

## Mass Timber Integrated into Building Enclosures

- Mass timber elements often part of the building enclosure
  - Above grade walls & roofs
  - Wood desired to be left exposed for function and aesthetics
  - Protection from moisture during construction & in-service
  - Heat, air, and moisture, noise and fire
  - Movement: structural loads, initial & seasonal wood movement
  - Structural: load bearing or not (infill or curtainwall)



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## What Makes Mass Timber Buildings Unique?

- Use of engineered mass timber components
  - Alternate structural systems (post/beam, engineered panels, infill components)
  - Unique & new connections, interfaces & details
  - Hybrid steel-wood-concrete components & connections
- Longer & heightened exposure of large wood components to rain and weathering during construction
- Is not the same as stick built mid-rise wood-frame, but is also different from high-rise steel or concrete structures



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## Tall Wood Structures

- Potentially erected fast
- Sensitive to moisture
- Greater movement (shrinkage & drift)
- Mixed steel, concrete & wood components & connections
- Fire codes dictate protection during erection and exposure of wood finishes when complete



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Post & Beam w/  
Interior Shear Walls

Post & Plate w/  
Core Shear Walls

Solid Wall & Floor Panels  
w/ Exterior Shear Walls

## Tall Wood Building Enclosures

### → Need for Speed

- Erect and seal as fast as possible to protect the wood structure
- Preference for offsite prefabrication & minimal site preparation
- Be accommodating of inclement weather

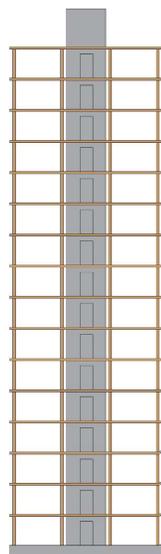
### → Ensure Durability

- Robust materials - high-rise appropriate
- Be more tolerant of movement
- Thermally efficient
- Non-combustible



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## Building Enclosures for Tall Wood Structures

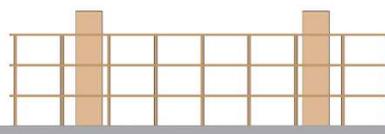


### → Tall Structures

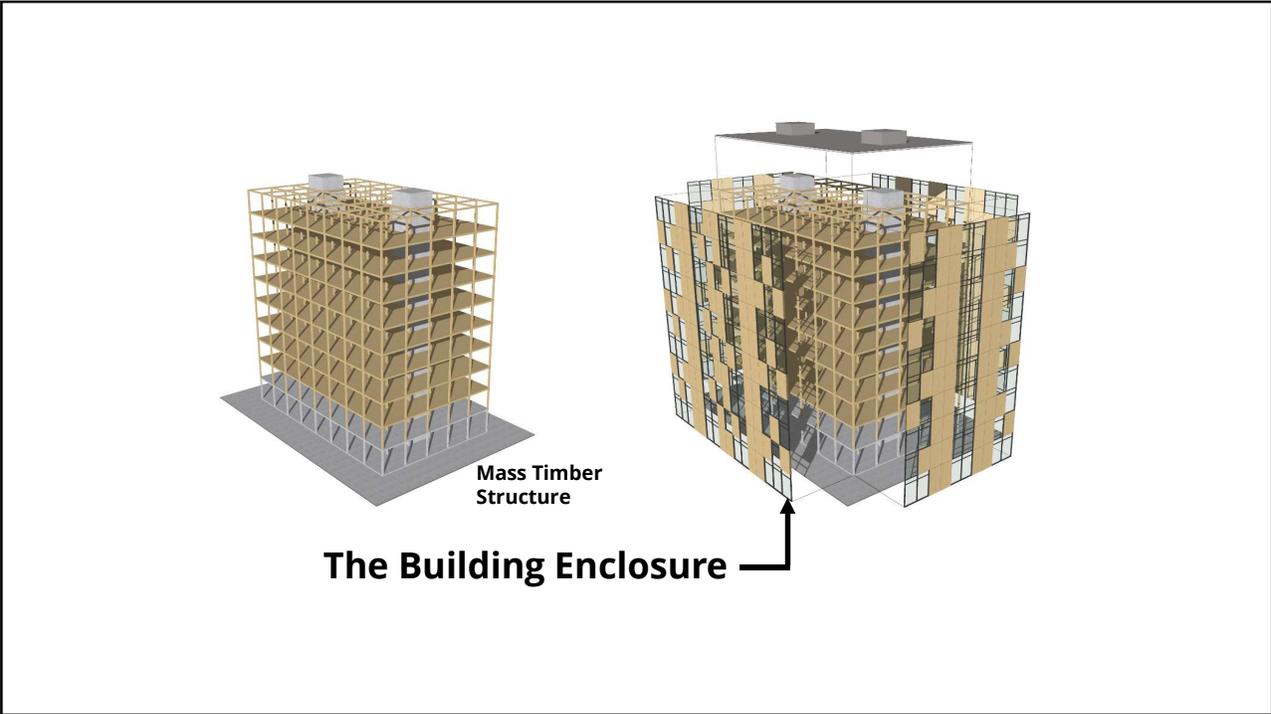
- More repetitive, more exposed, need for more speed - *ideal for prefabrication*
- Less focus on roof and more on walls for weather protection

### → Low-rise structures

- Less repetitive? Less exposed
- Greater focus on roof for weather protection than walls



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### Good vs Bad Use of Mass Timber

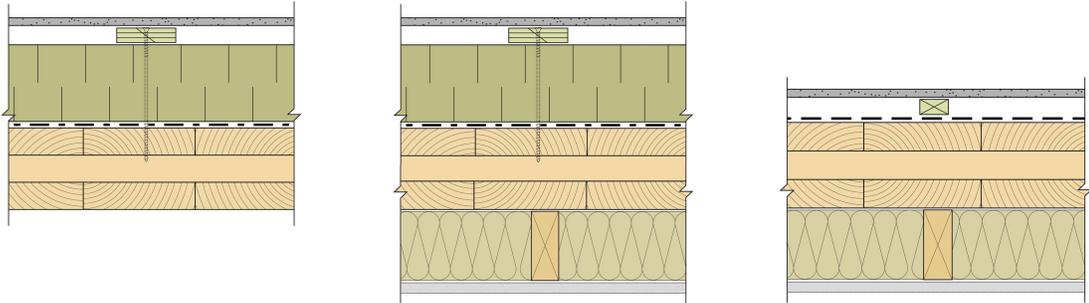


Good - Warm, dry and protected by the building enclosure ☺

Bad - exposed to weathering ☹



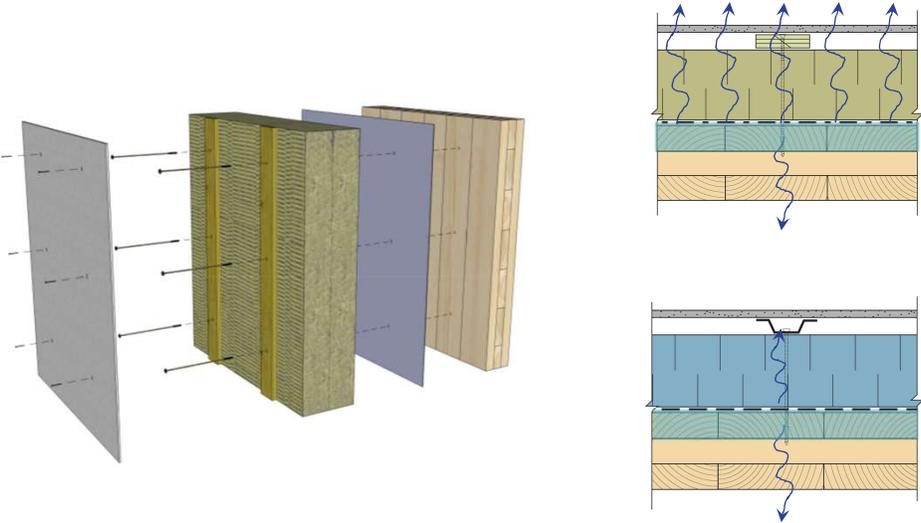
### CLT Wall Considerations



Best Placement & Insulation Type? - It Depends!



### CLT Walls - Exterior Insulated Is Better in the North

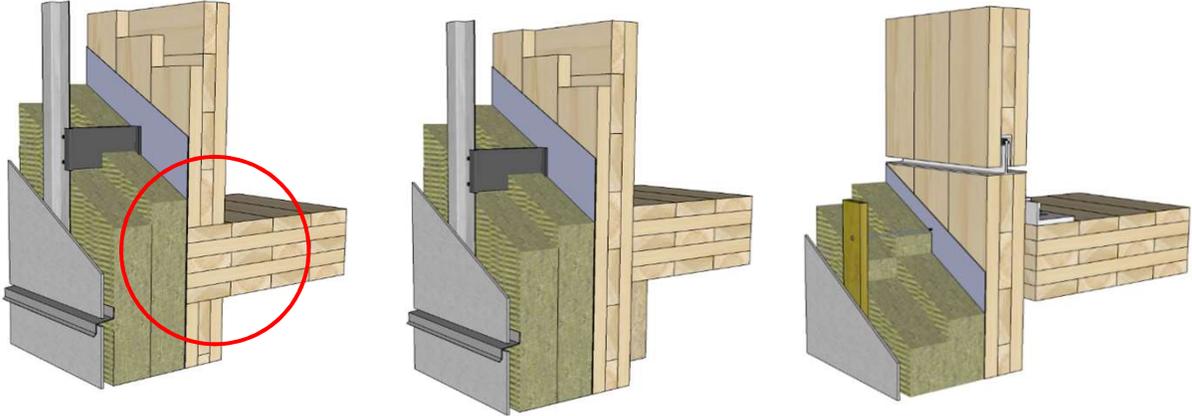


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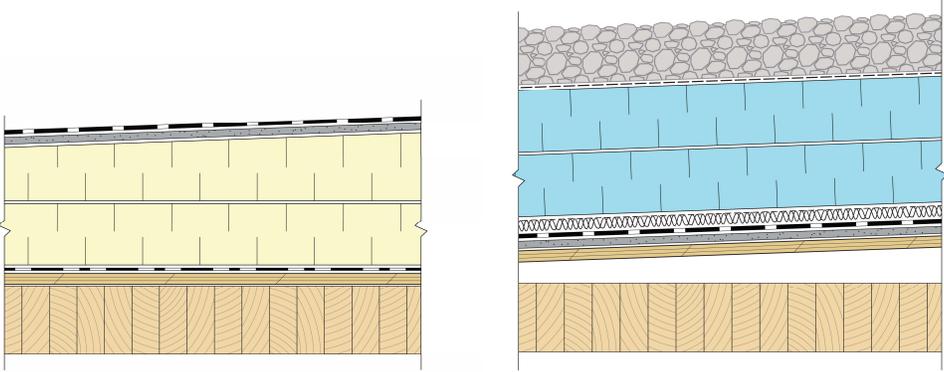
Origin: Nordic Structures

### CLT Wall Considerations - Movement



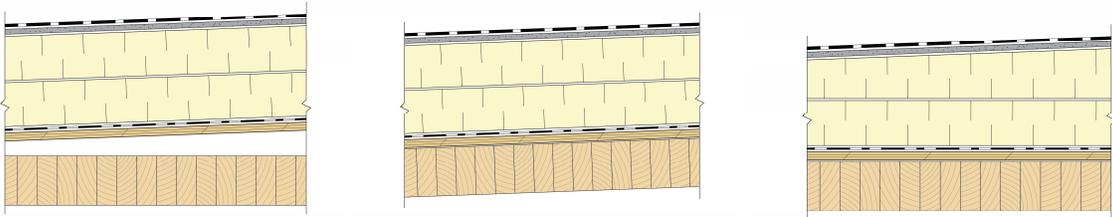
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### Roofs - Exterior Insulated (Conventional or PMR)



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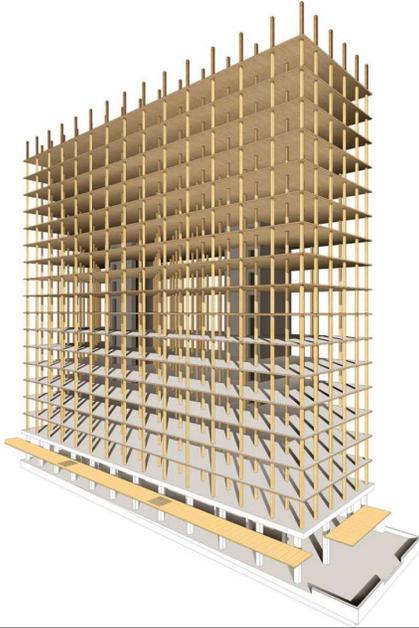
### CLT Roof Considerations - Slope & Wood Protection



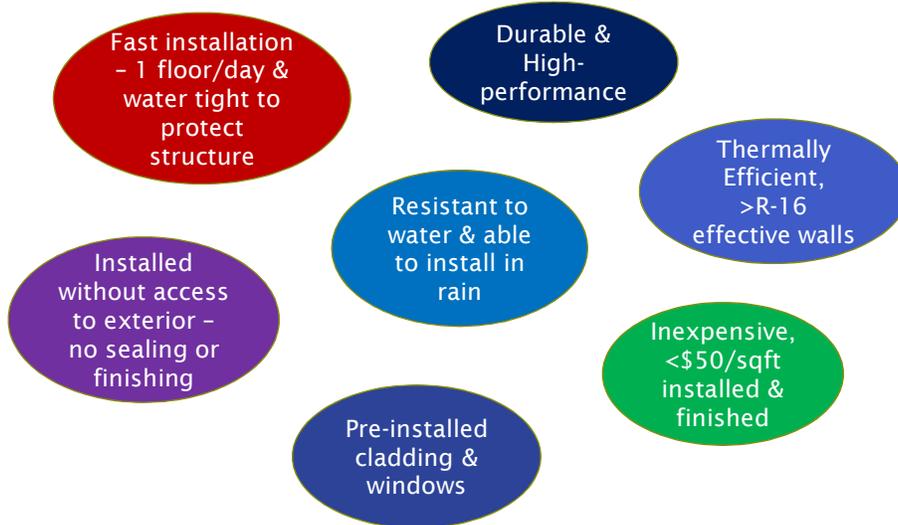
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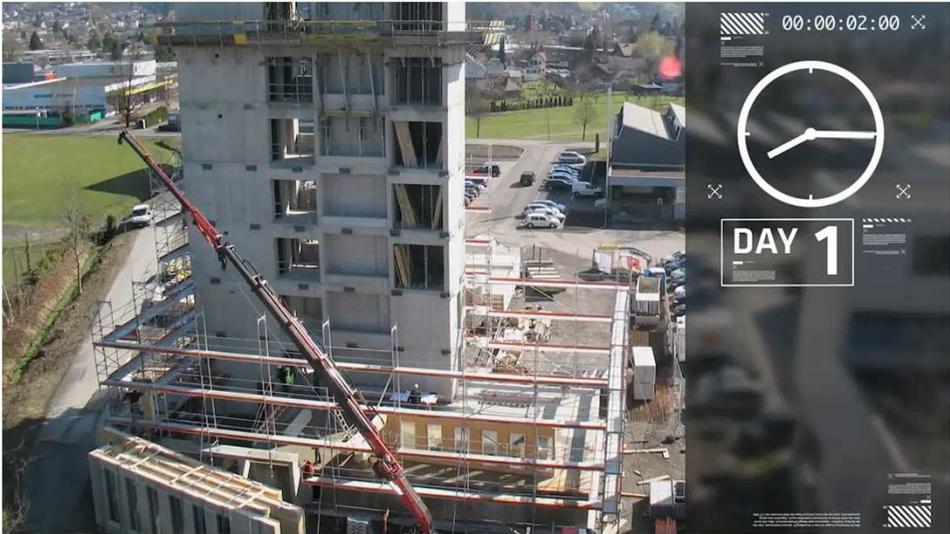
## Case Study - UBC Tall Wood House Façade Design



## UBC Tall Wood House - Façade Design Criteria



### Precedents for Prefabrication of Tall Wood



Courtesy of: Architekten Hermann Kaufmann ZT GmbH

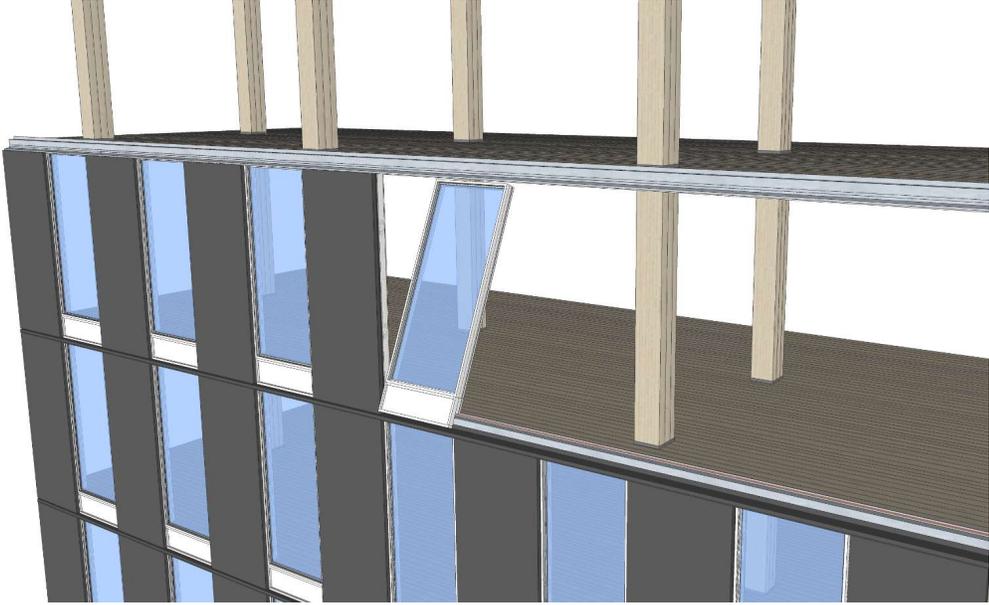
### Precedents for Prefabrication of Tall Wood



### Precedents for Prefabrication of Tall Wood



### Façade Prefabrication - Small Panel with Separate Windows

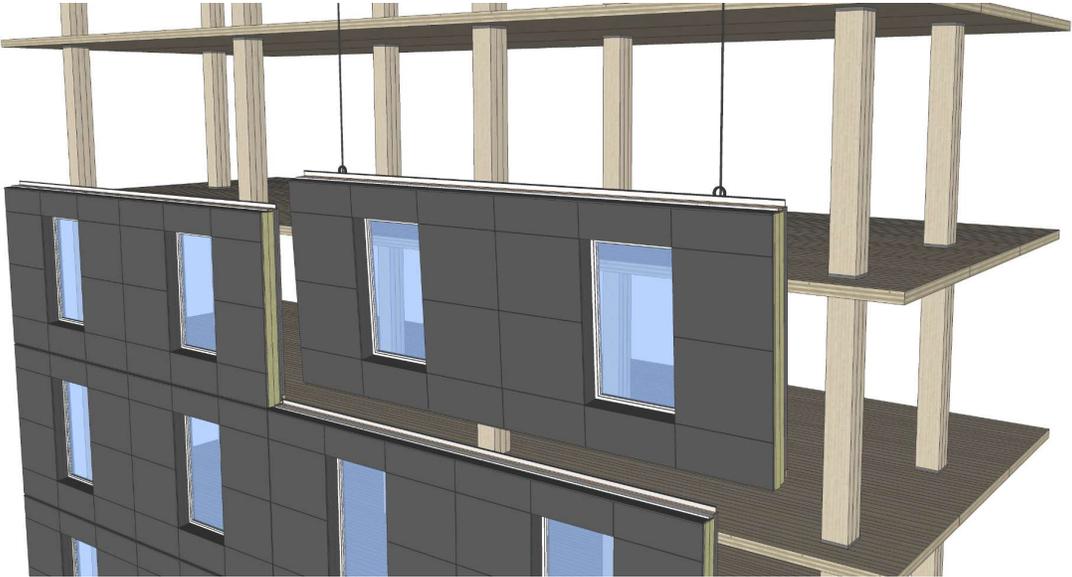


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**Unitized Curtain Wall Option  
Problem: Cost, Schedule, Energy**

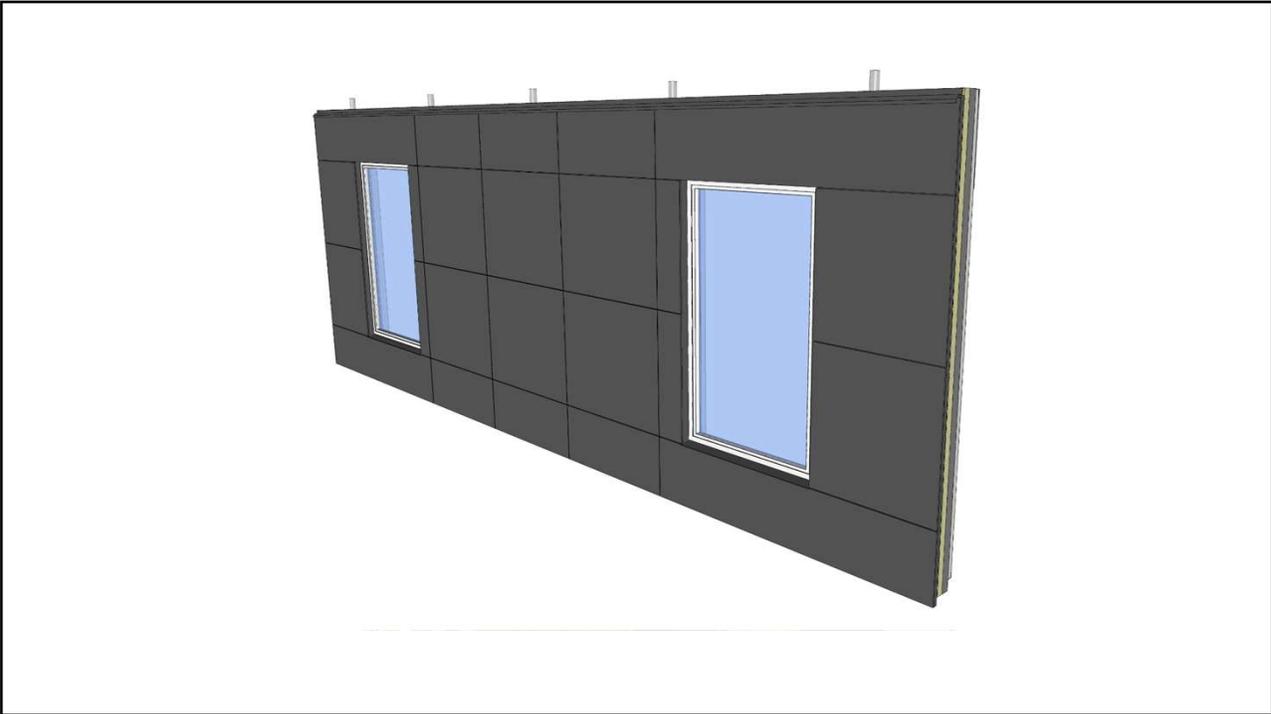


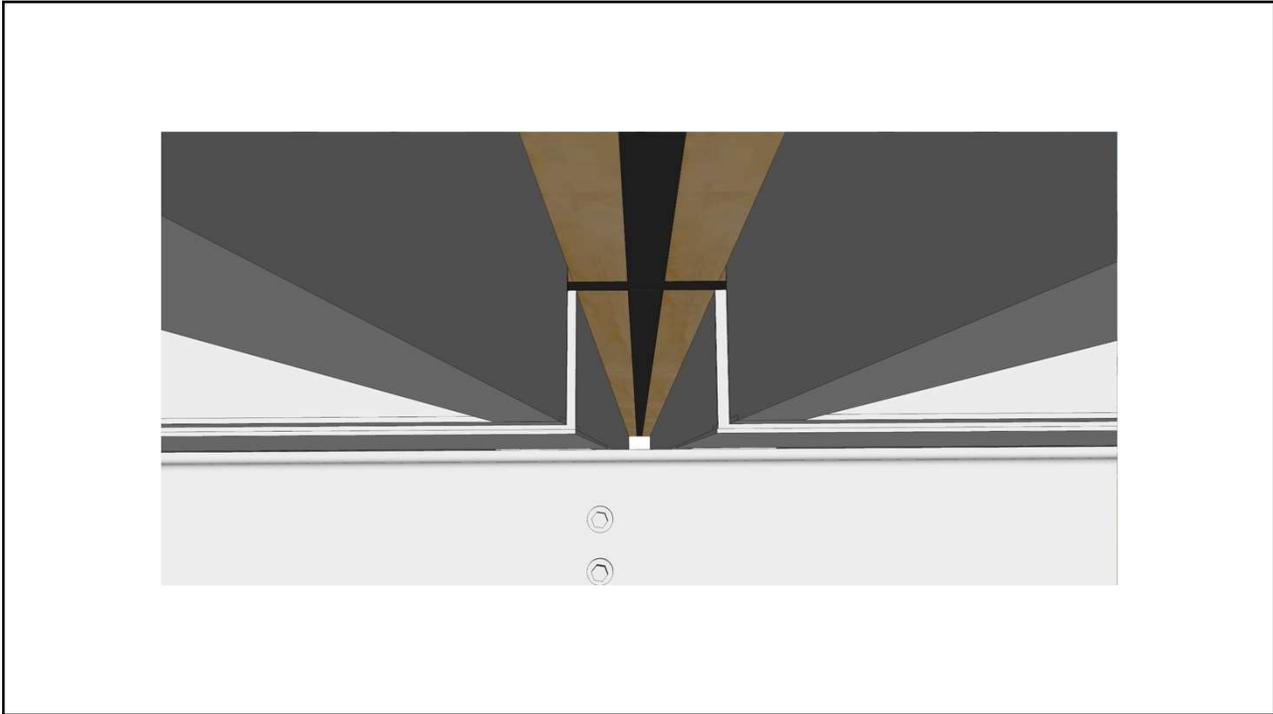
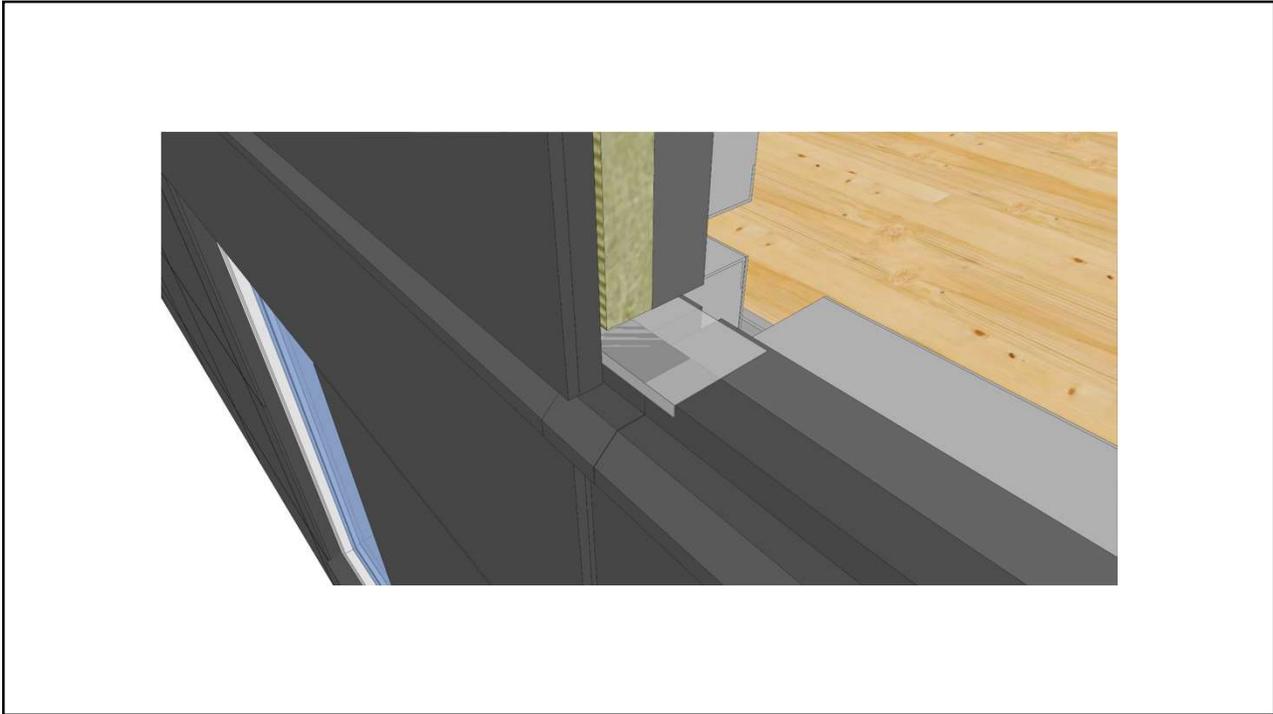
**Façade Prefabrication - Large Panel with Pre-installed Windows**

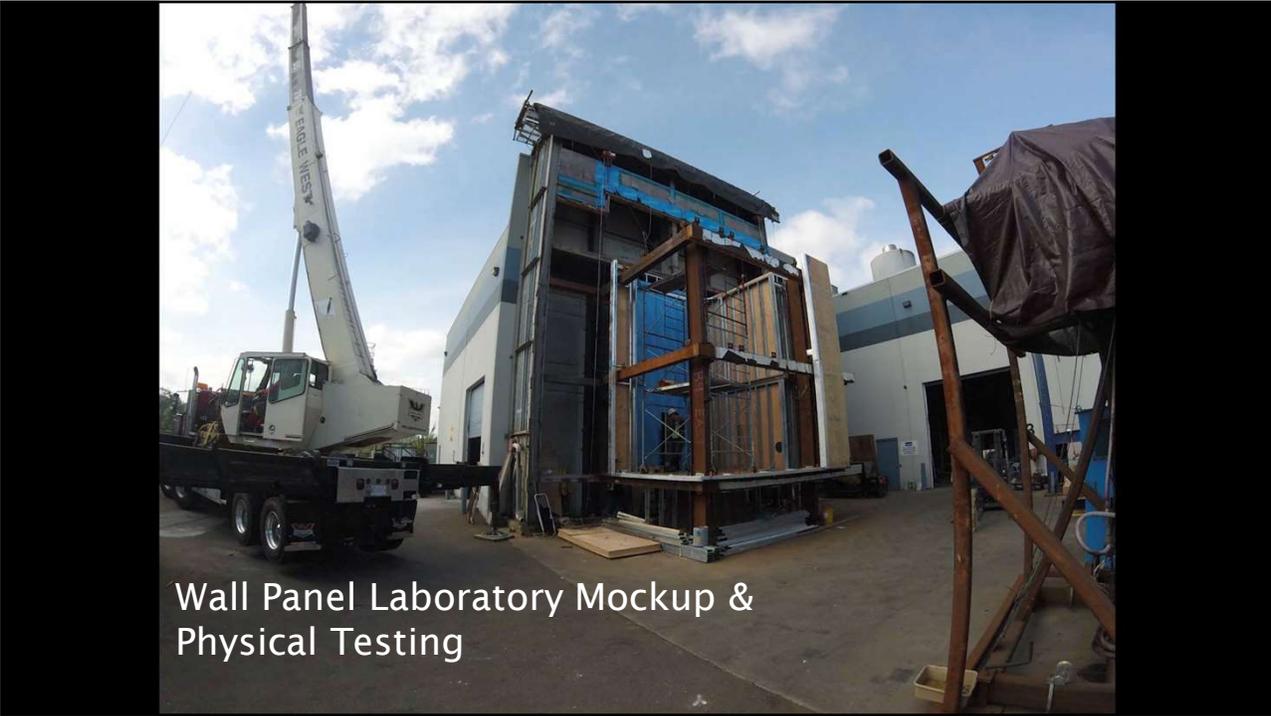
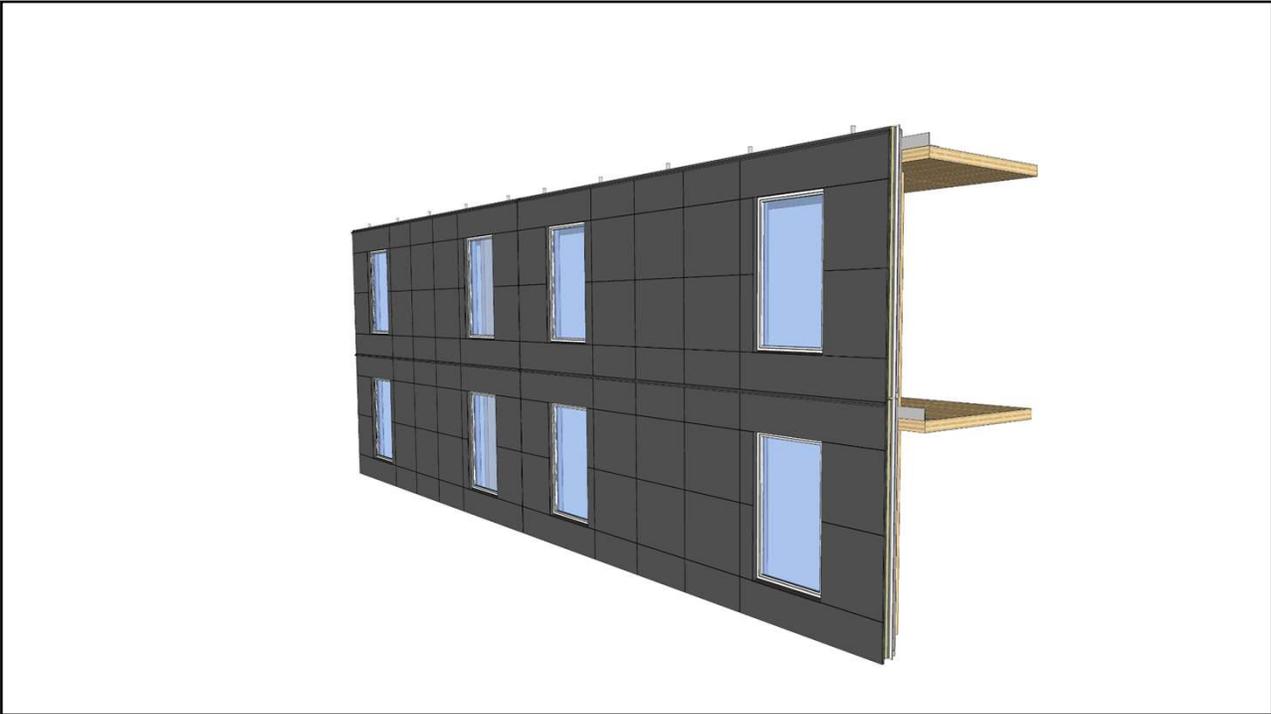


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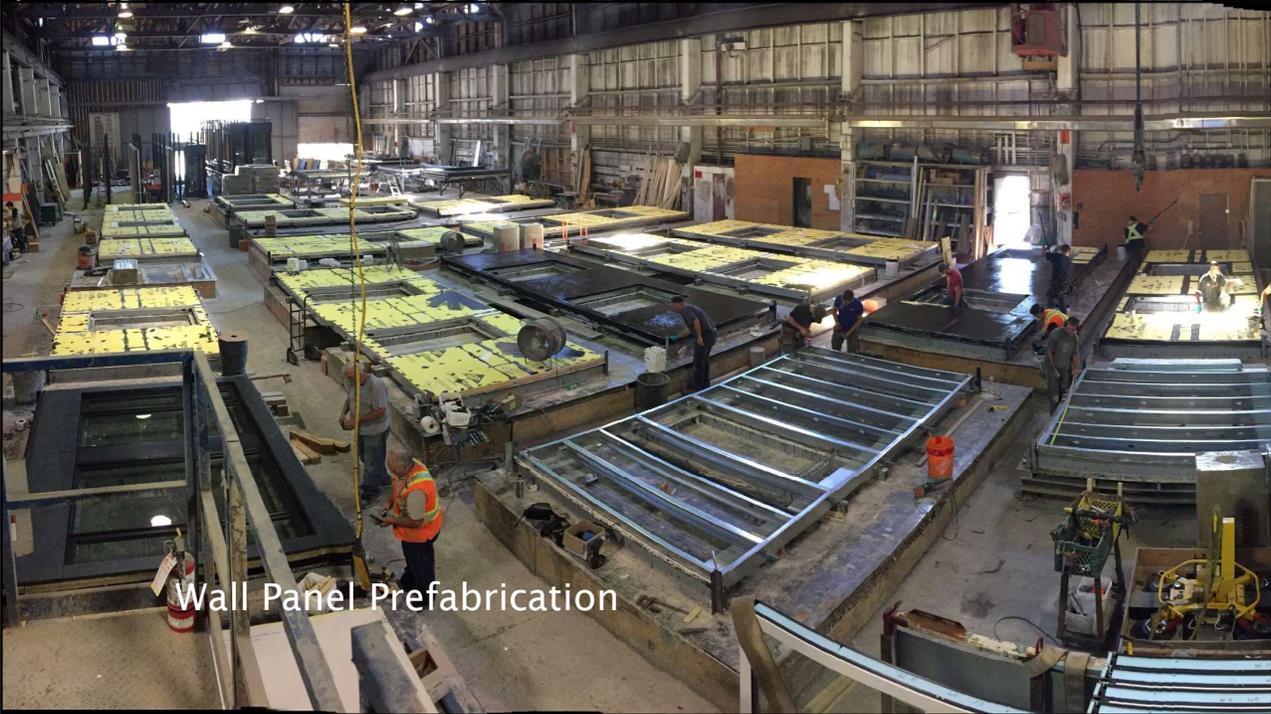
### UBC Tall Wood - Prefabricated Panel Competition







Wall Panel Laboratory Mockup & Physical Testing







WEEK: 1 ↻

TIMELAPSE ██████████

**UBC**  
BROCK COMMONS

**WOOD** █  
CONSTRUCTION  
STARTS ██████████

**JUNE/6**

WOOD  
☺

# Mass Timber Structure & Prefabricated Façade



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Katerra / MGA



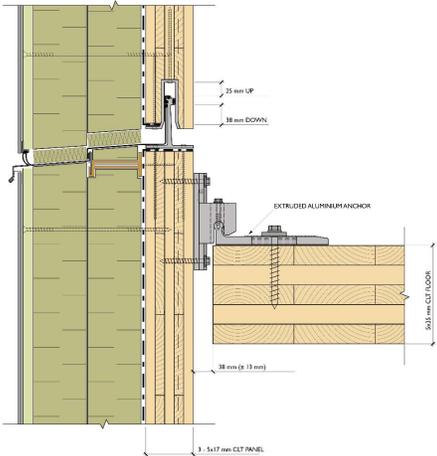


Prefabricated - CLT to Cladding Supports



Site Installation, Joint Sealing & Terra Cotta Cladding

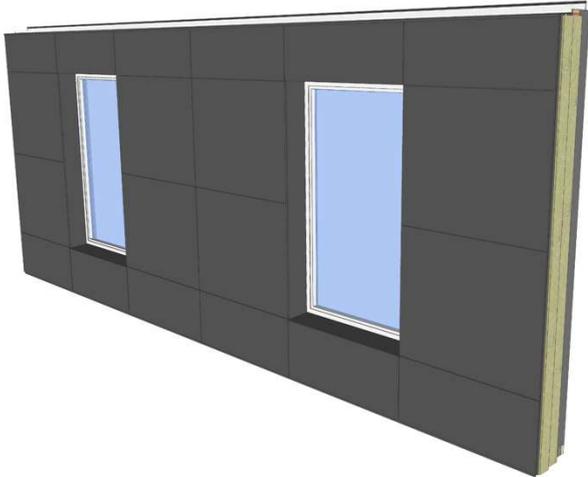
### Where Next? "Curtainwood"



### Prefabricated Passive House CLT Wall Panels



### Prefabricated Passive House CLT Wall Panels

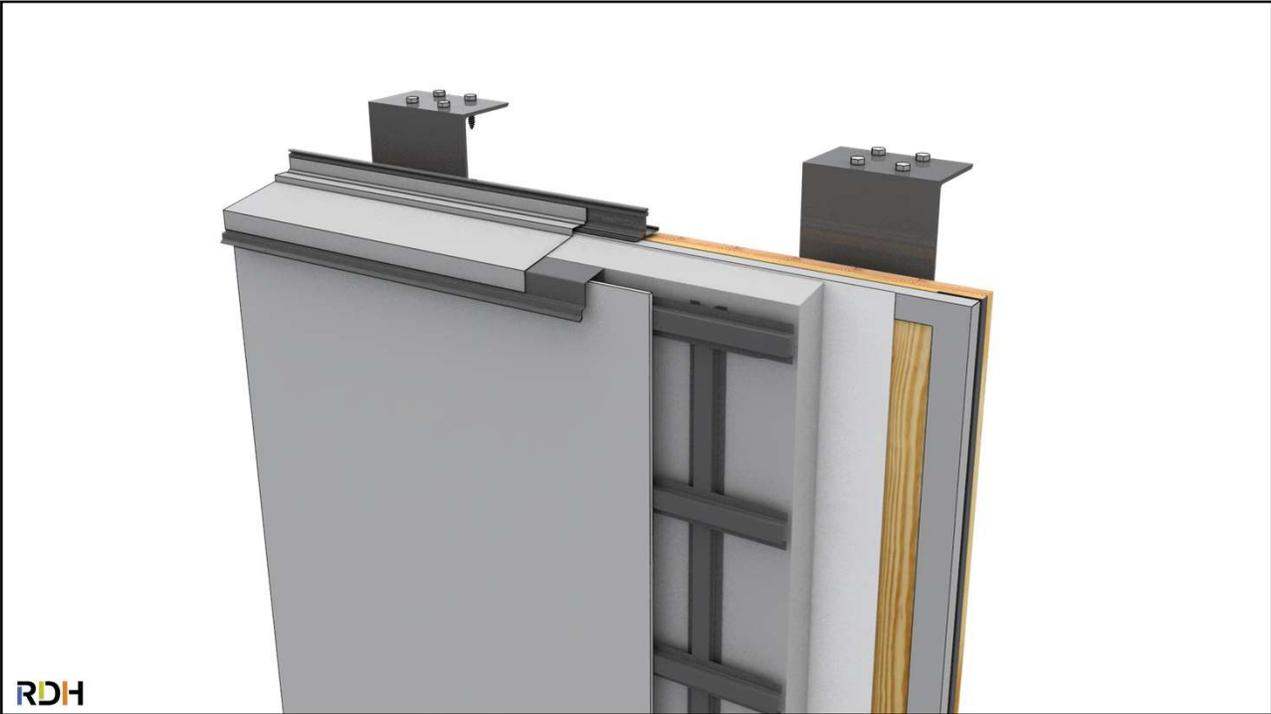


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### Prefabricated Passive House CLT Wall Panels



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## The Future of Tall Wood Facades/Enclosures

- Erected at same pace as structural systems build fast & dry
- Growing market opportunities for wood based prefabricated wall & window assemblies
  - Hybrid steel, concrete, wood framing or wood panel
  - Inspired by precast concrete and aluminum curtainwall industry, evolve and adapt for mass timber structures
- A Trifecta of Progression
  - Prefab, Passive House, & Mass Timber



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## Discussion + Questions

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Learn more at  
[rdh.com](http://rdh.com)

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