course

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