EARLY LESSONS

BUILDING FOR A SUSTAINABLE FUTURE

February 26, 2020 | University of Washington Tacoma
MASS TIMBER MIDDLE INCOME HOUSING
BUILDING FOR A SUSTAINABLE FUTURE

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University of Washington Tacoma
ARCHITECT: VIA
STRUCTURAL: CPL
GENERAL CONTRACTOR: GLY
WHY WAS CLT CONSIDERED ON THE POPLAR WAY OFFICE BUILDING?

“In the early 90s, Rowley Properties had a bright, young employee named Amanda Hindman who cared passionately about the earth. She was a pioneer for sustainability before there was even curbside recycling available and she taught Rowley Properties how sustainability made good business sense....Sadly, she was diagnosed with an aggressive form of lung cancer and passed away at the young age of 27.

Rowley Properties continuously honors her life and legacy by embracing the opportunity to be leaders in sustainability. Cross laminated timber is an exciting, sustainable building product that has incredible potential to replace less-sustainable building products and sequester more carbon.”

— Kari Magill, CEO, Rowley Properties
CLT PANEL JOINTS + WALL PANELS

PLYWOOD SPLINE

CLT ROOF, REF PLAN

ASSY 3/8"Ø X 9-1/2" SK SCREWS @ 12" O.C. TYP EA SIDE OF JOINT

4" O.C. @ BRACED FRAMES AND DRAG STRUTS. STAGGER WITH PLYWOOD SPLINE SCREWS.

END JOINT @ ROOF FRAMING

PANEL JOINT, 1/4" GAP MAX

WOOD NAILER, BY OTHER

STEEL BM, REF STRUCT.
CLT FABRICATION
WOOD SLEEPERS ON STEEL ROOF BEAMS

STEEL ERECTION UNDERWAY EARLY FEBRUARY
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EXPECTATIONS?

Photo: Brock Commons UBC
BALLARD HOTEL

TYPE IV-C

8 Stories / 85’ Height
Building Area 61,000 SF
Typical Floor 8,000 SF
Hotel/Lodging Use (R-1)

- Exposed CLT ceiling at guestroom
- Exposed CLT ceiling, glulam columns and beams in public spaces
- Construction Pre-App with SDCI April 2018
AKARI HOUSE

TYPE IV-B

12 Stories / 160’ Height
Building Area 66,300 SF
Typical Floor 4,700 SF
Residential Use (R-2)

• 20% Exposed CLT ceilings at Residential Units
• 100% Exposed glulam columns; 20% Exposed glulam beams & CLT ceiling at the public spaces
• Construction Pre-App with SDCI November 2019
WHY MASS TIMBER MAKES SENSE?

- Small Site: 6,886 SF Site Area
- Limited Staging Area
- No alley access
- Principal Streets on 3 Sides
- Shorter Construction Duration
- Quiet Construction
- Aesthetics
CONSIDERATIONS FOR EXPOSING MASS TIMBER

- Impacts of upsizing structure and potential conflict within interior spaces
- Cost of the additional fiber to upsize structure
- Routing of MEP around upsized structure
- Aesthetics of exposed members

Char Thickness for Glulam
2-Hr = 3.2” inches
Char Thickness for CLT
2-Hr = 3.8” inches

Photo: ARUP
STRUCTURAL POST & PLATFORM

EXPOSED
• Column 12 ¼” X 16 ½”
• Currently there are no prescriptive formulas for 2-way interaction, thus full scale testing for 2-way CLT is required.

CONCEALED
• Column 10 ¾” X 10 ½”
• Floor Panel 6.7” (5 PLY)
STRUCTURAL POST & BEAM

EXPOSED
• Column 14 ¼” x 16 ½”
• Beam 10 ¾” x 24”
• Floor Panel 6.9” (5-6 PLY)

CONCEALED
• Column 12 ¼” X 15”
• Beam 6 ¾” X 22 ½”
• Floor Panel 5.5” (5 PLY)
EXPOSURE LIMITATIONS FOR IV-B MASS TIMBER

Residential Floor

• 20% Exposed CLT ceilings within each residential unit (fire area)

• Concealed glulam beams

• Concealed glulam columns
EXPOSURE LIMITATIONS FOR IV-B MASS TIMBER

Ground Floor

- 20% Exposed CLT ceilings/ glulam beams at ground floor public space
- 100% exposed glulam columns at ground floor public space
SDCI - MASS TIMBER CONSTRUCTION PRE-APP

- 2 Hour rating at structural members.

- Mass timber columns can be exposed 100% since there are not any mass timber wall elements.

- Combustible blocking is **NOT** permitted within the Type IV-B construction.

- Assembly space (A-3) is permitted up to 180’ and 12 stories in Type IV-B construction.
FIRE SAFETY REQUIREMENTS DURING CONSTRUCTION

IFC 3308.4

- Provide standpipes.
- Provide water supply for fire department operations, approved by fire chief.
- For buildings greater than 6 stories, no more than 4 levels of mass timber elements can be constructed without providing noncombustible protection per 604.2 before erecting additional floor levels.
ACOUSTICAL CONSIDERATIONS

- Finish floor
- 2-1/2" Gypcrete
- Acoustic Mat
- (2) Layers 5/8" type 'X' gypsum board
- 5-ply CLT floor panel
- Glulam beam (protected)