Risk Analysis and Scheduling Approaches

with Chris Evans

Woodworks | August 19, 2020

Disclaimer: This presentation was developed by a third party and is not funded by WoodWorks or the Softwood Lumber Board.
Presentation Goal:
To identify potential project risks, recommend mitigation tactics, so that mass timber projects can be implemented with financial efficiency.
Risk and Schedule Management Learning Objectives

**Financial Risk**
- Project Delivery Method
- Purchasing: Exchange Rate
- Purchasing: Commodity Pricing
- Project Delivery Method

**Jurisdictional Risk**
- Code Path
- Code Interpretation
- Limited Tested Assemblies
- Field Inspections

**Schedule**
- MEPF Penetration Incorporation
- Schedule Critical Shop Drawing Dates
- Adjacent Structural Systems
- Manage RFI Process
- Factory Backlog & OPP
- Erection Sequencing Constructability
Project Risks

FINANCIAL

JURISDICTIONAL

SCHEDULE
FINANCIAL RISK

Project Delivery Method
Purchasing: Exchange Rate
Purchasing: Commodity Pricing
Project Delivery Method

Project Delivery Matters: Why?

- CMGC, GC/CM, CMAR, Design-Build

5% Savings - Neutrality - 10% Premium

Design-Bid-Build
Project Delivery Method: New Product Types

Risk: New and unfamiliar products can lead to unoptimized design => $$$$$
Mitigation: Gain technical knowhow from industry experts => $
Can Details Be Fabricated?
Can Details Be Installed?
Efficient Detailing and Fabrication leads to Lower Installation Costs
Risk Mitigation Strategies:
Avoid Design-Bid-Build
Hire and use a CM or GC during design for paid precon => spend $ to save $$$
Engage with a mass timber firm during precon to optimize system costs
Risk: Purchase of material has exchange rate risk
Mitigation: Be prepared to execute an LOI to lock in exchange rate risk at time of bid. This approach requires teaming effort with owner, contractor, architect, and engineer.

Bid Date: May 15th, 2020
Bid Amount: $1,000,000
Bid Amount is not locked, varies with exchange rate
Bid Leveling, Approvals, Etc.: May 15th – July 28th
LOI Date: July 28th
Purchase Price: $1,096,500
Financial Risk: $96,500 or 9.65%
Risk: Purchase of material has commodity index risk, similar to steel and concrete.

Mitigation: Be prepared to execute an LOI to avoid commodity price risk at time of bid. This approach requires teaming effort with owner, contractor, architect, and engineer.
JURISDICTIONAL RISK

Code Path
Code Interpretation
Limited Tested Assemblies
Permit Comments
Field Inspections
Risk: Local adoption of code influences what can and can’t be done with mass timber
Mitigation: Understand code path and required variances at inception of project
Each jurisdiction may interpret the code slightly differently.

**Mitigation:**

- Meet with the AHJ for pre-app conferences to discuss code interpretation for project
- Document and circulate meeting minutes to ensure team is on the same page
Limited Tested Assemblies

2 HR Shafts through Non-Rated or 1 HR Floors
2 HR rated Timber to Timber Connections

Limitations of tested connections (loading in Kips)

Risks:

Tested assemblies may be required

Mitigation:

Engage consultants and system experts to determine what project details require engineering judgements or project specific testing. Can the design be modified to remove engineering judgements or project specific testing?
Incorporate Permit Comments into Shop Drawings

Risk: Permit comments required to complete mass timber shop drawings

Mitigation:

- Know when first round of structural comments are anticipated, place date in schedule
- Ensure structural comment date is tied to critical path in schedule
Risk: Approved permit does not limit field inspector interpretation of the plans.
Mitigation:
Determine assemblies requiring engineering judgements
Proactively plan for inspections and engage inspector prior to onsite inspections
SCHEDULE RISK

MEPF Penetration Incorporation
Schedule Critical Shop Drawing Dates
Adjacent Structural Systems
Manage RFI Process
Factory Backlog & OPP
Erection Sequencing Constructability
Early MEPF Involvement Leads to Schedule Enhancement

Risk: Failure to engage MEPF partners early leads to difficulty field fabricating penetrations

Mitigation:

Take advantage of CNC Technology, coordinate MEPF trades early in project design
Prefabricating MEPF openings leads to quicker field installation times and better quality
Shop Drawing Schedule
Risk: Failure model, and build off of model, for adjacent structural systems (concrete/steel)
Mitigation:

Ensure subcontractor performing steel and concrete structures build off of a model
Coordinate timber model with other structural models
RFI Submission & Response Timing

Risks:
Protracted RFI submittal and response period leads to hold ups with fabrication drawing development

Mitigation:
Teamwork and RFI meetings between AEC teams will speed up RFI period and facilitate timely execution of fabrication drawings
Risk: If large projects ahead of you in the factory’s queue get delayed then your material may become delayed
Mitigation: Understand the manufacturer’s backlog and risk associated with those projects.
(1) Steel holddown plate attached to CLT
(2) Set CLT wall
(3) Weld hold-down transfer plate to Connection Link
(4) Set tube steel column
(5) Infill CLT panel
(6) Set Steel beam on CLT wall
(7) Set remaining CLT walls on top of HSS tube steel.
Thank you!

Chris Evans
Director
Swinerton Mass Timber
cevans@swinerton.com
971.803.1843

The mission of Swinerton Mass Timber is to accelerate the mainstream adoption of mass timber construction by providing comprehensive engineering, procurement, and construction (EPC) services in the US commercial construction market.