



Mass Timber Construction

Optimizing Transportation and Staging

Presented by Dave Beck, XL Construction

GOOGLE 1265 BORREGAS PROJECT
SUNNYVALE, CALIFORNIA
185,000 S.F.
5 STORIES



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Mass timber is an innovative building material with many benefits, including construction speed, aesthetics, sustainability, and strength-to-weight ratio. The beauty of the finished product has inspired many owners and designers to pursue mass timber for their projects. However, while design and code aspects receive a great deal of focus, it is the construction aspects that often decide whether a project goes forward. While mass timber draws installation techniques from other construction types, it also has unique attributes—and a complete understanding of the differences is key to efficient estimating, planning and construction. This workshop is designed to address critical gaps in knowledge and skills among contractors and installers, with topics such as cost considerations , site planning, schedule, and risk mitigation . It will also include three brief case studies highlighting design team interaction, challenges, benefits and lessons learned during construction. Intended for construction industry professionals looking to gain a deep understanding of the unique attributes of mass timber, this workshop will leave attendees with information they need to successfully bid and construct a mass timber project.

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1. Understand the unique attributes and considerations of mass timber construction.
 2. Determine how to manage mass timber building sites and mitigate potential risks to personnel, material and ultimately, schedule.
 3. Discuss project workflows to identify potential construction schedule savings and maintaining thorough construction safety practices.
 4. Explore best practices for coordination with the mass timber manufacturer, planning and scheduling for cost efficiency, and safety on site.

12-Week Duration

Mass Timber Erection Progress



Week 1



Week 4

12-Week Duration

Mass Timber Erection Progress



Week 7



Week 8

12-Week Duration

Mass Timber Erection Progress



Week 10



Week 12

12-Week Duration

Mass Timber Erection Progress



- » 1,900 pcs / 12 weeks
- » 158 pcs / week
- » 32 pcs / day

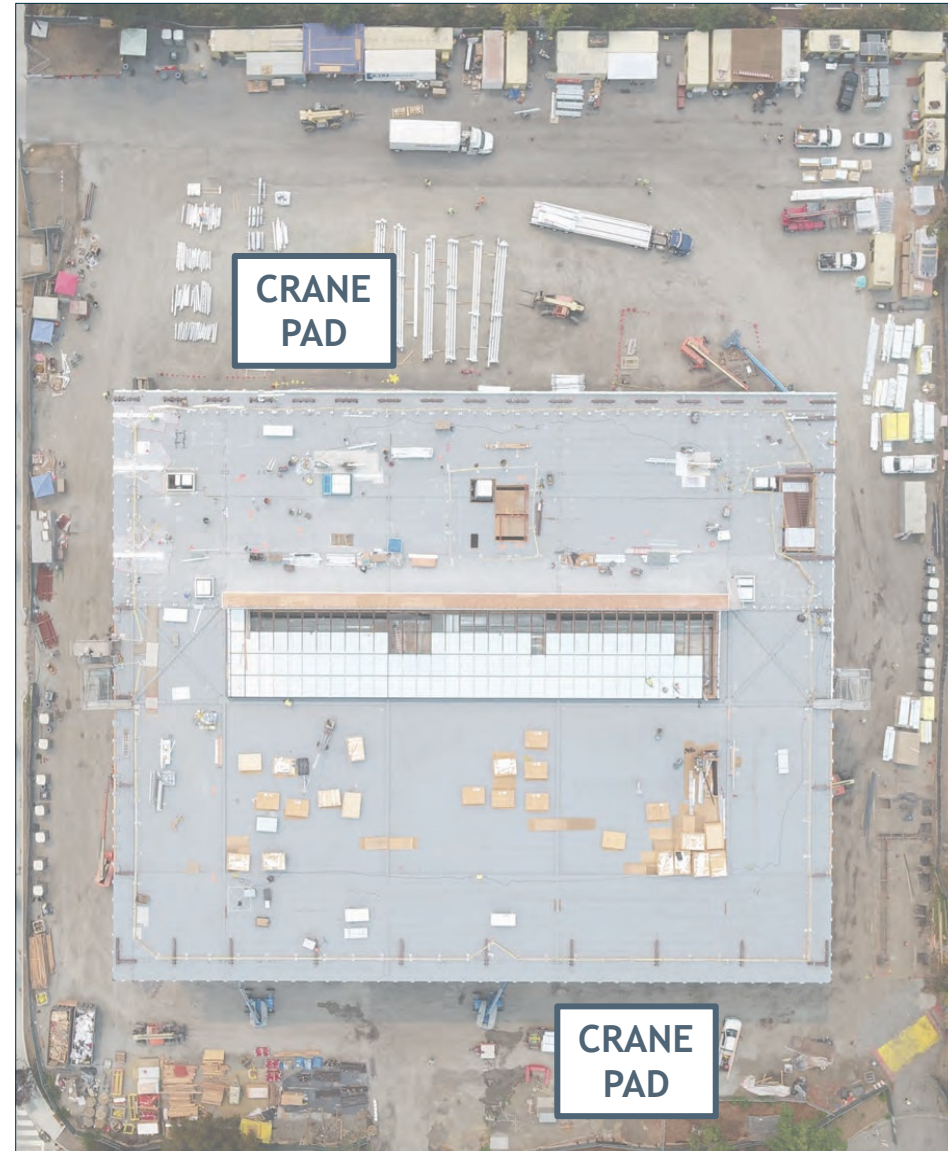
Storing and Staging

Determine how much storage space will be required for staging of Mass Timber material.

» Is there enough space on site?

OR

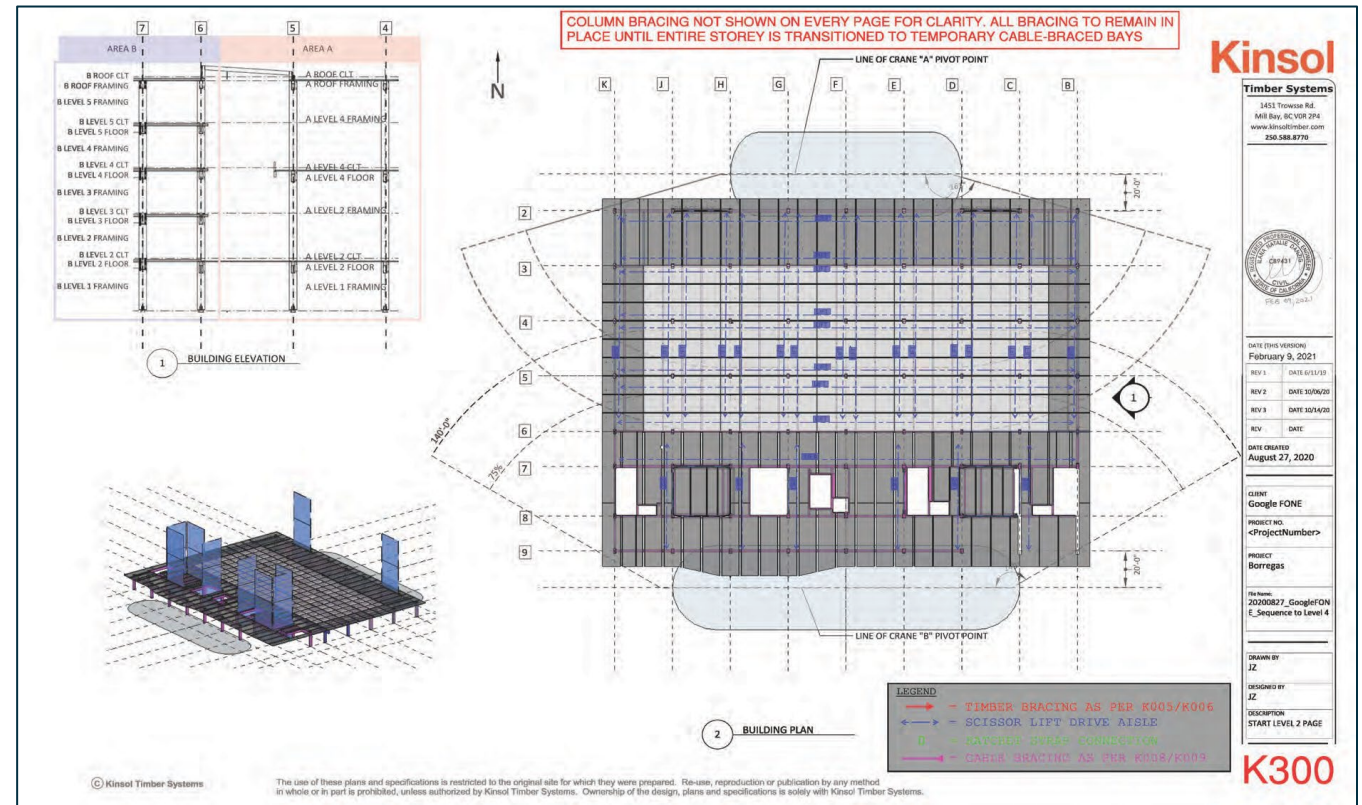
» Will a staging yard be used?
(with just in time delivery)



Determine Erection Sequence

Develop the project's *erection sequence* to inform:

- » Priority of manufacturing
- » Sequence of deliveries



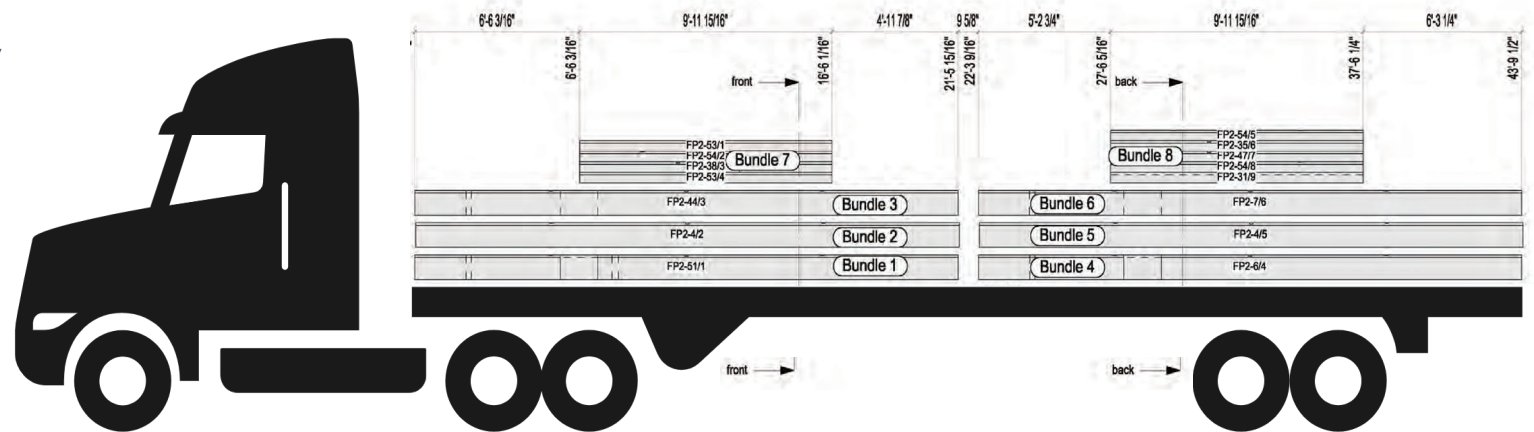
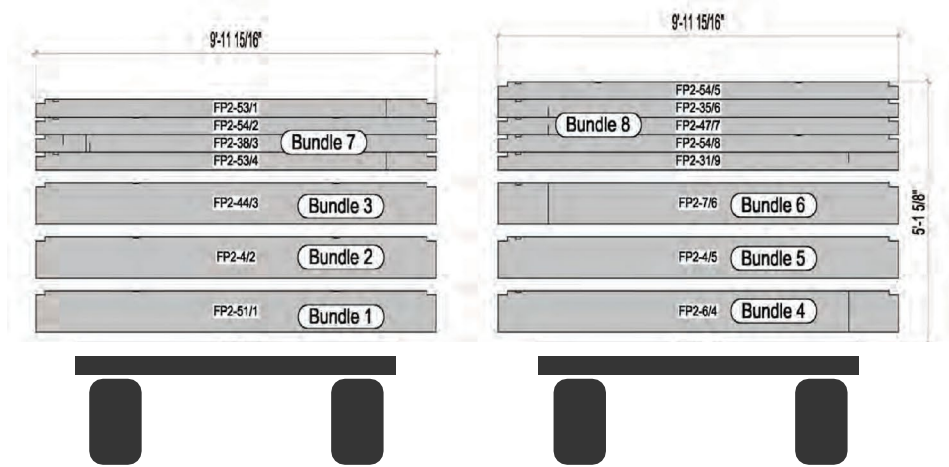
Level 2 Erection Sequence Drawing

Trailer Load Sequencing

Work with timber manufacturer to determine trailer load sequencing.

CONSIDER

- » Are there efficiencies in manufacturing all similar members at once?
- » Develop most efficient loads based upon weight and space.



549 Baltic Way

Timber Yard Storage

- » 4-acre site
- » 140 loads delivered over 5 months
- » 125 stacks of timber
- » 75,000 CF of glulam material
- » 120,000 CF of CLT material
- » 1,900 pieces Total

Layout Your Timber Yard

- » Develop stacks that will be as similar as possible to how deliveries to the site will be made
- » Minimize handling of product
- » Reverse stack the timber members in piles



Storage Site Map

Receiving Site Equipment



36,000 LB FORKLIFT

Special fork attachments:

- » 8' long
- » 1.75" thick



15,000 COMBI LIFT

With bi-lateral movement capabilities

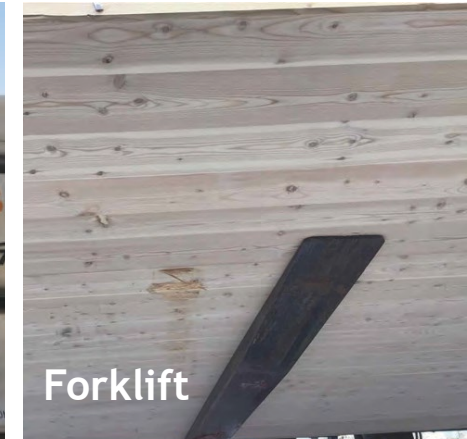
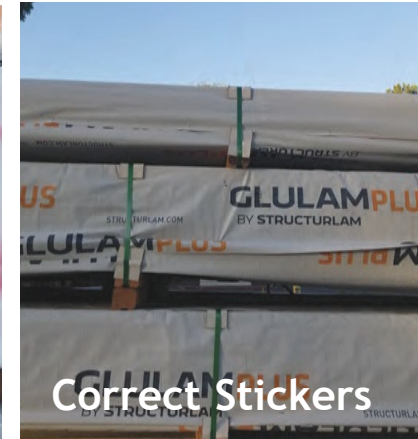
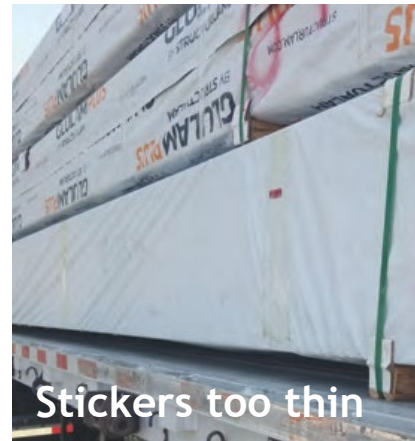


SAFETY TIE-OFF BEAM

For use on manlifts to access stacks taller than 6'

Shipping and Receiving Best Practices

- » Use thicker stickers between members - allows for site forklifts to unload without damaging members.
- » Proper strapping of loads to prevent chatter marks during shipping.
- » Have appropriate dunnage at storage yard. Maintain required clearance off ground and set all members level. (Consider using cut up CLT product for dunnage.)



Shipping and Receiving Best Practices

SUNTANNING

Storing Mass Timber with manufacturers wrap with printing on it long-term will cause suntanning on the timber with the printing baked into the surface.

- » Use additional UV protective tarps to cover all material.



Suntanning from Wrap

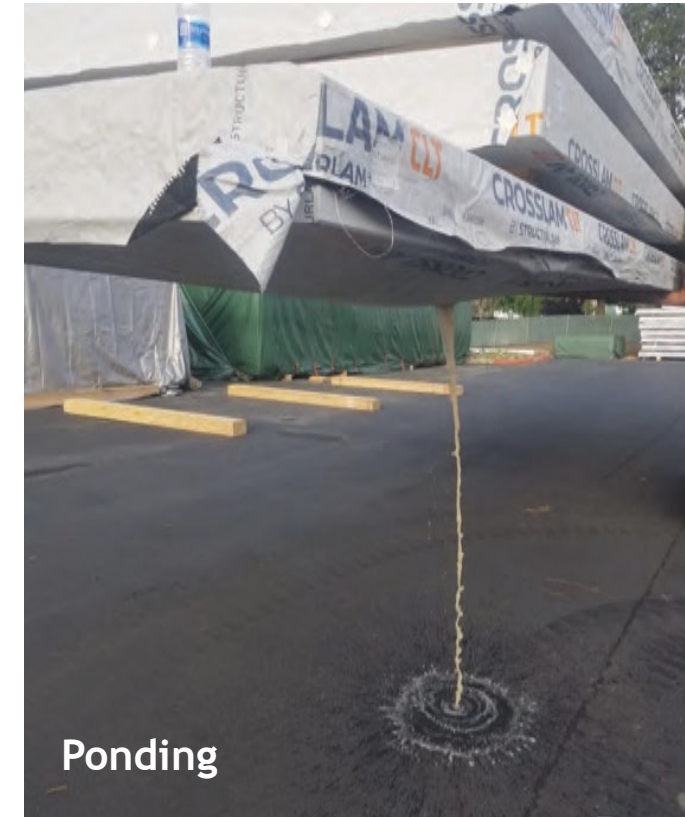
PONDING

Pay attention to detail of wrapping stacks to prevent ponding of water.

- » Open up tarps after heavy rain to allow moisture to escape.



UV Protective Wraps



Ponding

Tracking Connectors and Screws

- » Keeping track of loose steel connectors
- » Keeping track of screws by grouping by area



Screw Group & Documentation



Labeled Loose Steel Connectors



Shipping Timber: Manufacturer to Storage

» Consider travel time in timber receiving schedule:

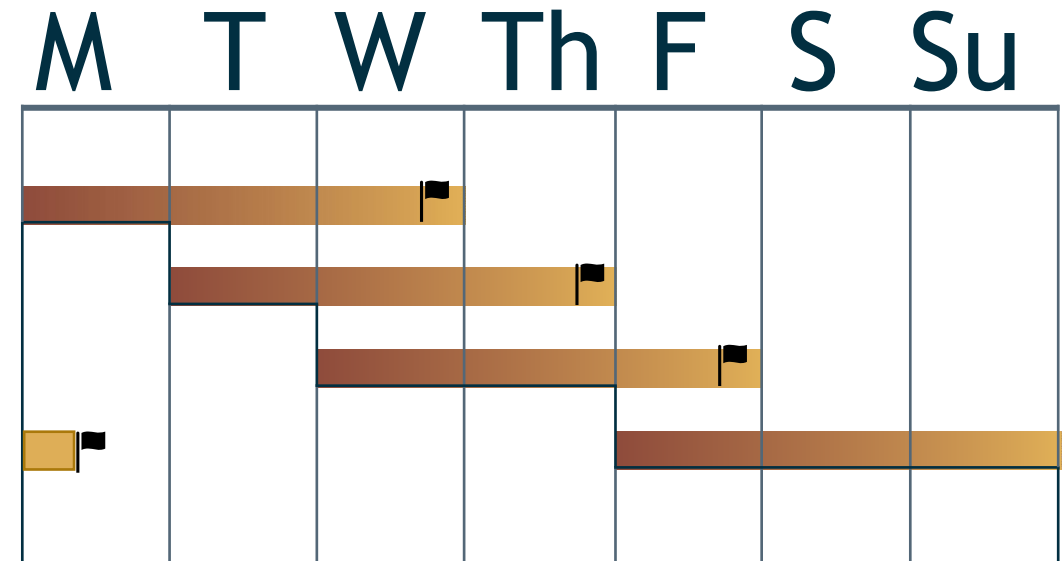
- Borregas had a 3-day route
- No deliveries on Tuesdays at site

» Allowable time to unload trailers:

- » 2 hours
- » Shorter for CLT
- » Longer for Glulam

» Consider 3-4 loads per day

Canada  MT1 Sunnyvale, CA



Shipping Timber: Storage Yard to Project Site



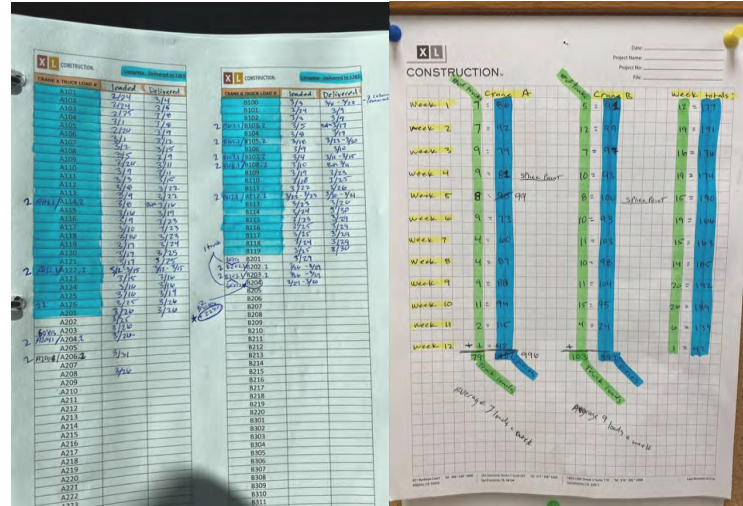
Timber Shipping Trailers

- » Used (20) 48' long trailers and 1 driver with tractor.



Individual Load Document

- » Just in time shipping approach (2-3 days of material always loaded)



Load Tracking Spreadsheet Examples

- » Delivery tracking sheets



Screws Shipped by Erection Area

Shipping Timber: Storage Yard to Project Site

When loading for delivery to site, organize and brace members to make it as easy as possible for the field crews to rig and offload the members.



Loaded for Crane Picking



Skylight Component
Pre-Assembled & Loaded



Loaded Trailer Arriving at Site

Costs of a Storage Yard

- » Three tradespeople to receive, store, and unload material
- » Management of load planning
- » Equipment rental
- » Winter weather protection



Loaded Trailers With Documentation

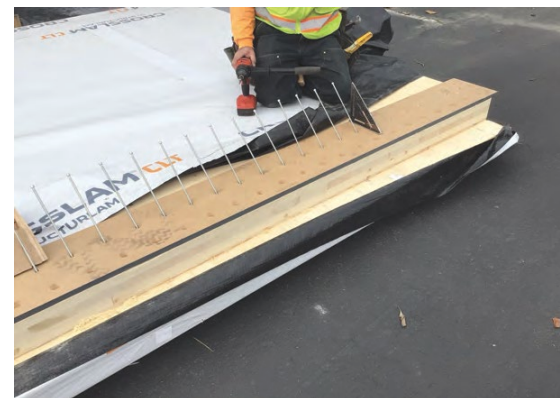


Tarping and Strapping Down

Benefits of a Storage Yard

- » More flexibility in shipping from manufacturer
- » Maximize shipping loads
- » Able to confirm all members are in yard ahead of erection
- » Allows for installation of hardware and screws ahead of erection
- » Able to modify timber resulting from changes ahead of erection

Goal: Minimize erection time due to no material availability issues



Benefits of a Storage Yard

1265 BORREGAS TIMBER YARD

- » Erection Costs - \$3,000/hour
- » 2 x 275 Ton Crawler Cranes with (2) 7-person erection crews
- » When project was shut down due to COVID-19 and City permits were delayed, timber manufacturing and delivery still proceeded as planned.
 - Avoided COVID-19 manufacturing impact costs



QUESTIONS?

This concludes The American
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Dave Beck

XL Construction

Thank you

