The Timber High Rise Advantage: Design & Cost Considerations for Tall Wood

June 23 & 24, 2026

Presented by:

John O'Donald II, PE
WoodWorks

Image: 80 M Street / Hickok Cole / Arup / Photo Ron Blunt

Outline

- **Tall Wood Introduction**
- Lateral Systems in Tall Wood
- Connections in Tall Wood
- Penetrations in Tall Wood
- Sealants at Mass Timber Panel Edges
- Joints and Intersecting Elements
- Fire Safety During Construction
- Acoustical Design
- **Preliminary Cost Estimating**

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  - Acoustical Design
  - Preliminary Cost Estimating

2008 – 2015: International Inspiration

8-18 Story Projects in Europe, Canada, and Australia

Photos: Waugh Thisleton Architects | Bygg Mesteren | Voll Arkitekter | Michael Elkan | Naturally Wood | UBC

2015-2018: Building a Code Roadmap

Photos: ICC

ATF Lab Tests, 2017
Photo: LendLease

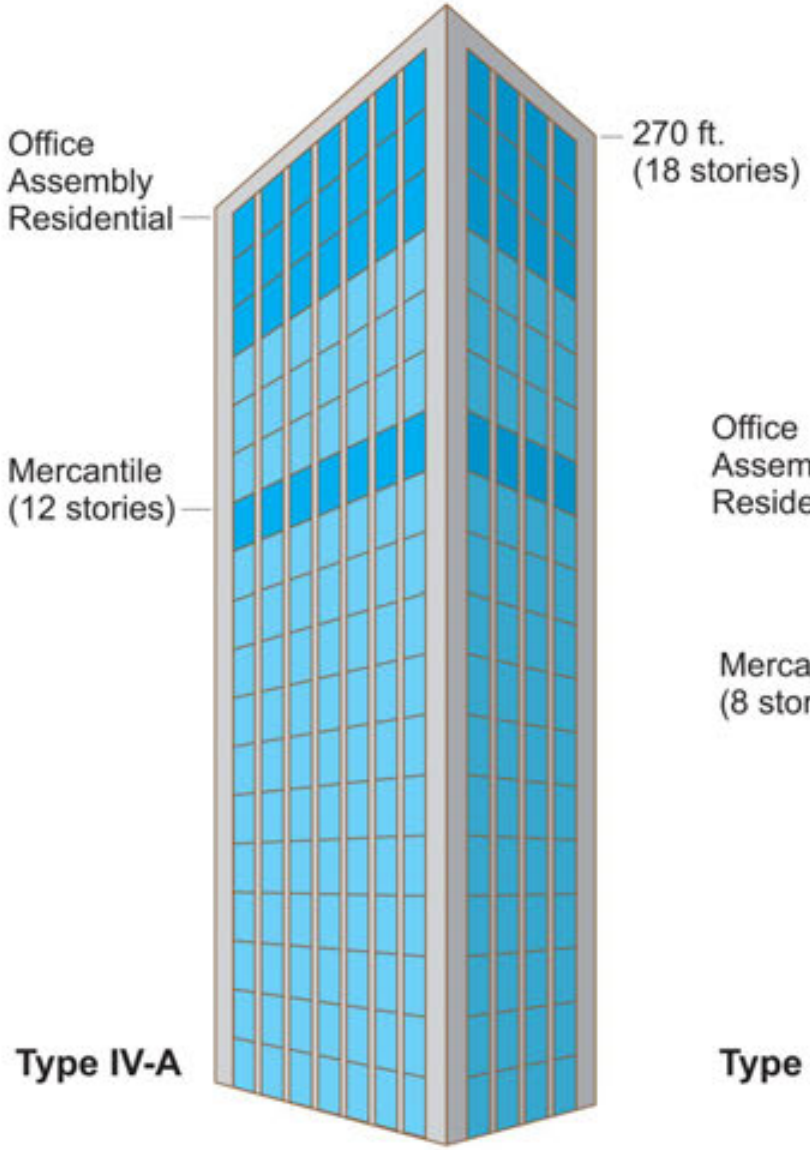
ATF Lab Tests, 2017
Photo: LendLease

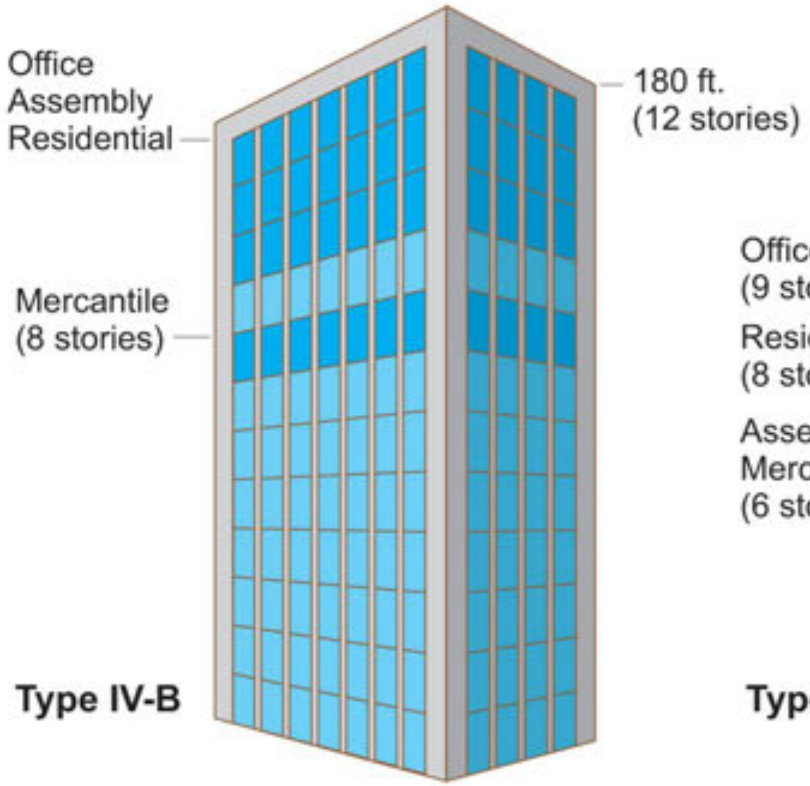
ATF Lab Tests, 2017
Photo: LendLease

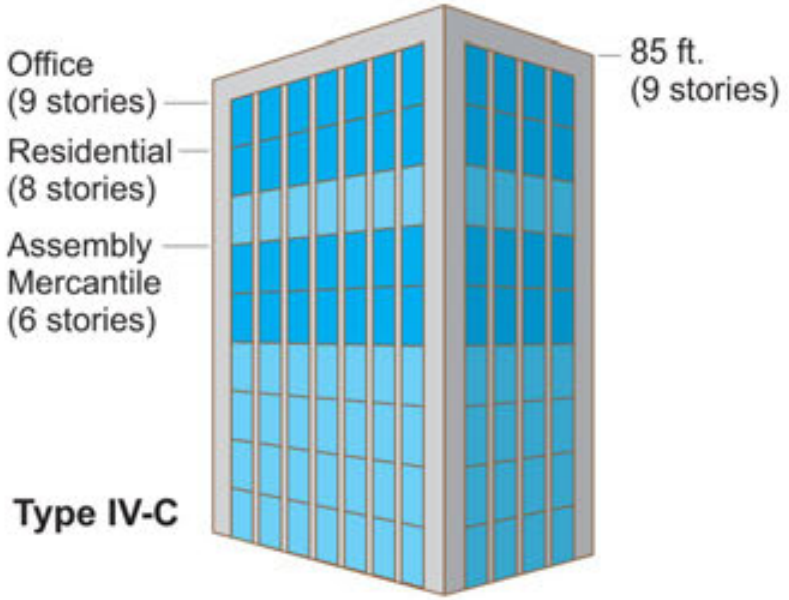
ATF Lab Tests, 2017
Photo: LendLease

Tall Mass Timber

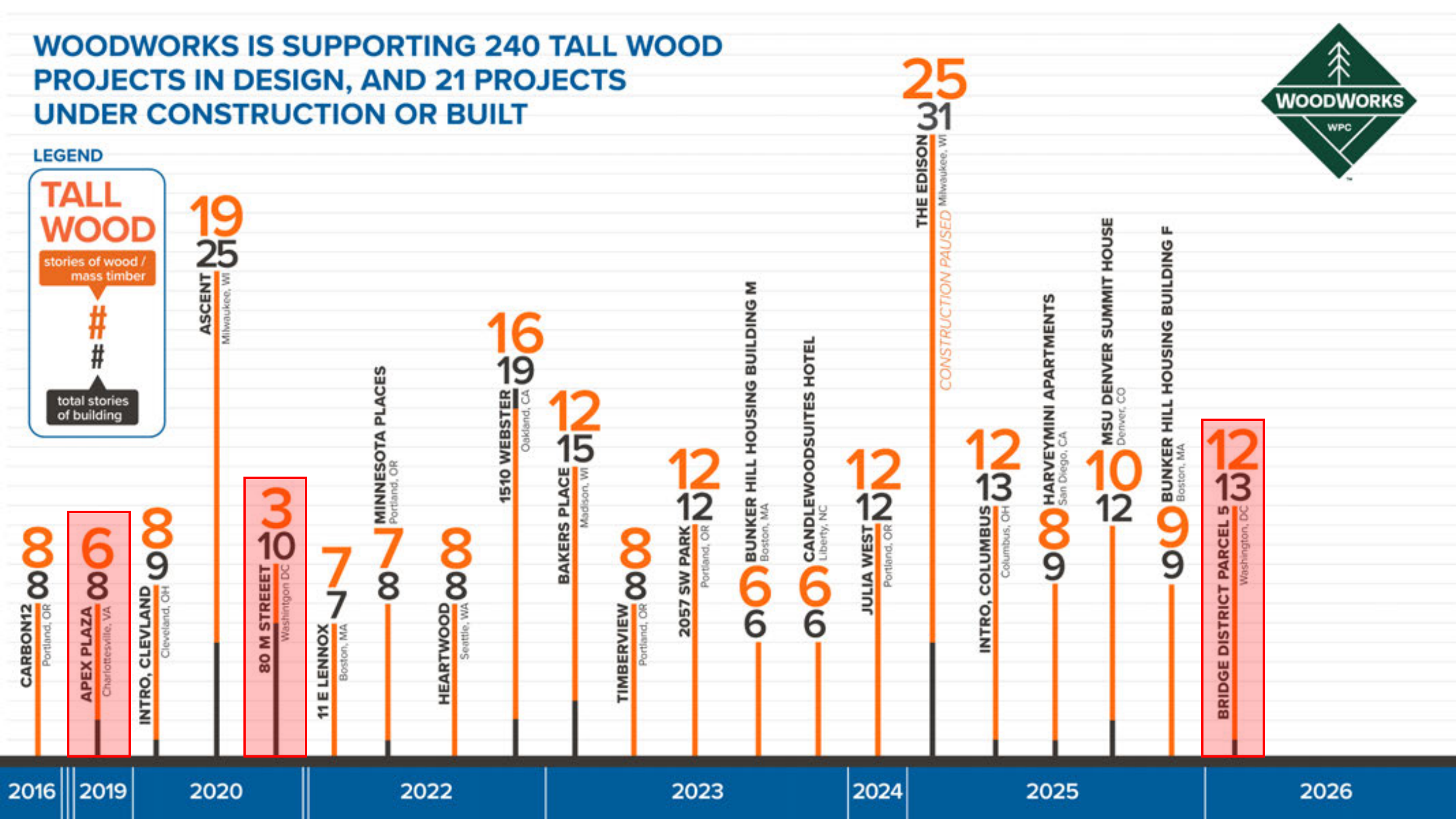
2021 IBC: 3 New Tall Mass Timber Construction Types







WOODWORKS IS SUPPORTING 240 TALL WOOD PROJECTS IN DESIGN, AND 21 PROJECTS UNDER CONSTRUCTION OR BUILT



Tall Mass Timber

2021 IBC Introduces 3 new tall wood construction types:

- IV-A
- IV-B
- IV-C
- Previous type IV renamed type IV-HT

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B

Mid-Rise vs. High-Rise

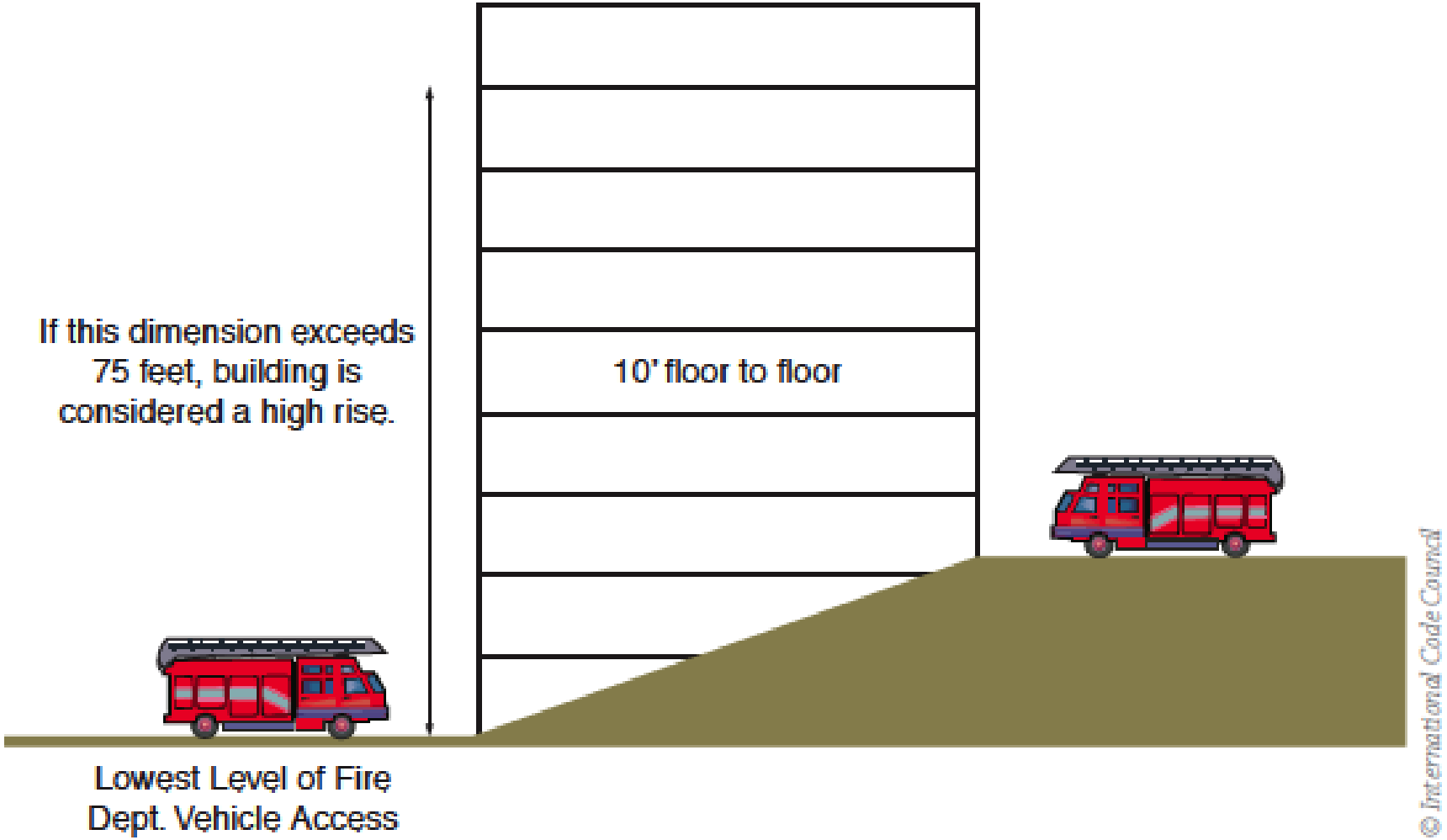


FIGURE 6-6 Determination of high-rise building

Sprinklers in High Rises

Two Water Mains Required if:

- Building Height Exceeds 420 ft, or
- Type IV-A and IV-B buildings that exceed 120 ft in height

Photo: Michael Green Architecture

Type IV-C Height and Area Limits

IV-C

Credit: Susan Jones, atelierjones

Occupancy	# of Stories	Height	Area per Story	Building Area
A-2	6	85 ft	56,250 SF	168,750 SF
B	9	85 ft	135,000 SF	405,000 SF
M	6	85 ft	76,875 SF	230,625 SF
R-2	8	85 ft	76,875 SF	230,625 SF

Areas exclude potential frontage increase

In most cases, Type IV-C height allowances = Type IV-HT height allowances, but add'l stories permitted due to enhanced FRR

Type IV-C area = 1.25 * Type IV-HT area

Type IV-C Protection vs. Exposed

IV-C

Credit: Susan Jones, atelierjones

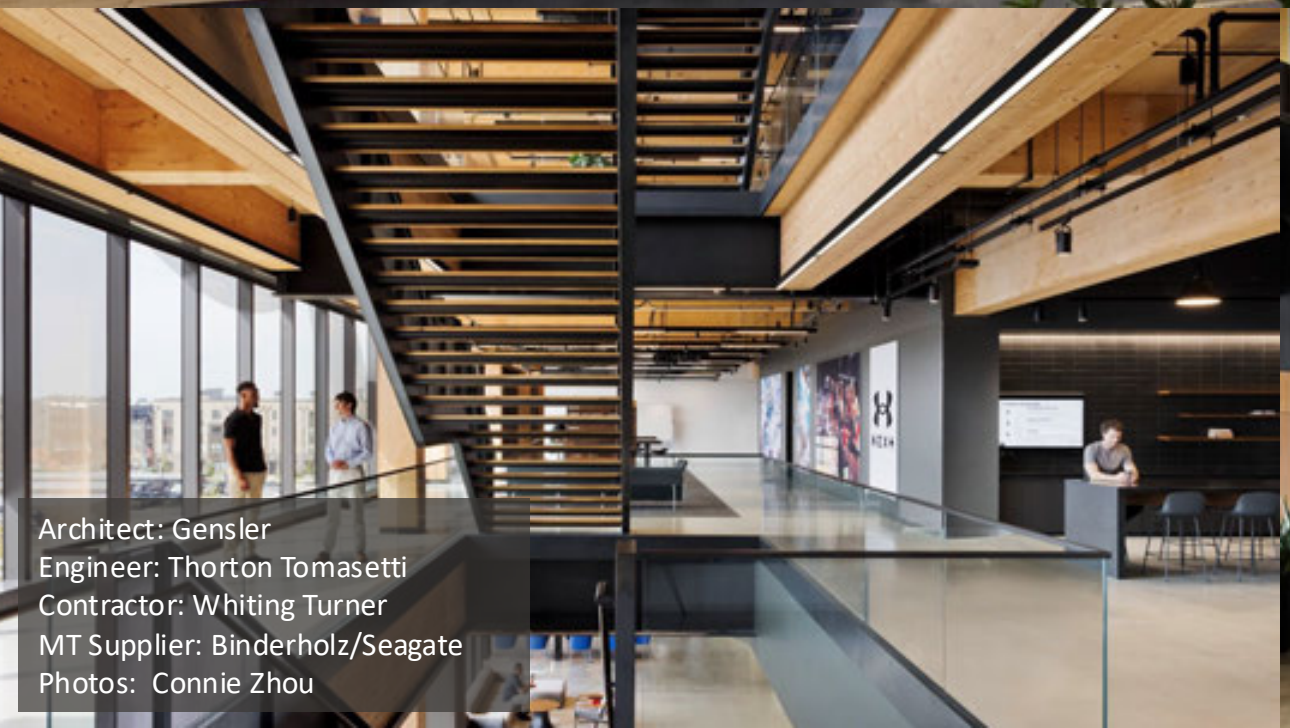
Credit: Kaiser+Path, Ema Peter

All Mass Timber surfaces may be exposed

Exceptions: Shafts, concealed spaces, outside face of exterior walls

"When companies like Under Armour build a new headquarters, they create more than a workspace—they craft a bold statement of identity and values. A headquarters becomes the symbol of a brand's heritage and legacy,
while representing its commitment to the community and its people."

JJ Rivers, AIA, Principal, Gensler



Architect: Gensler
Engineer: Thorton Tomasetti
Contractor: Whiting Turner
MT Supplier: Binderholz/Seagate
Photos: Connie Zhou

Bunker Hill Housing Redevelopment – Stellata

Boston, MA

Architect: Stantec
Engineer: McNamara • Salvia
Photo: Bryan Maltais with McNamara • Salvia

119,600 sf, 6 stories

Type IV-C

Multi-Family

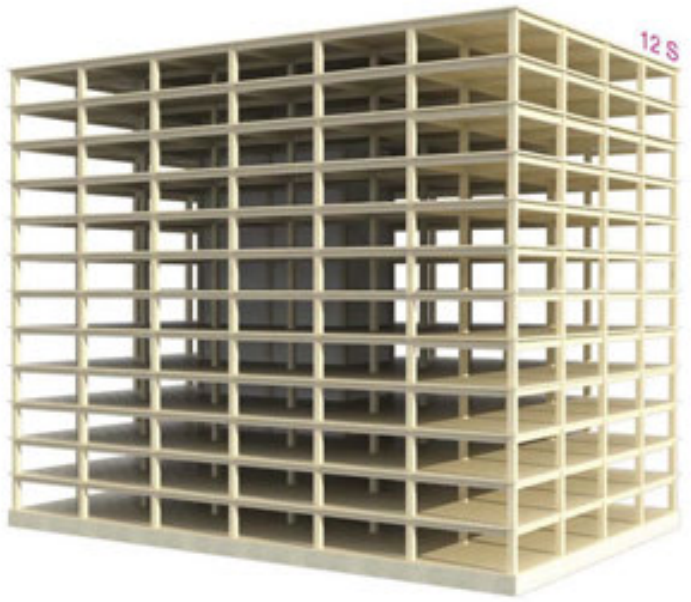
Mass Timber / Light Gauge Hybrid

Completed 2025

WN PROFILE

Type IV-B Height and Area Limits

IV-B



12 STORIES
BUILDING HEIGHT 180 FT
ALLOWABLE BUILDING AREA 648,000 SF
AVERAGE AREA PER STORY 54,000SF

TYPE IV-B

Credit: Susan Jones, atelierjones

Occupancy	# of Stories	Height	Area per Story	Building Area
A-2	12	180 ft	90,000 SF	270,000 SF
B	12	180 ft	216,000 SF	648,000 SF
M	8	180 ft	123,000 SF	369,000 SF
R-2	12	180 ft	123,000 SF	369,000 SF

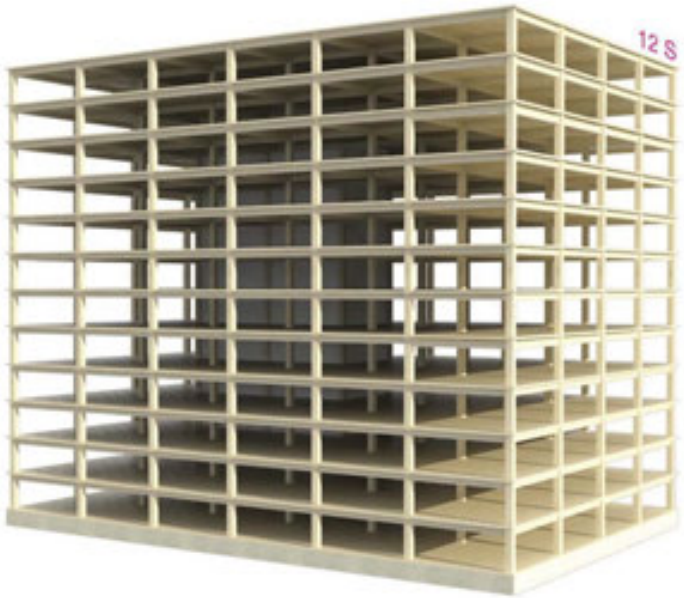
Areas exclude potential frontage increase

In most cases, Type IV-B height & story allowances = Type I-B height & story allowances

Type IV-B area = 2 * Type IV-HT area

Type IV-B Protection vs. Exposed

IV-B



12 STORIES	
BUILDING HEIGHT	180 FT
ALLOWABLE BUILDING AREA	648,000 SF
AVERAGE AREA PER STORY	54,000SF

TYPE IV-B

Credit: Susan Jones, atelierjones

Credit: Kaiser+Path

NC protection on all surfaces of Mass Timber except limited exposed areas

~20% of Ceiling or ~40% of Wall can be exposed

Type IV-B Protection vs. Exposed

IV-B

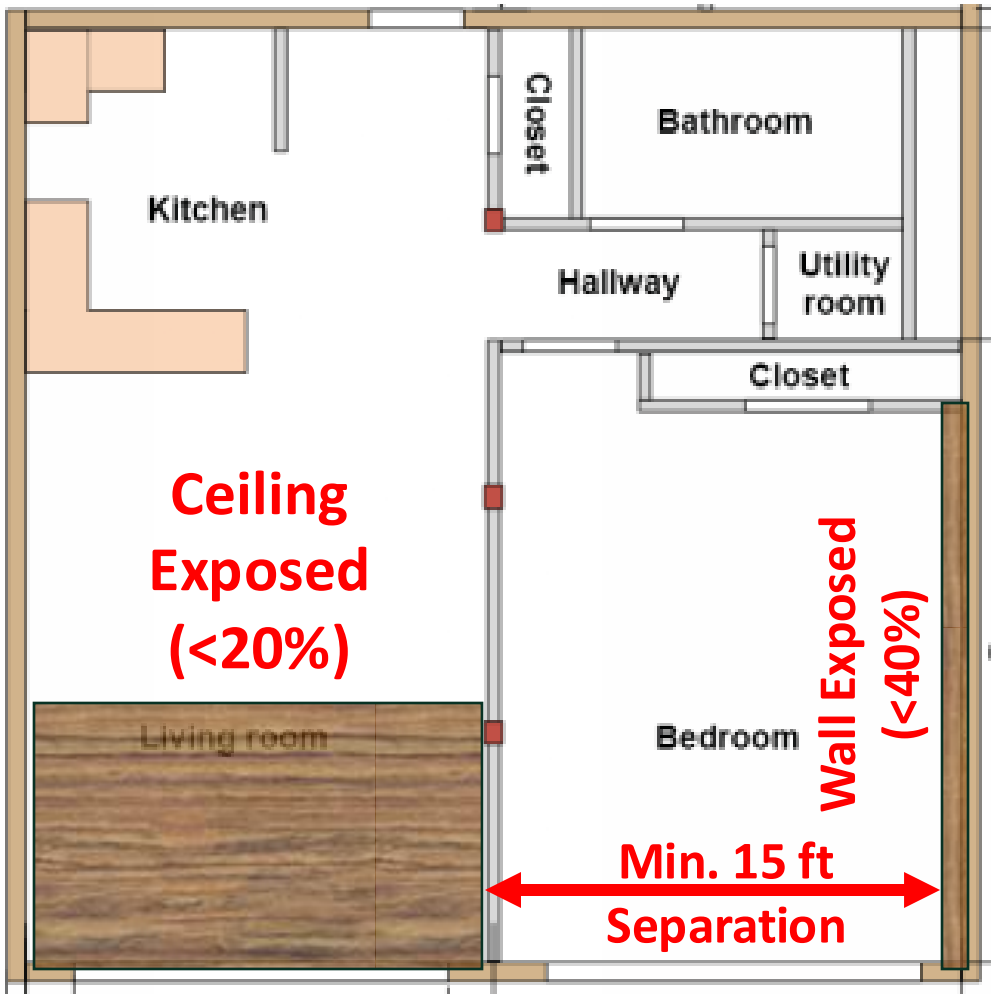
Limited Exposed MT allowed in Type IV-B for:

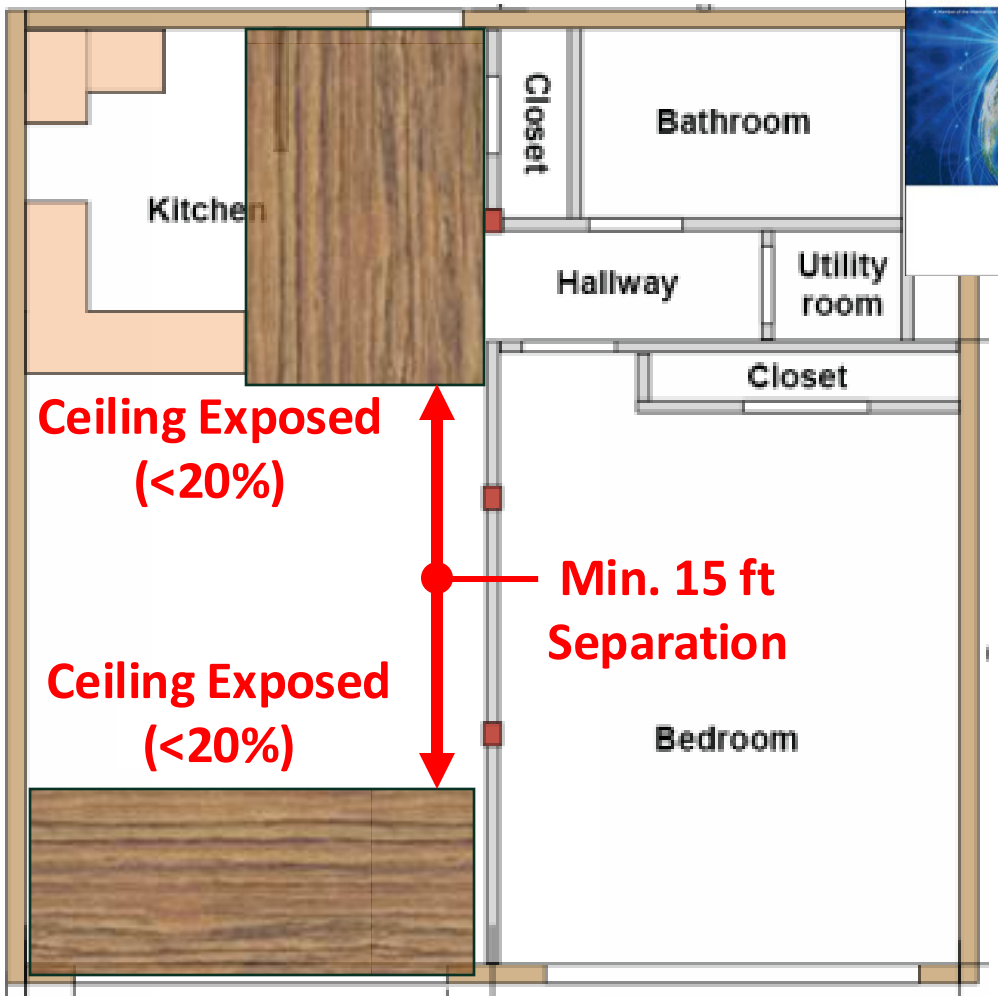
- **MT beams and columns which are not integral part of walls or ceilings, no area limitation applies**
- **MT ceilings and beams up to 20% of floor area in dwelling unit or fire area, or**
- **MT walls and columns up to 40% of floor area in dwelling unit or fire area, or**
- **Combination of ceilings/beams and walls/columns, calculated as follows:**

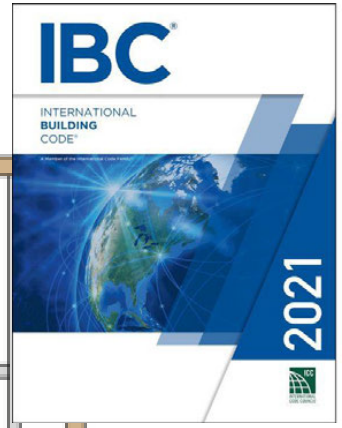
Credit: Kaiser+Path

2019-2022: REFINING THE CODE ROADMAP

2021 IBC Allowances



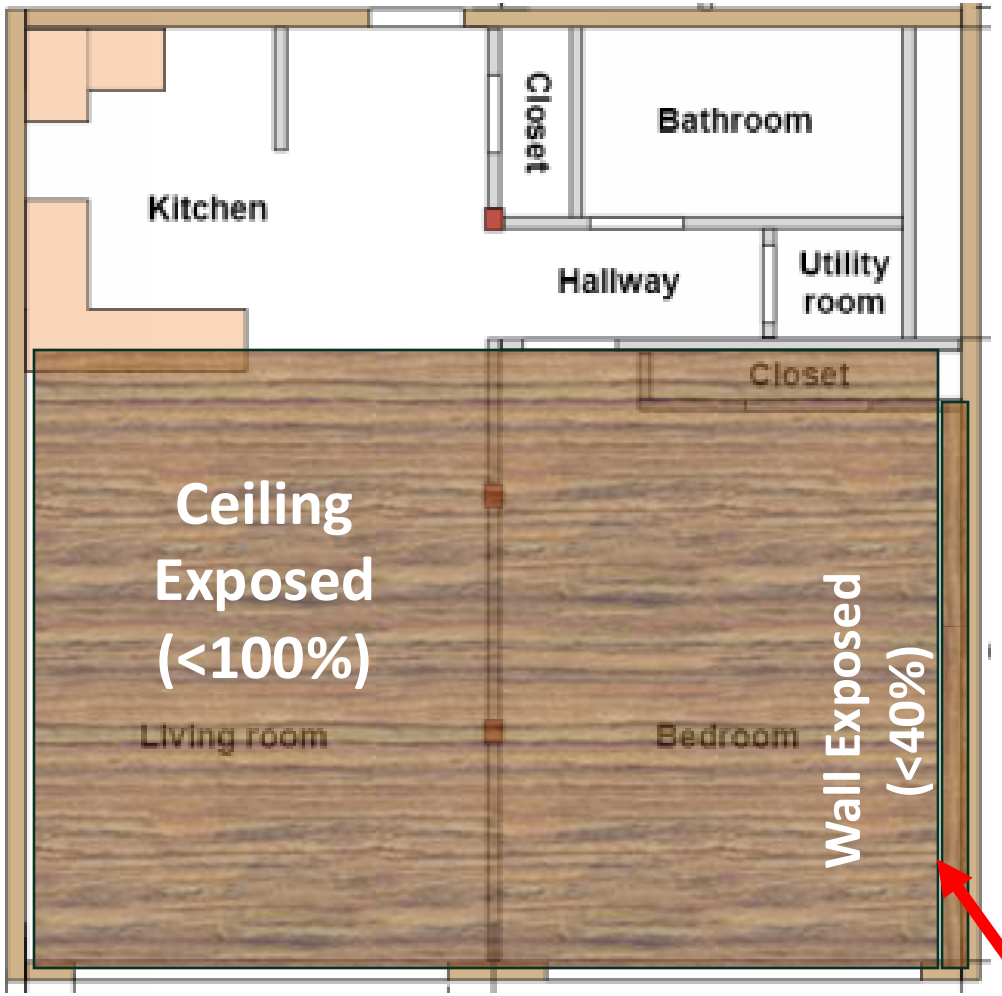


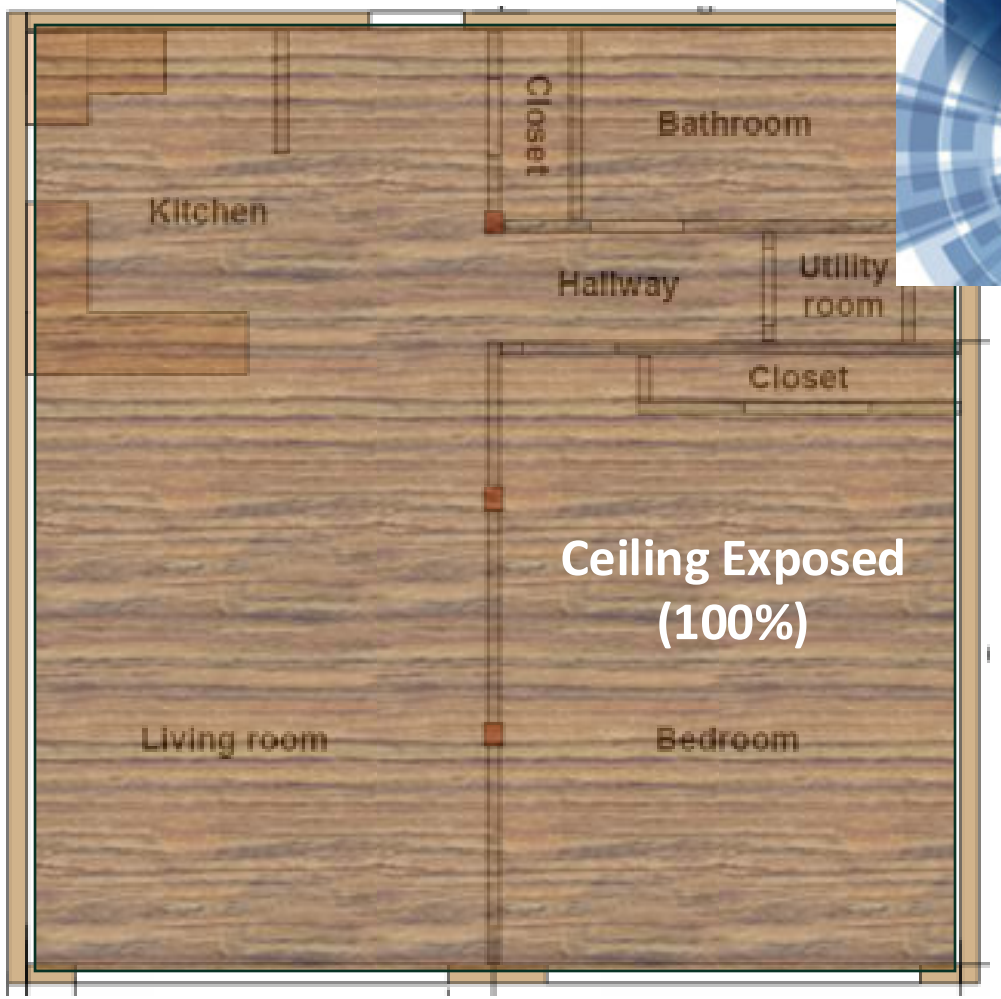


Credit: AWC

2019-2022: REFINING THE CODE ROADMAP

2024 IBC Allowances





Credit: AWC

No separation req'd between wall & ceiling

https://www.woodworks.org/resources/julia-west-house/

CASE STUDY

Julia West House

Small footprint, big impact: 12 stories of mass timber affordable housing

Julia West House / Holst Architecture / KPFF
Photo Carpentry Plus

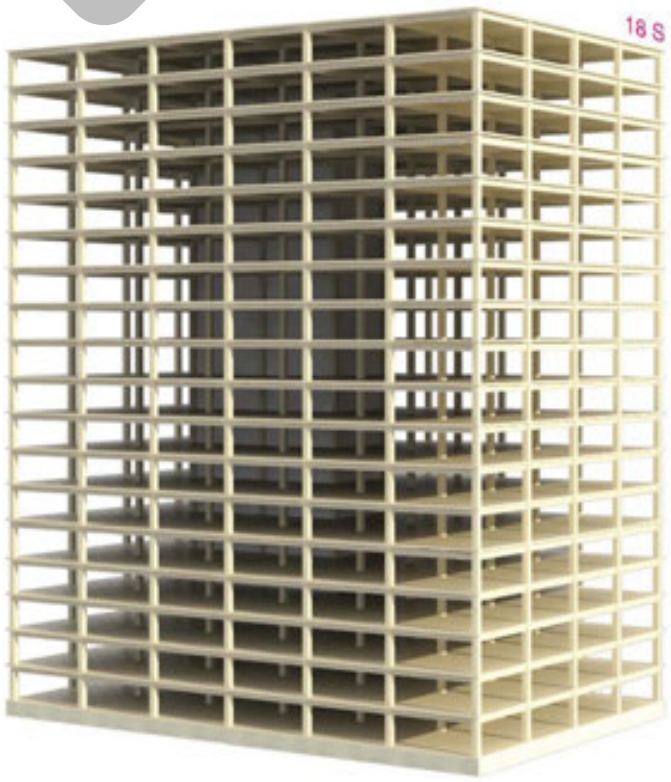
80 M Street

Washington, DC

Architect: Hickock Cole
Engineer: ARUP
Photo: Hickock Cole

IV-A

Type IV-A Height and Area Limits



18 STORIES
BUILDING HEIGHT 270'
ALLOWABLE BUILDING AREA 972,000 SF
AVERAGE AREA PER STORY 54,000SF

TYPE IV-A

Credit: Susan Jones, atelierjones

Occupancy	# of Stories	Height	Area per Story	Building Area
A-2	18	270 ft	135,000 SF	405,000 SF
B	18	270 ft	324,000 SF	972,000 SF
M	12	270 ft	184,500 SF	553,500 SF
R-2	18	270 ft	184,500 SF	553,500 SF

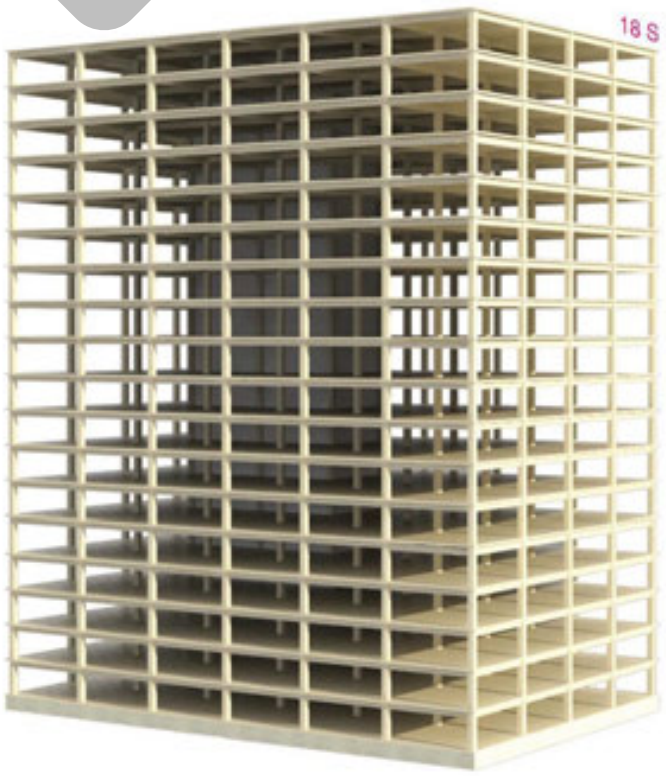
Areas exclude potential frontage increase

In most cases, Type IV-A height & story allowances = 1.5 * Type I-B height & story allowances

Type IV-A area = 3 * Type IV-HT area

IV-A

Type IV-A Protection vs. Exposed



18 STORIES
BUILDING HEIGHT 270'
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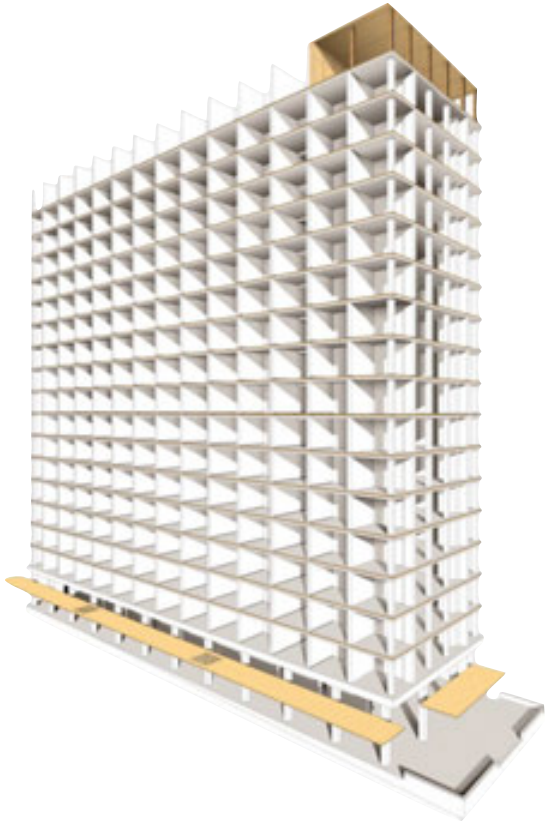
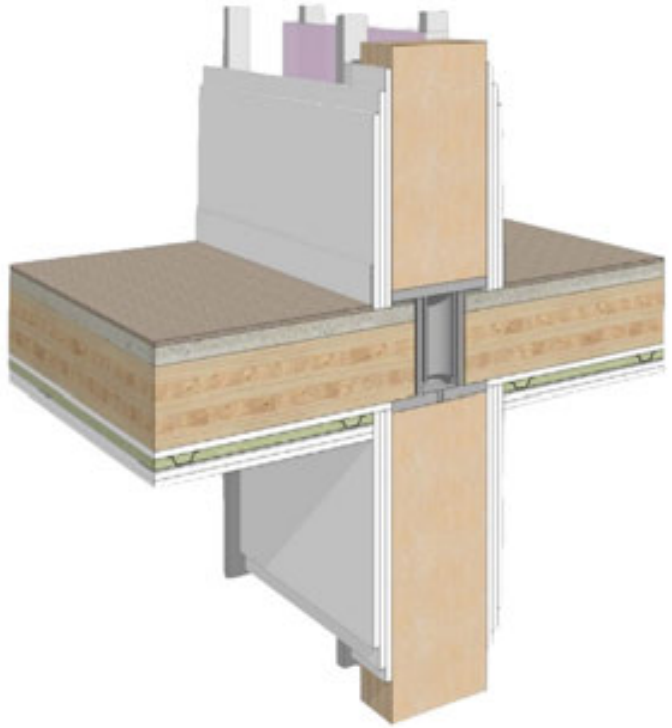
AVERAGE AREA PER STORY 54,000SF

TYPE IV-A

Credit: Susan Jones, atelierjones





100% NC protection on all surfaces of Mass Timber

Credit: Acton Ostry Architects, Fast + Epp

Rendering: oWow

1510 Webster

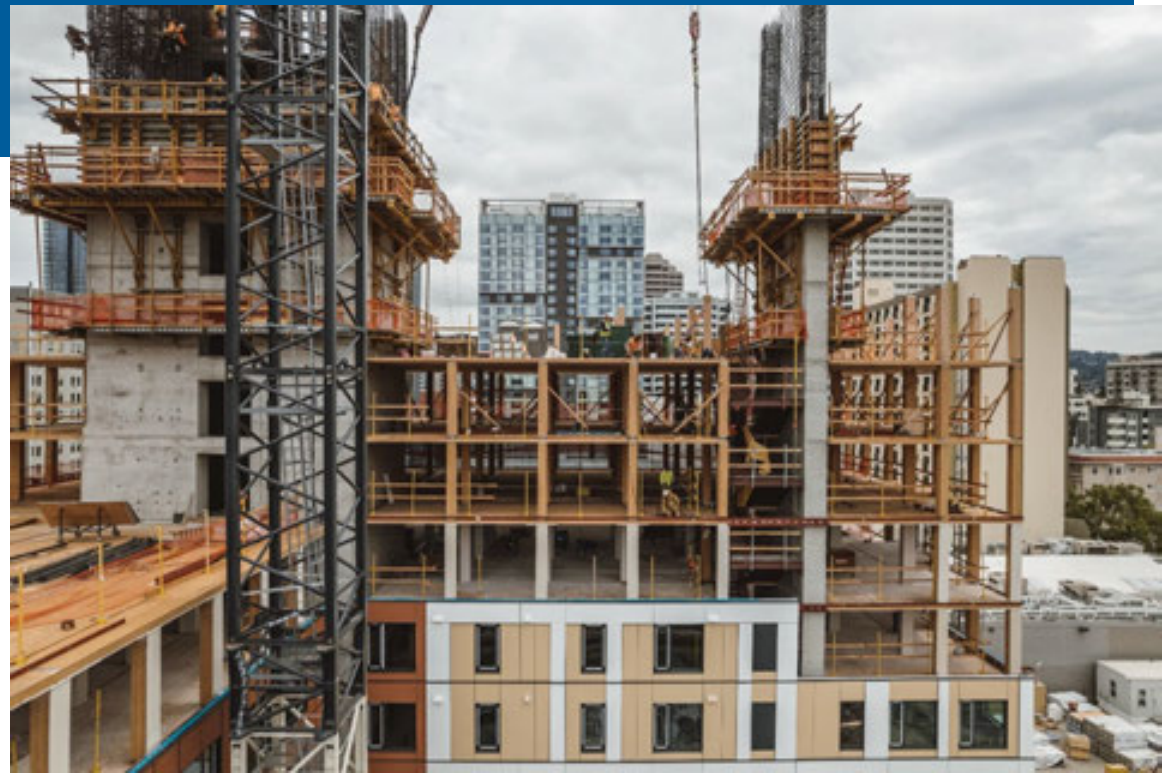
Oakland, CA

Building Facts	179,020 sf, 19 stories
	16 stories Mass Timber
	Type IV-A
	Mixed Use
	Completed 2024
Developer	oWow
Architect	oWow
Engineer	DCI Engineers
General Contractor	oWow

1510 Webster

Oakland, CA

- 18 stories mass timber over one-level concrete
- Designed with Tall Wood code provisions in the 2021 IBC. Mass Timber with concrete cores and staircases.



Photos: Flor Projects

oWow
DCI Engineers

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INTRO – Cleveland, OH

Concrete Core Shear Walls

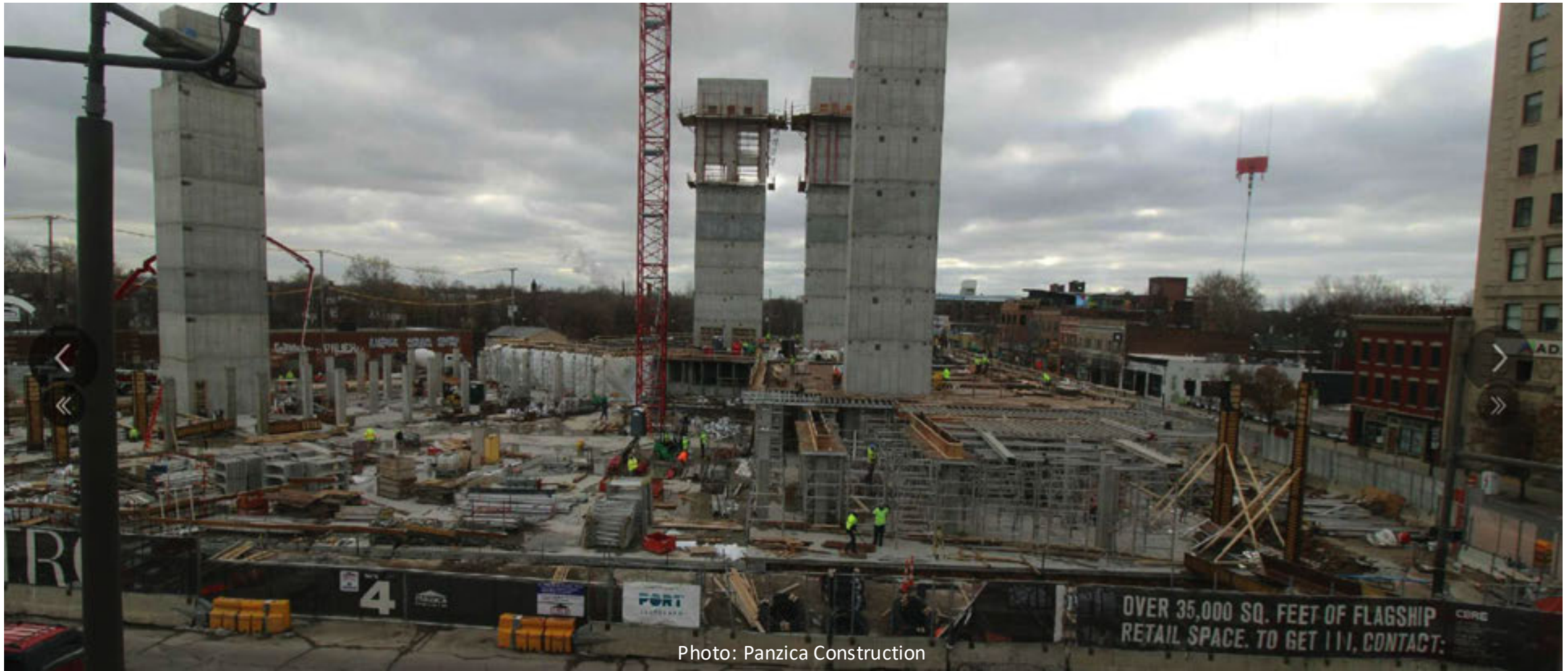
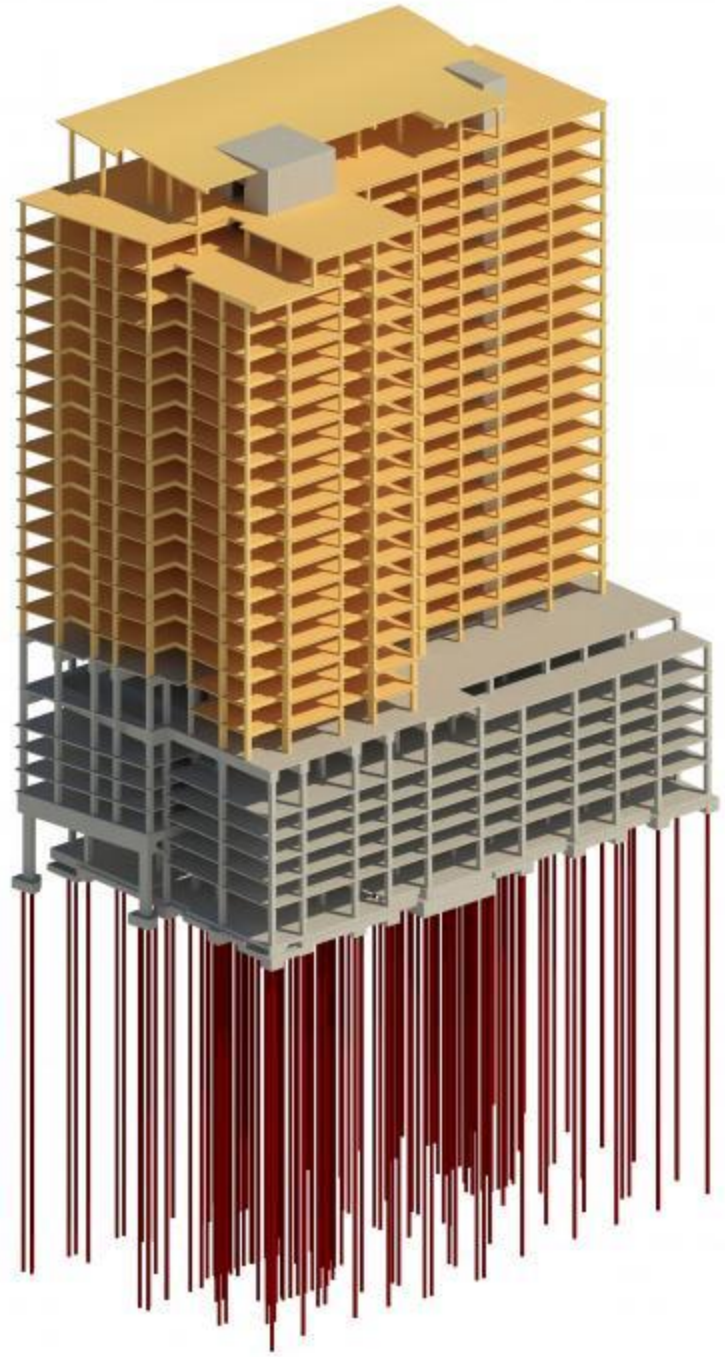


Photo: Panzica Construction

Ascent – Milwaukee, WI

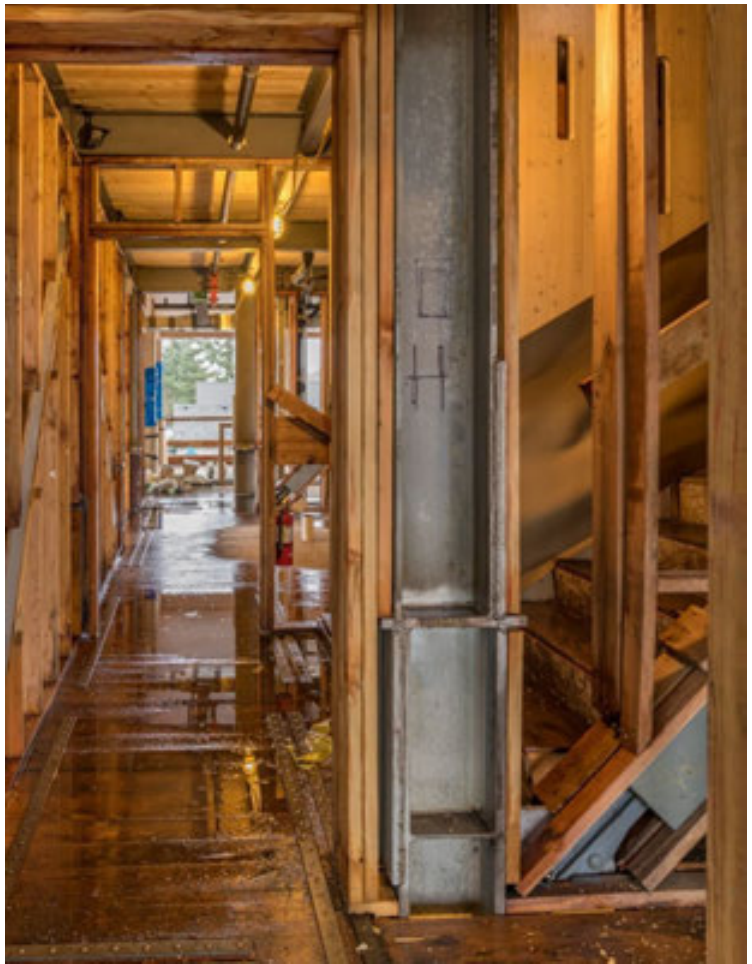
Concrete Core Shear Walls

Photos: Korb + Associates, Thornton Tomasetti



Carbon12 – Portland, OR

Buckling-Restrained Braced Frame



Photos: Marcus Kauffmann, ODF

Future Potential Lateral System for Tall Wood

Mass Timber Rocking Shear Walls

Photo: WoodWorks

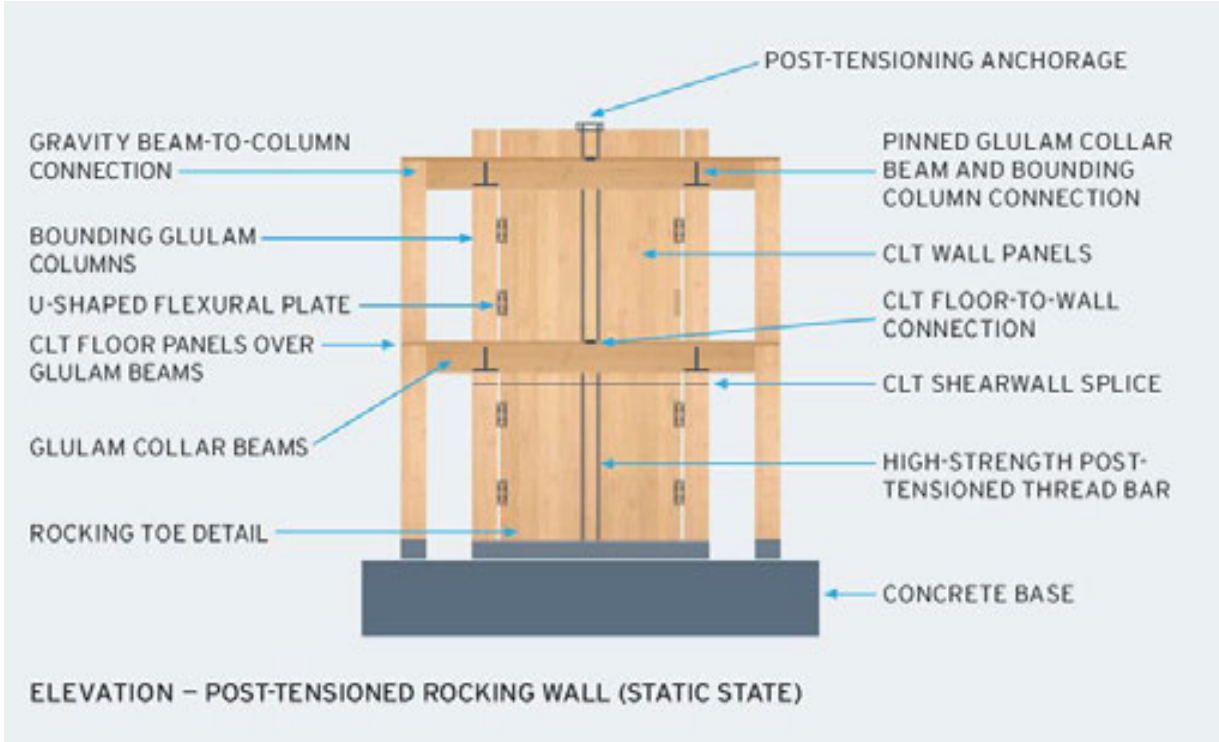


Image: KPFF

Considerations for Lateral Systems

<u>Prescriptive Code Compliance</u>

Concrete Shear Walls ✓

Steel Braced Frames ✓

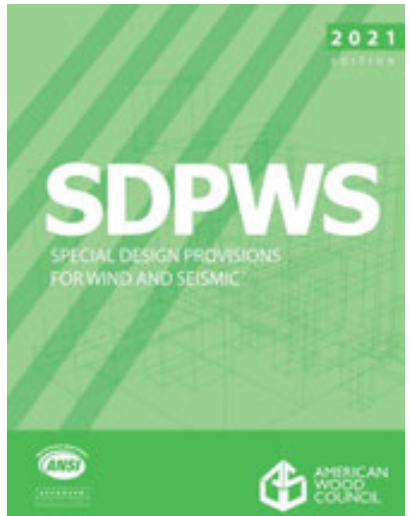
CLT Shear Walls (65 ft max) ✓

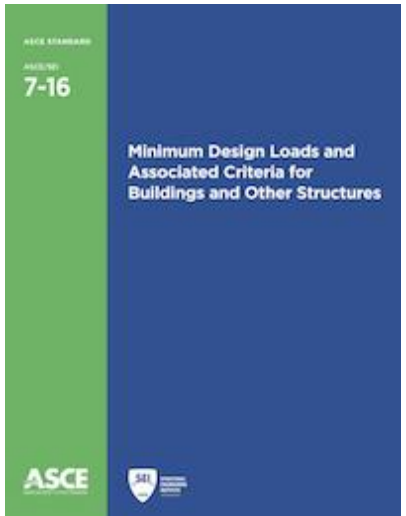
CLT Rocking Walls ✗

2021 SDPWS
ASCE 7-22


Photo: WoodWorks


Photo: Acton Ostry Architects

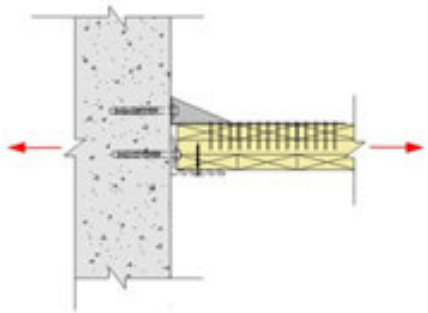


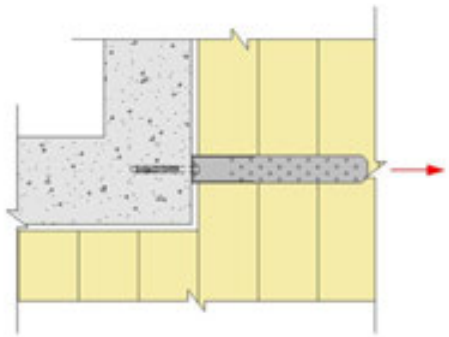


Considerations for Lateral Systems

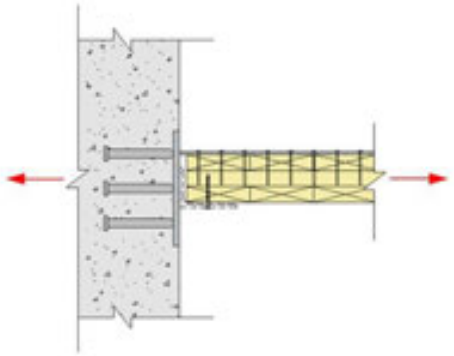
Connections to concrete core

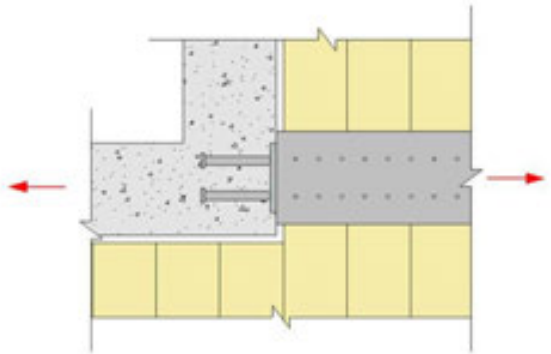
- Tolerances & adjustability
- Drag/collector forces





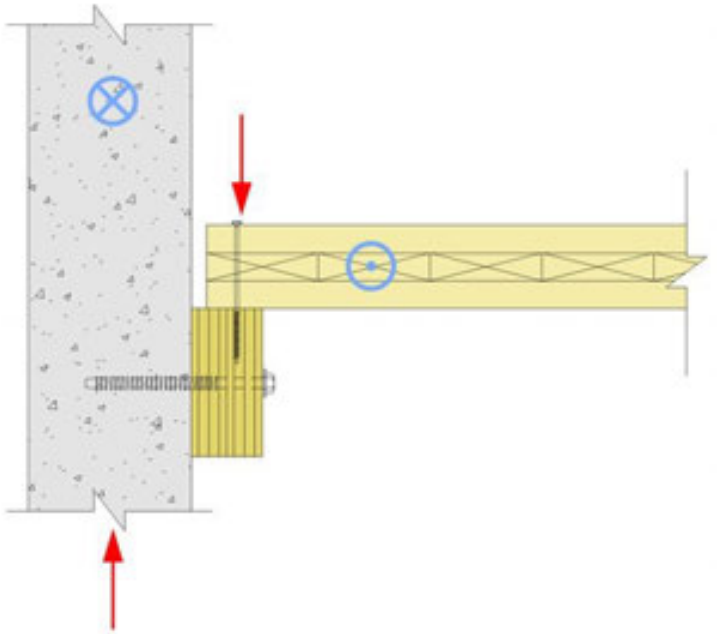
PLAN VIEW

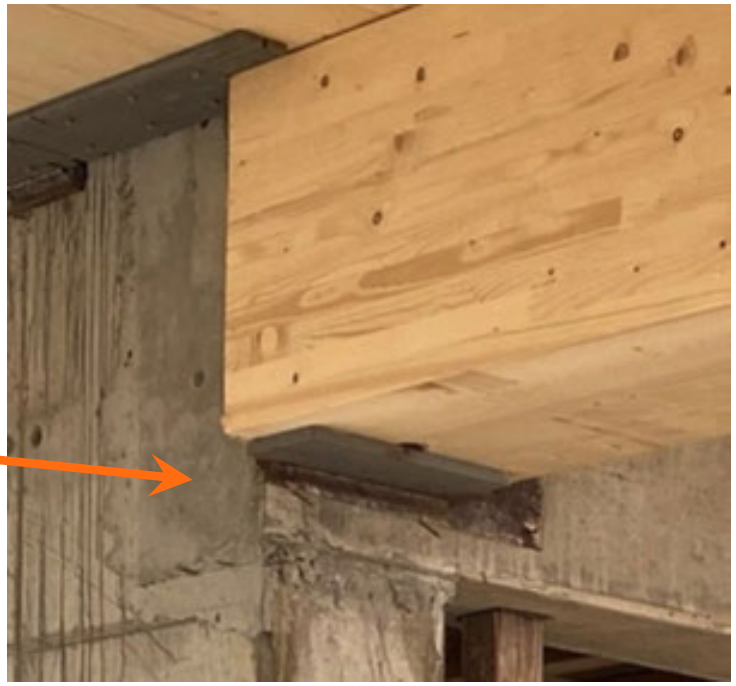




PLAN VIEW

Photo: Acton Ostry Architects





INTRO

Harbor Bay Ventures /
Hartshorne Plunkard Architecture /
Forefront Structural Engineers /
Fast + Epp / Panzica Construction
Photos WoodWorks

Considerations for Lateral Systems

Connections to steel frame

- Tolerances & adjustability
- Ease of installation

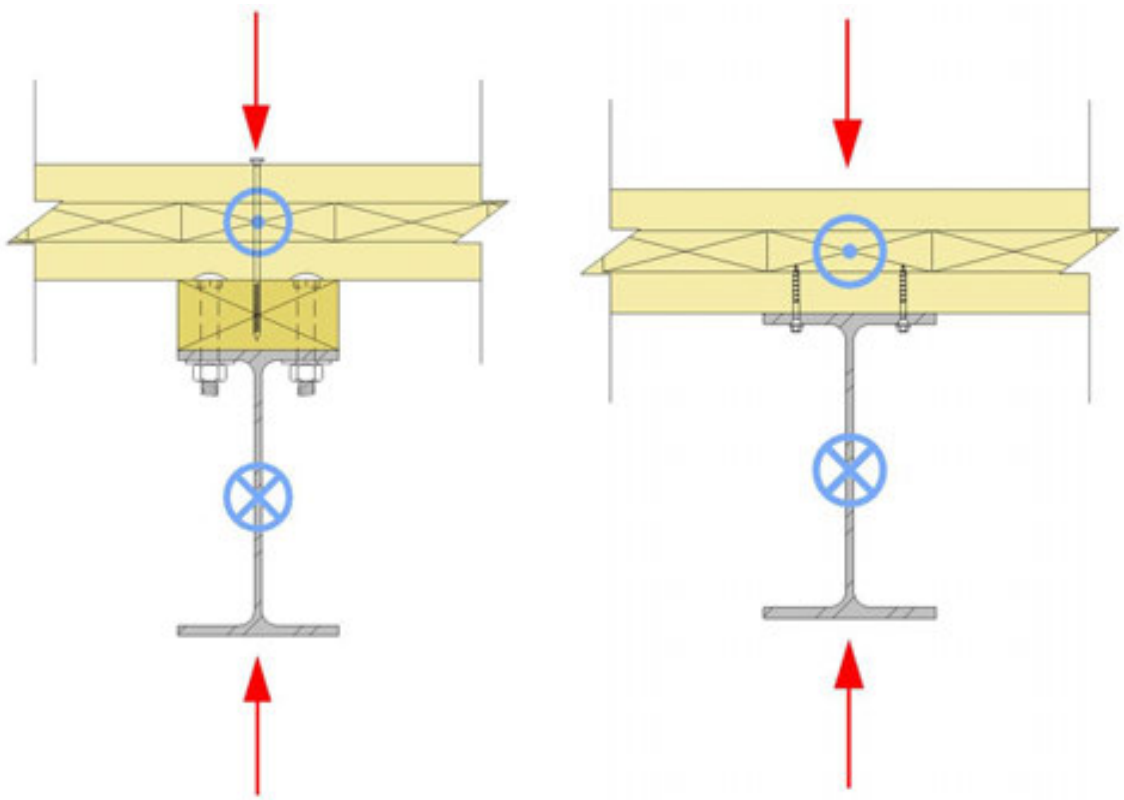


Photo: Marcus Kauffmann, ODF

COSTAR HQ

RICHMOND, VA

CREDIT: WOODWORKS

Shaft Enclosures in Tall Timber

- When can shaft enclosures be MT?
- What FRR requirements exist?
- If shaft enclosure is MT, is NC required?

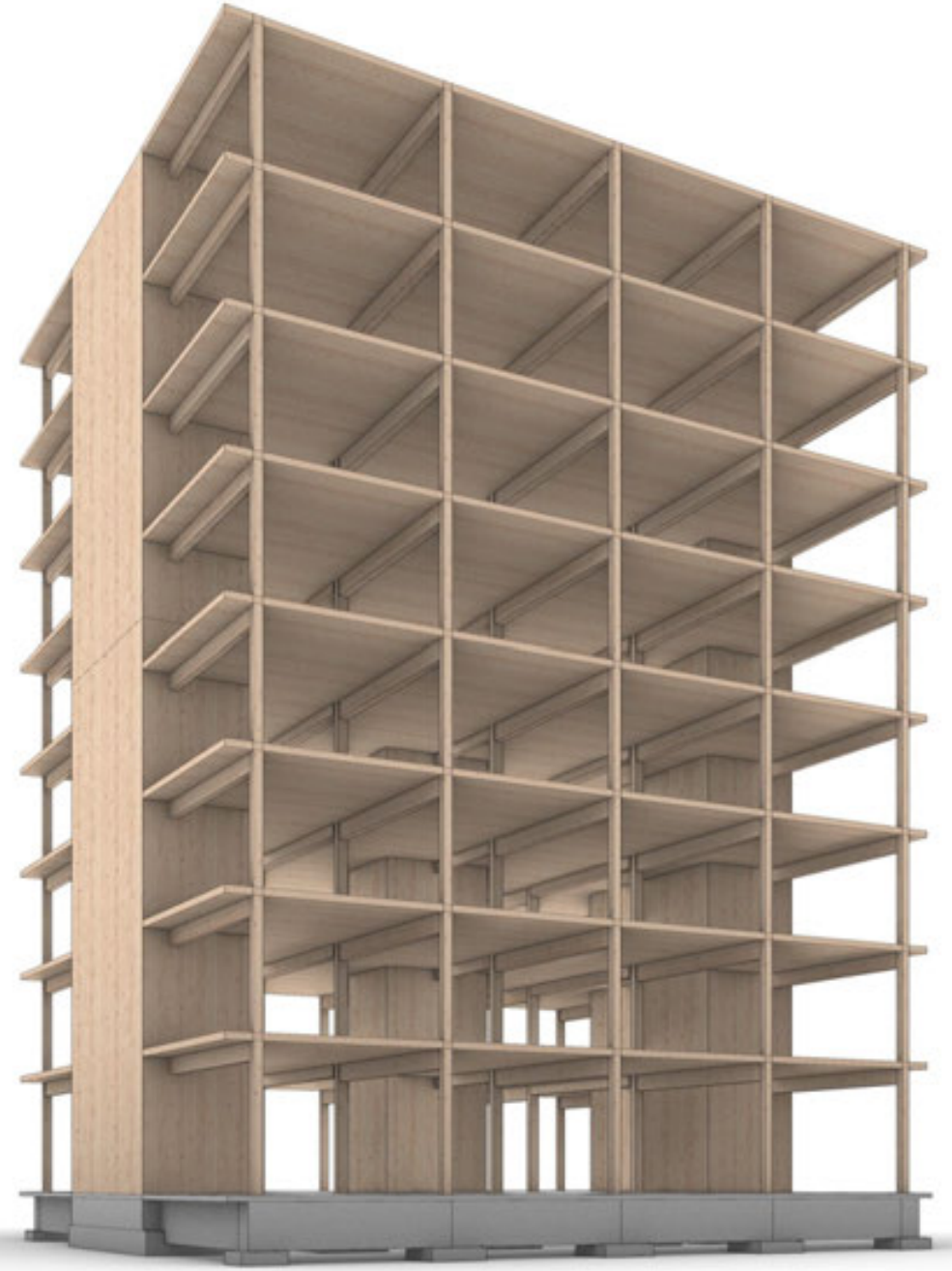


Image: Generate Architecture and Technologies + MIT – John Klein

Tall Wood Shaft Enclosures

	IV-A	IV-B	IV-C
Exit & Hoistway Enclosures	Up to 12 Stories or 180 ft: MT protected with 2 layers 5/8” type X gyp (if 2 HR req’d) or 3 layers 5/8” type X gyp (if 3 HR req’d) both sides Above 12 Stories or 180 ft: Noncombustible shafts (IBC 2021 602.4)	NC or MT protected with 2 layers 5/8” type X gyp (IBC 2021 602.4.2.6) both sides	NC or MT protected with 1 layer 5/8” type X gyp (IBC 602.4.3.6) both sides
E&H Enclosures FRR	2 HR (not less than FRR of floor assembly penetrated, IBC 713.4)		

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- Preliminary Cost Estimating

Connection Fire Protection

In Construction Types IV-A, IV-B & IV-C, building elements are required to be FRR as specified in IBC Tables 601 and 602.

Connections between these building elements must be able to maintain FRR no less than that required of the connected members.

Photo: MyTiCon

16.3 Wood Connections

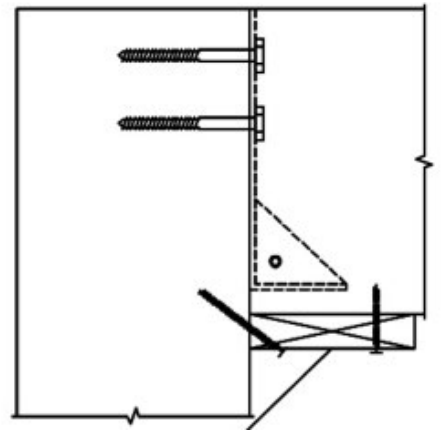
Wood connections, including connectors, fasteners, and portions of wood members included in the connection design, shall be protected from fire exposure for the required fire resistance time. Protection shall be provided by wood, fire-rated gypsum board, other approved materials, or a combination thereof.

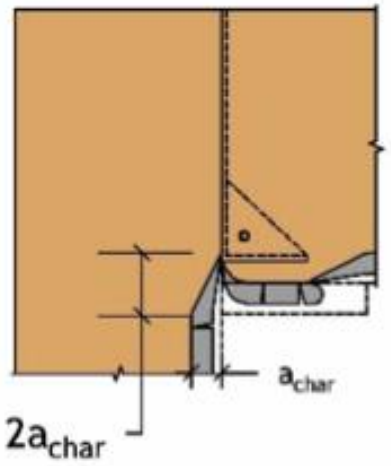
Source: NDS

Fire Resistance of Connections

2304.10.1 Connection fire resistance rating. Fire resistance ratings in Type IV-A, IV-B, or IV-C construction shall be determined by one of the following:

1. Testing in accordance with Section 703.2 where the connection is part of the fire resistance test.
2. Engineering analysis that demonstrates that the temperature rise at any portion of the connection is limited to an average temperature rise of 250o F (139o C), and a maximum temperature rise of 325o F (181o C), for a time corresponding to the required fire resistance rating of the structural element being connected. For the purposes of this analysis, the connection includes connectors, fasteners, and portions of wood members included in the structural design of the connection.



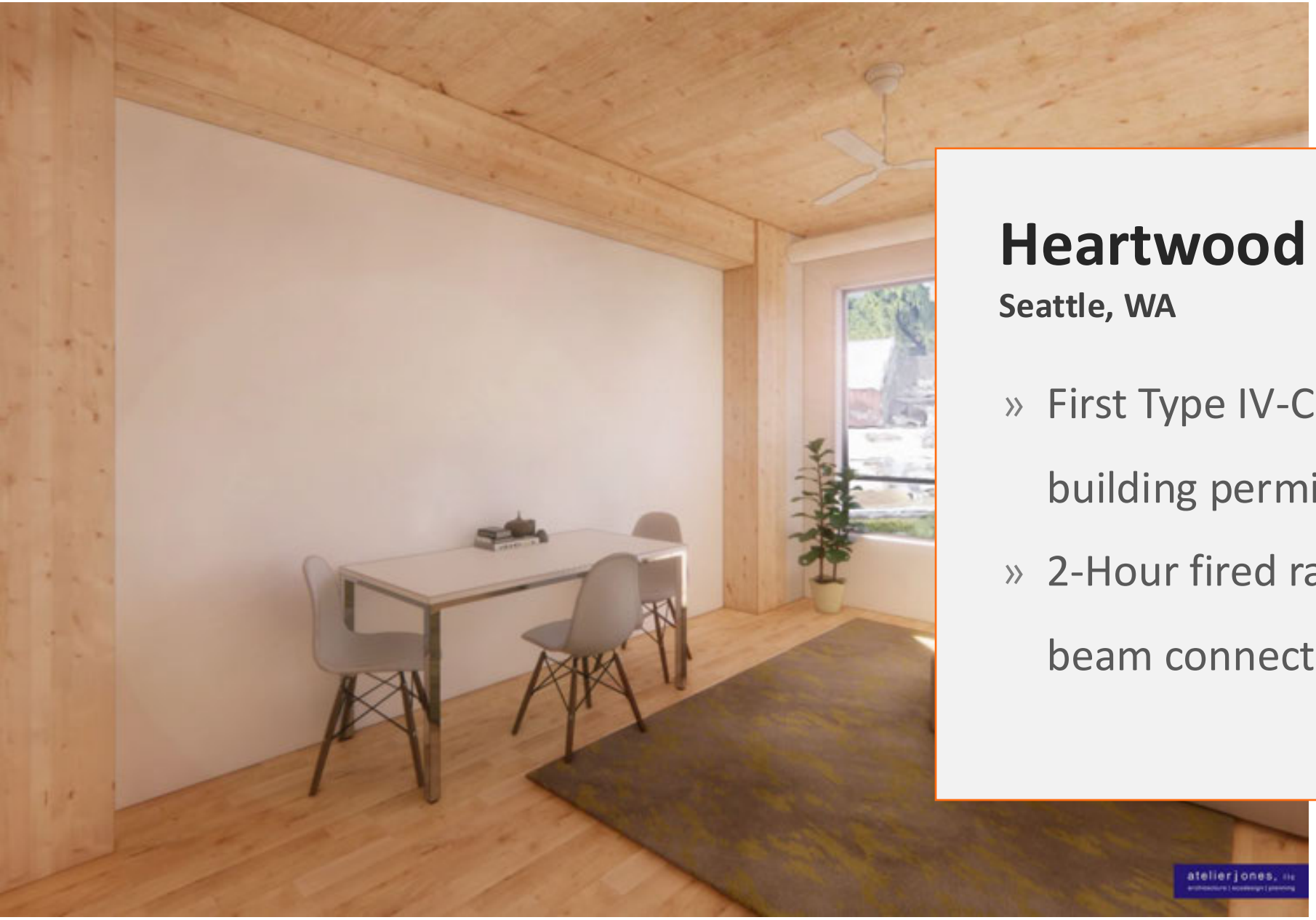


Source: AWC's TR 10

Connection Fire Protection

2017 Glulam Beam to Column Connection Fire Tests under standard ASTM E119 time-temperature exposure

Photo: ARUP/SLB



Heartwood

Seattle, WA

- First Type IV-C Building Code building permitted in WA
- 2-Hour fired rated beam-to-beam connections

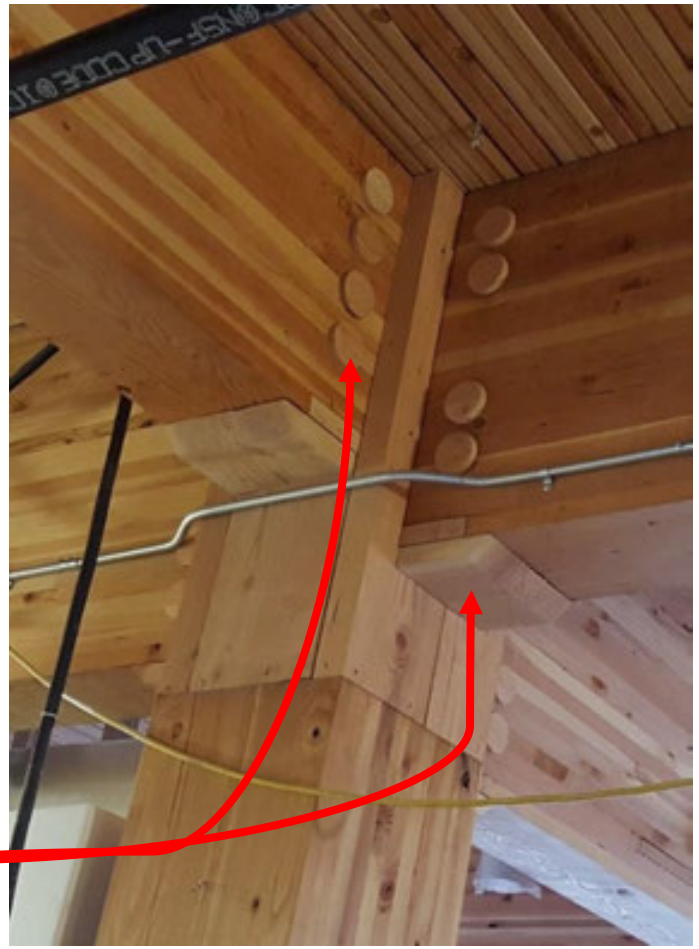
WN PROFILE

atelierjones LLC
DCI Engineers
Image: atelierjones LLC

Tall Mass Timber Inspections

Wood Connection Coverings for Fire-Resistance

110.3.5 Type IV-A, IV-B, and IV-C connection protection inspection. In buildings of Type IV-A, IV-B, and IV-C Construction, where connection fire resistance ratings are provided by wood cover calculated to meet the requirements of Section 2304.10.1, inspection of the wood cover shall be made after the cover is installed, but before any other coverings or finishes are installed.



Inspection of Wood Coverings

Tall Mass Timber Special Inspections

Table is only required for Type IV-A, IV-B, and IV-C

TABLE 1705.5.3
REQUIRED SPECIAL INSPECTIONS OF MASS TIMBER CONSTRUCTION

Type	Continuous Special Inspection	Periodic Special Inspection
1. Inspection of anchorage and connections of mass timber construction to timber deep foundation systems.		X
2. Inspect erection of mass timber construction		X
3. Inspection of connections where installation methods are required to meet design loads		
3.1. Threaded fasteners		
3.1.1. Verify use of proper installation equipment.		X
3.1.2. Verify use of pre-drilled holes where required.		X
3.1.3. Inspect screws, including diameter, length, head type, spacing, installation angle, and depth.		X
3.2. Adhesive anchors installed in horizontal or upwardly inclined orientation to resist sustained tension loads	X	
3.3. Adhesive anchors not defined in 3.2.		X
3.4. Bolted connections		X
3.5. Concealed connections		X

Source: International Building Code

Outline

- Tall Wood Introduction
- Lateral Systems in Tall Wood
- Connections in Tall Wood
- **Penetrations in Tall Wood**
- Sealants at Mass Timber Panel Edges
- Joints and Intersecting Elements
- Fire Safety During Construction
- Acoustical Design
- Preliminary Cost Estimating

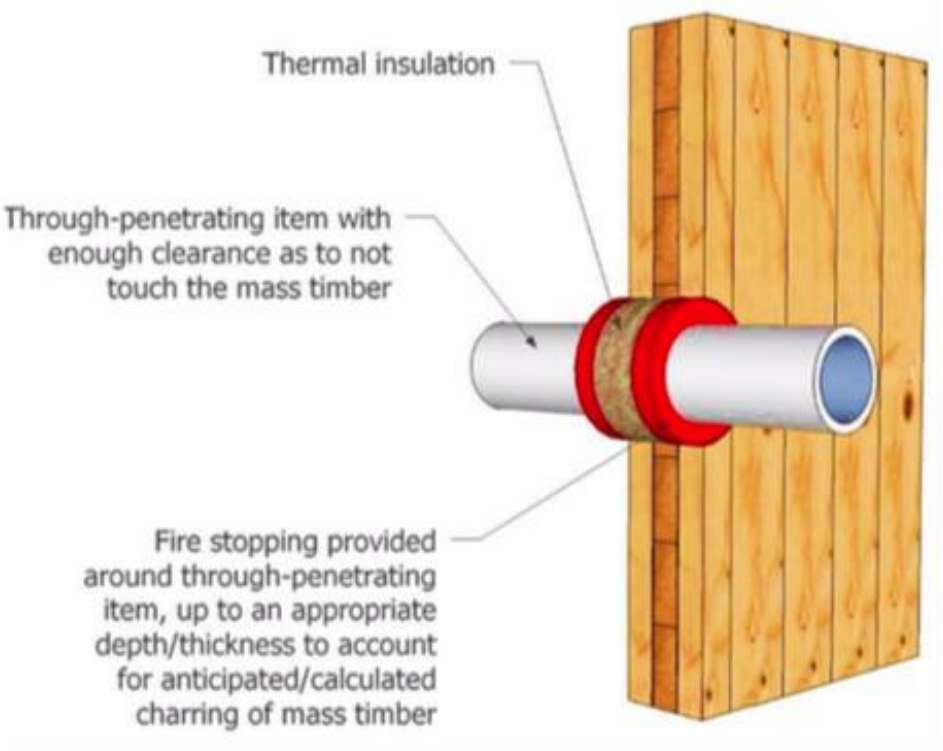
Penetration Fire Protection

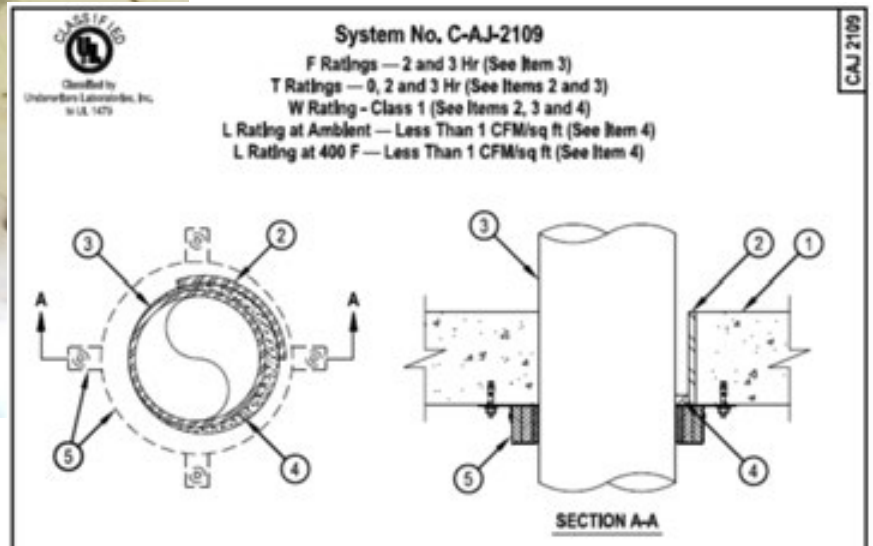
Although not a new code requirement or specific to tall wood, more testing & information is becoming available on firestopping of penetrations through MT assemblies

Photos: AWC/FPInnovations

Penetration Fire Protection

Most firestopping systems include combination of fire safing (eg. noncombustible materials such as mineral wool insulation) plus fire caulk





Photos: AWC/FPInnovations/Hilti

Penetration Fire Protection

Inventory of Fire Tested Penetrations in MT Assemblies

Mass Timber Panel	Exposed Side Protection	Unexposed Side Protection	Penetrating Item	Penetrant Centered or Offset in Hole	Firestopping System	F Rating (Hours)	T Rating (Hours)	Test Protocol	Method of Compliance
3-layer 3.07" (100mm) CLT	1 layer 5/8" Type X gypsum	None	4" sched. 40 PVC pipe	Centered or offset up to 9/16 in.	Maximum 5 inch diameter opening. One stack of three layers STI BLU2 Wrapstrip with SSWRC Collar secured to underside of floor or both sides of wall. 1/2 inch depth of SpecSeal® LCI Intumescent sealant on top of floor or both sides of wall with a 1/4 inch bead at point contact.	2	0.75	ASTM E814 and CAN/ULC S115	Intertek Listing STI/PF 120-01 (http://bpdirectory.intertek.com/controls/SDDocumentViewer.aspx?document_id=718930&name=STI%2fPF+120-01)
3-layer 3.07" (100mm) CLT	1 layer 5/8" Type X gypsum	None	AC Lineset with max 1" copper condensate, 1" insulated copper with 3/4" AB/PVC insulation, two No. 18 conductor control wires	Centered or offset. Offset may range from 1/2 in. to 1-3/4 in.	Maximum 5 inch diameter opening. 4pcf mineral wool packed to fill opening and recessed 3/4 inch from the top of the floor or both sides of the wall. 3/4 inch depth of SpecSeal® LCI Intumescent sealant on top of floor or both sides of wall. Firestop installation and products based on Intertek System STI/PF 120-02	2	0.25	ASTM E814 and CAN/ULC S115	Intertek Listing STI/PF 120-02 (http://bpdirectory.intertek.com/controls/SDDocumentViewer.aspx?document_id=719795&name=STI%2fPF+120-02)
3-layer 3.07" (100mm) CLT	1 layer 5/8" Type X gypsum	None	Cable bundle	Centered or offset. Offset may range from 1/2 in. to 1-1/2 in.	Maximum 6 inch diameter opening. 4pcf mineral wool packed to fill opening and recessed 3/4 inch from the top of the floor or both sides of the wall. 3/4 inch depth of SpecSeal® LCI Intumescent sealant on top of floor or both sides of wall. Firestop installation and products based on Intertek System STI/PF 120-03	2	0.5	ASTM E814 and CAN/ULC S115	Intertek Listing STI/PF 120-03 (http://bpdirectory.intertek.com/controls/SDDocumentViewer.aspx?document_id=719796&name=STI%2fPF+120-03)
					Maximum 6 inch diameter opening. 4pcf mineral wool packed to fill opening and recessed 3/4 inch from the top of the floor or both sides of the wall. 3/4 inch			ASTM E814	Intertek Listing STI/PF 120-04 (http://bpdirectory.int

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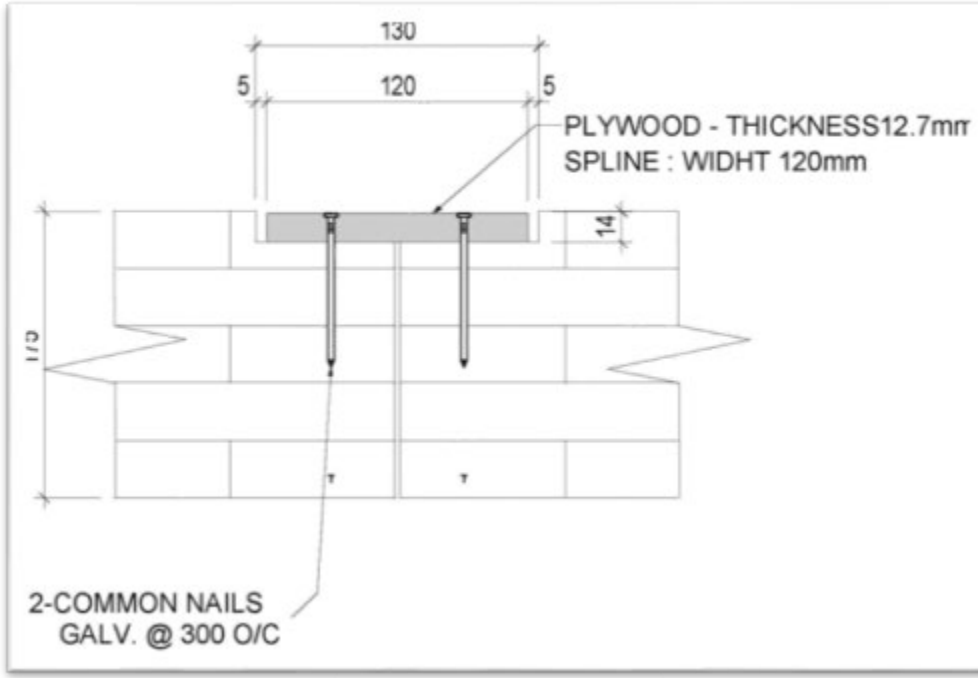
Sealants at MT Panel Edges

Photos: ARUP

Sealants at MT Panel Edges

703.9 Sealing of adjacent mass timber elements.
In buildings of Type IVA, IVB, and IVC construction, sealant or adhesive shall be provided to resist the passage of air in the following locations:

1. At abutting edges and intersections of mass timber building elements required to be fire resistance-rated
2. At abutting intersections of mass timber building elements and building elements of other materials where both are required to be fire resistance-rated.



Sealants at MT Panel Edges

Several MT fire tested assemblies have successfully been completed w/o adhesives/sealants at abutting panel edges

2021 IBC will require periodic special inspections of adhesive/sealant installation (when required to be installed)


Photo: NRCAN


Photo: Fast + Epp


Photo: ARUP

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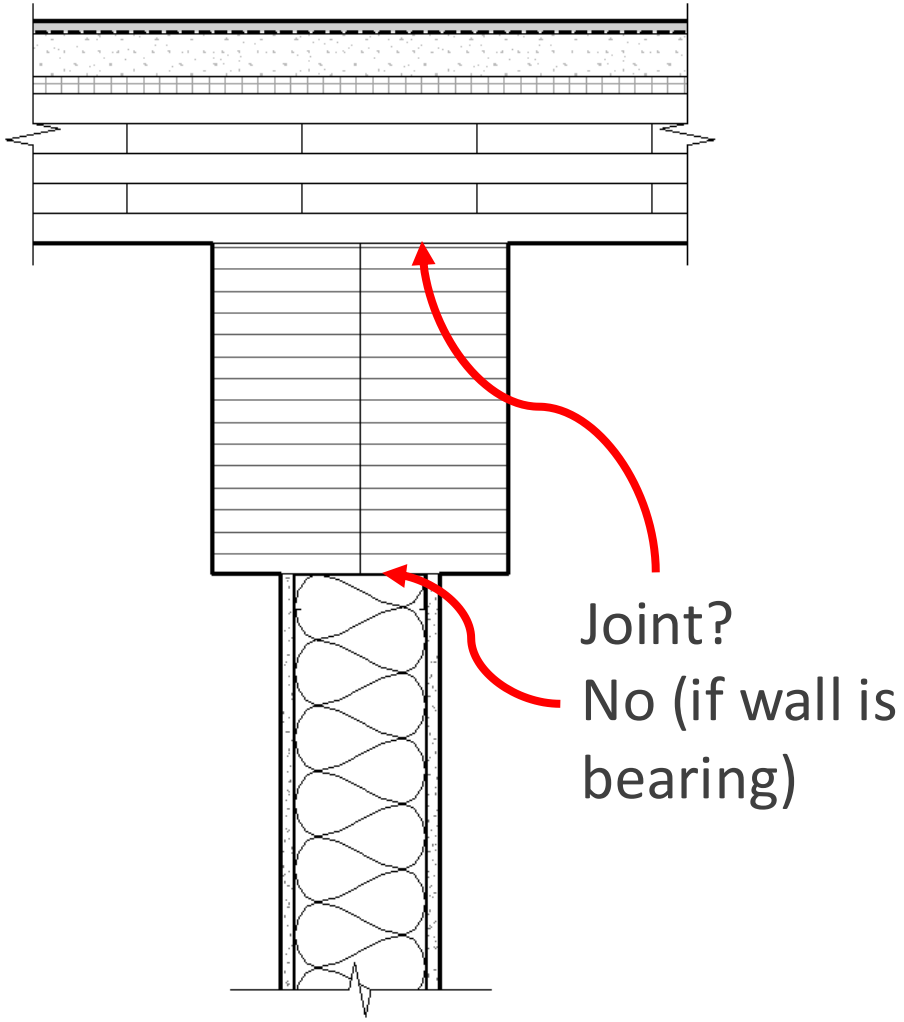
Joints & Intersecting Elements

Section 202 Definitions

Joint: The opening in or between adjacent assemblies that is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

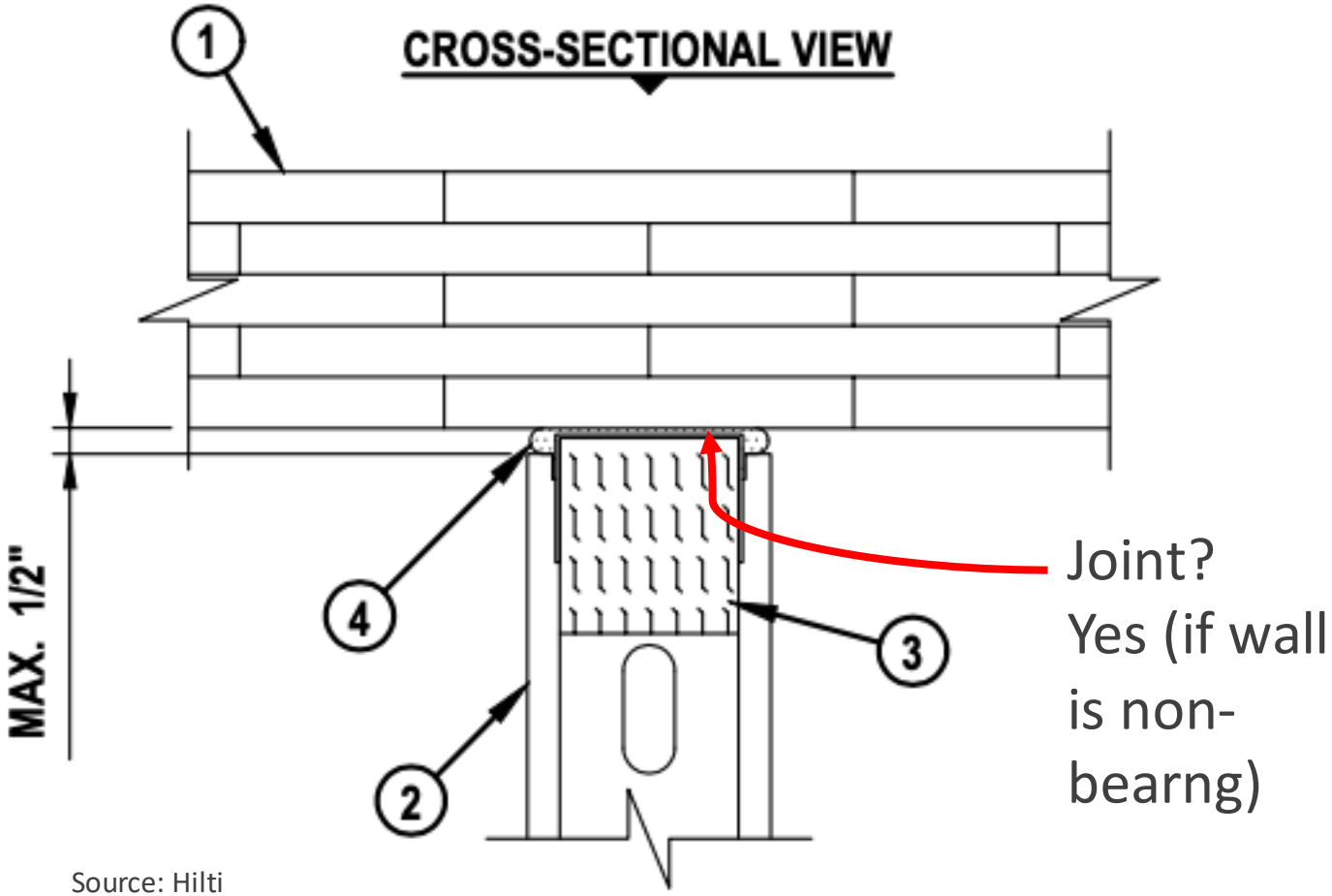
Considerations:

- Is wall, beam and slab rated?
- Required to prevent smoke passage?
- Not a tall timber specific item, applicable to all mass timber construction



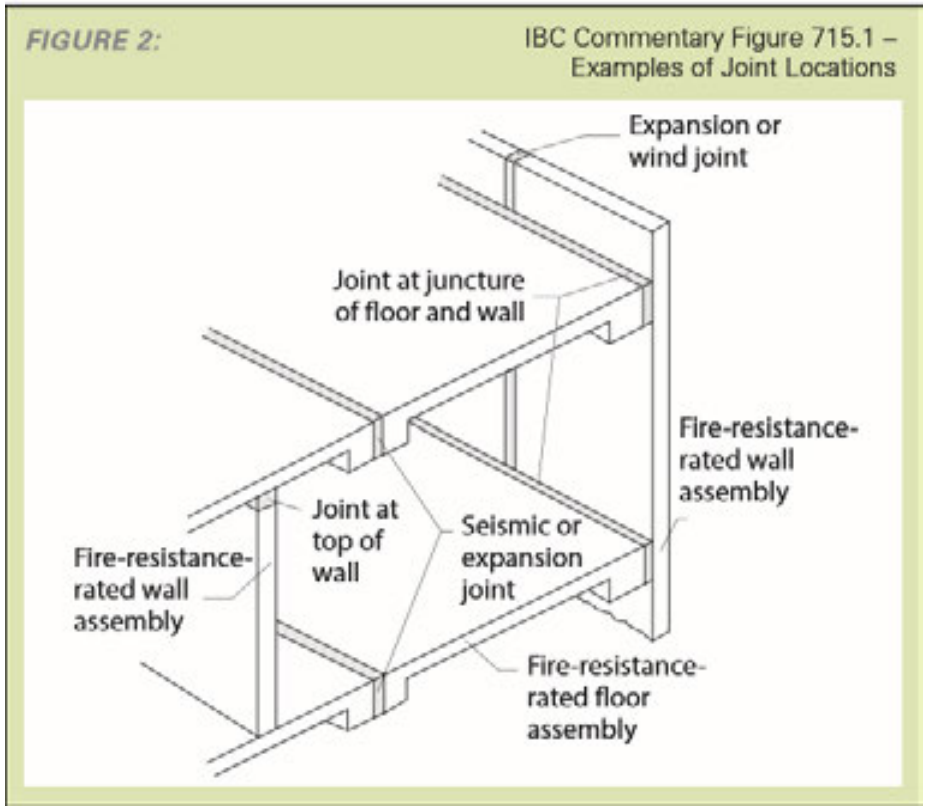
Joints & Intersecting Elements

Not a tall timber specific item, applicable to all mass timber construction



Joint?
Yes (if wall is non-bearng)

Source: Hilti



Source: International Building Code

Occupancy Separation

Protection of MT used for occupancy separation

Addition to IBC 508.4.4.1 requires:

Mass timber elements serving as fire barriers or horizontal assemblies to separate occupancies in Type IV-B or IV-C construction shall be separated from the interior of the building with a minimum of ½” gypsum board or a noncombustible equivalent.

Photo: MIT | John Klein

Incidental Use Separation

Protection of MT used for incidental use separation

New section 509.4.1.1 requires:

Where Table 509 specifies a fire- resistance-rated separation, mass timber elements serving as fire barriers or a horizontal assembly in Type IV-B or IV-C construction shall be separated from the interior of the incidental use with a minimum of ½” gypsum board or a noncombustible equivalent.

Photo: MIT | John Klein

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Fire Safety During Construction

New code provisions in International Fire Code (IFC) address construction fire safety of tall wood buildings

3308.4 Fire safety requirements for buildings of Types IV-A, IV-B, and IV-C construction. Buildings of Types IV-A, IV-B, and IV-C construction designed to be greater than six stories above grade plane shall meet the following requirements during construction unless otherwise approved by the fire code official.

1. Standpipes shall be provided in accordance with Section 3313.
2. A water supply for fire department operations, as approved by the fire chief.

Photo: Structurlam

Fire Safety During Construction

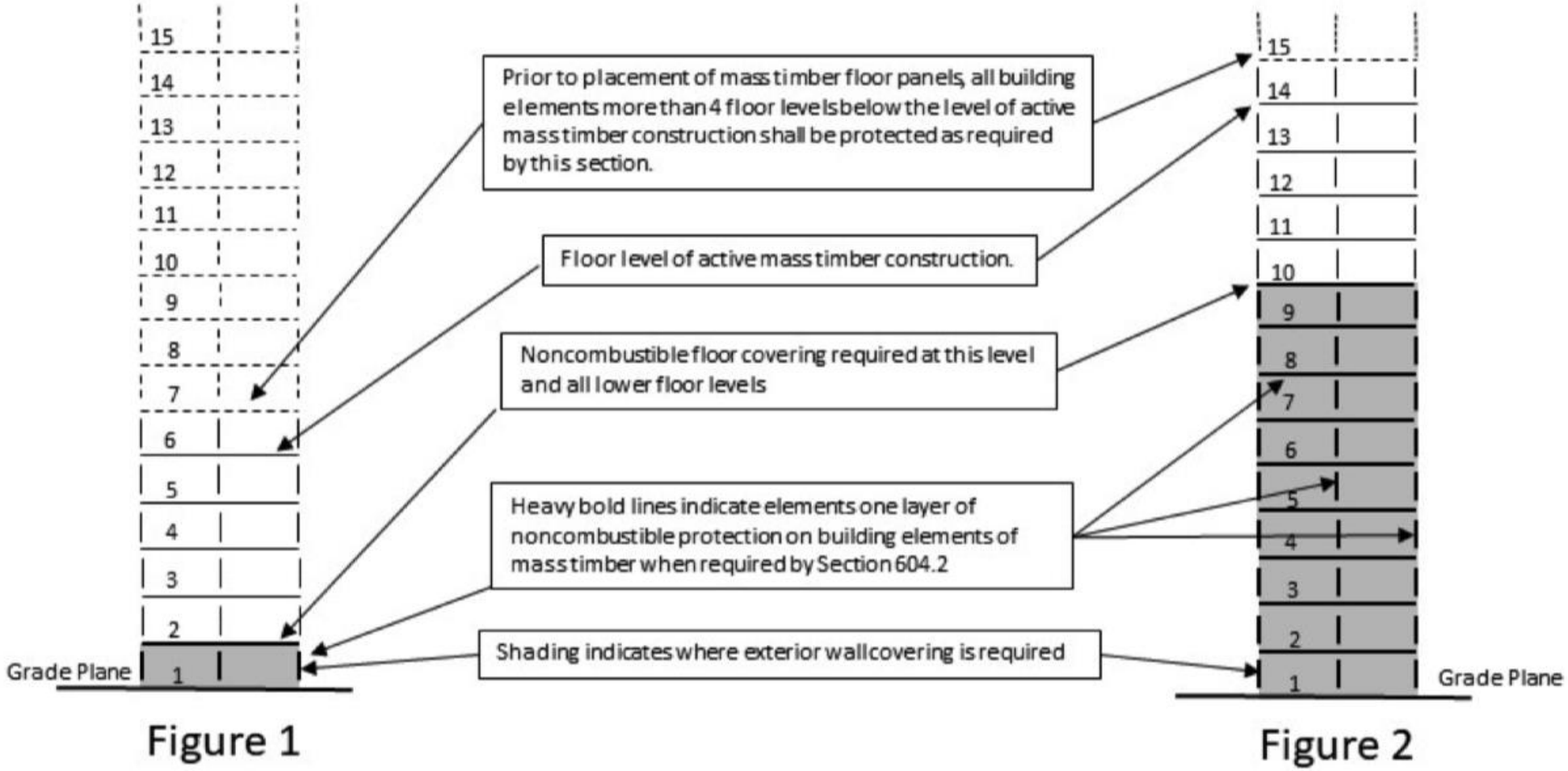

Figure 1

Figure 2

Examples of Protection During Construction For Mass Timber Buildings Greater Than 6 Stories Above Grade Plane

Credit: ICC

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Acoustical Design

Code requirements only address residential occupancies:

For unit to unit or unit to public or service areas:

Min. STC of 50 (45 if field tested):

- Walls, Partitions, and Floor/Ceiling Assemblies

Min. IIC of 50 (45 if field tested) for:

- Floor/Ceiling Assemblies

Acoustical Design

STC	What can be heard
25	Normal speech can be understood quite easily and distinctly through wall
30	Loud speech can be understood fairly well, normal speech heard but not understood
35	Loud speech audible but not intelligible
40	Onset of "privacy"
42	Loud speech audible as a murmur
45	Loud speech not audible; 90% of statistical population not annoyed
50	Very loud sounds such as musical instruments or a stereo can be faintly heard; 99% of population not annoyed.
60+	Superior soundproofing; most sounds inaudible

Mass Timber Acoustics

TABLE 1:

Examples of Acoustically-Tested Mass Timber Panels

Mass Timber Panel	Thickness	STC Rating	IIC Rating
3-ply CLT wall[4]	3.07"	33	N/A
5-ply CLT wall[4]	6.875"	38	N/A
5-ply CLT floor[5]	5.1875"	39	22
5-ply CLT floor[4]	6.875"	41	25
7-ply CLT floor[4]	9.65"	44	30
2x4 NLT wall[6]	3-1/2" bare NLT 4-1/4" with 3/4" plywood	24 bare NLT 29 with 3/4" plywood	N/A
2x6 NLT wall[6]	5-1/2" bare NLT 6-1/4" with 3/4" plywood	22 bare NLT 31 with 3/4" plywood	N/A
2x6 NLT floor + 1/2" plywood[2]	6" with 1/2" plywood	34	33

Source: Inventory of Acoustically-Tested Mass Timber Assemblies, WoodWorks[7]

Acoustical Detailing

Regardless of the structural materials used in a wall or floor ceiling assembly, there are 3 effective methods of improving acoustical performance:

1. Add mass
2. Add noise barriers
3. Add decouplers

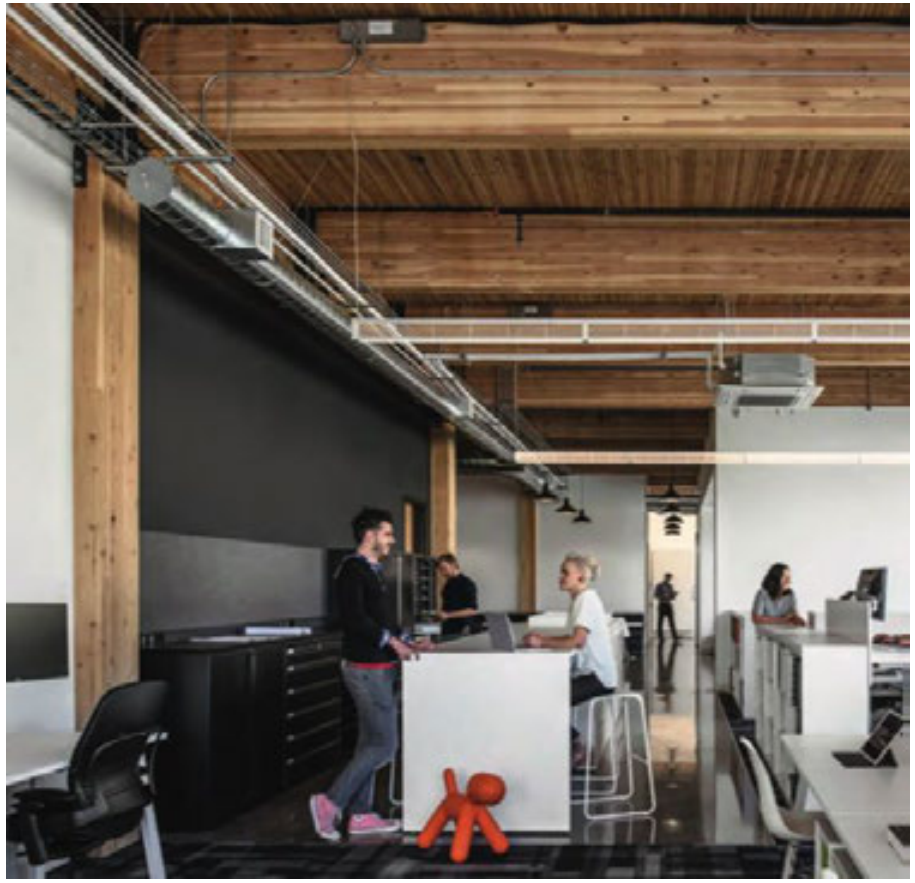


Image credit: Christian Columbres

Mass Timber Acoustics

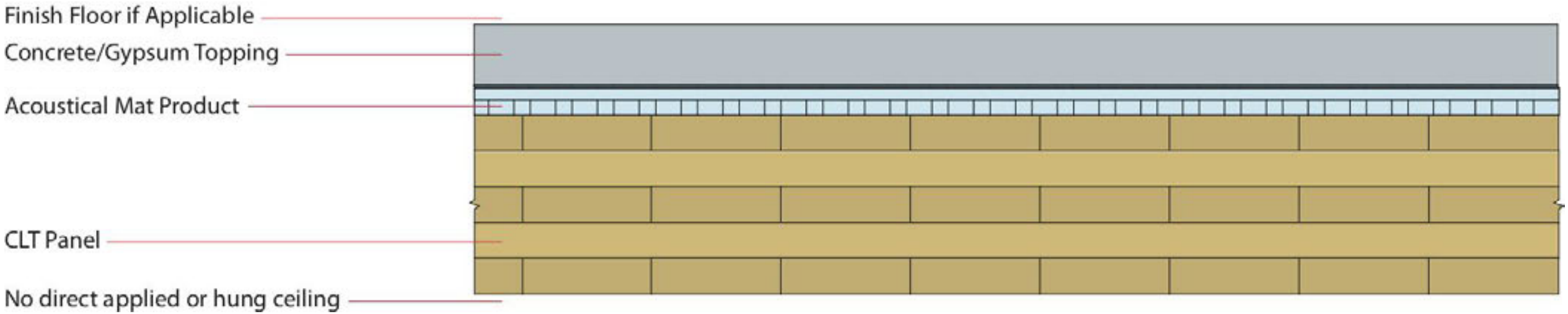
<u>Concrete Slab:</u>
6” Thick
80 PSF
STC 53

<u>CLT Slab:</u>
6-7/8” Thick
18 PSF
STC 41

Mass Timber Acoustics

There are three main ways to improve an assembly's acoustical performance:

1. Add mass
2. Add noise barriers
3. Add decouplers



Mass Timber Acoustics

There are three main ways to improve an assembly's acoustical performance:

1. Add mass
2. Add noise barriers
3. Add decouplers

Acoustical Mat:

- Typically roll out or board products
- Thicknesses vary: Usually ¼" to 1"+

Credit: Maxxon

Mass Timber Acoustics

Common mass timber floor assembly:

- Finish floor (if applicable)
- Underlayment (if finish floor)
- 1.5” to 4” thick concrete/gypcrete topping
- Acoustical mat
- WSP (if applicable)
- Mass timber floor panels

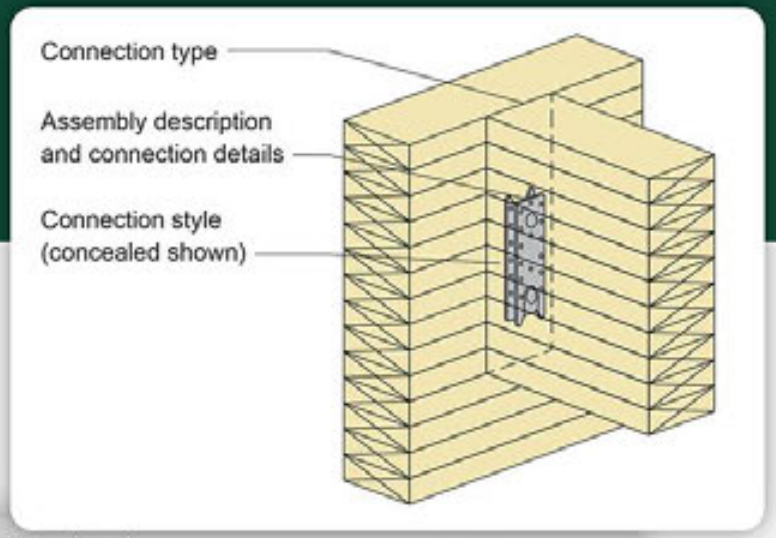
Credit: AcoustiTECH

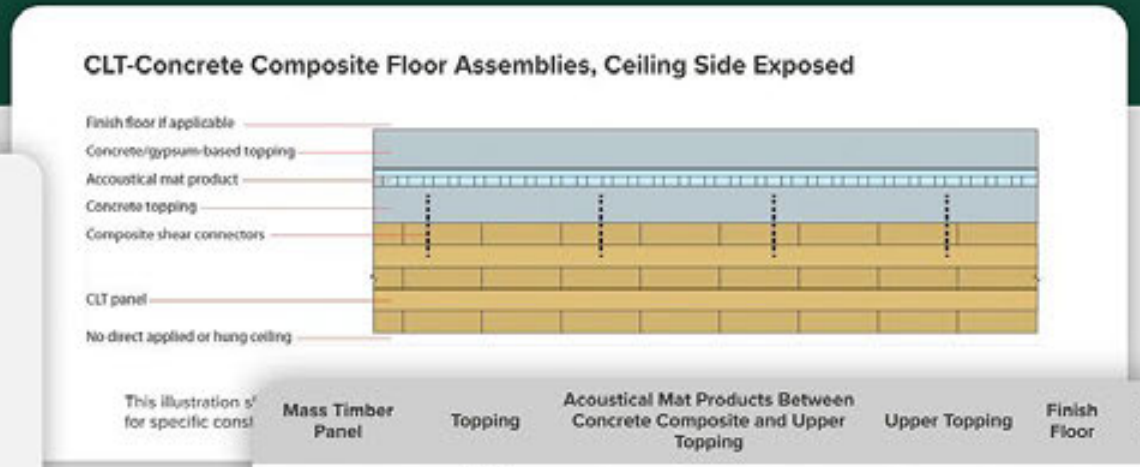
NEW ONLINE TOOL

Mass Timber Fire & Acoustic Database

Search tested and approved assemblies

https://www.woodworks.org/mass-timber-fire-acoustic-database/





< Back to Mass Timber Fire & Acoustic Database

Assembly Type

- ☐ Floor/Roof 532
- ☐ Wall 147

Application Type

- ☐ CLT/Concrete Composite 7
- ☐ Concealed Ceiling 201
- ☐ Concrete/Gypsum Topping 138
- ☐ Other 108
- ☐ Raised Access Floor or Wood Sleepers 78

Mass Timber Panel

- ☐ CLT 507
- ☐ CLT (SCL) 56
- ☐ NLT 72
- ☐ DLT 22

Mass Timber Panel	Topping	Acoustical Mat Products Between Concrete Composite and Upper Topping	Upper Topping	Finish Floor	Sound Rating	Impact Rating	Method of Compliance
5-layer 5.40" CLT	2.25" Concrete	Maxxon Acousti-Mat® 3/8	1" Gyp-Crete®	52	STC	50 IIC	Maxxon / Intertek Report # K3094.97-113-11-R0 Contact Product Manufacturer for More Information
5-layer 5.40" CLT	2.25" Concrete	Maxxon Acousti-Mat® 3/8	1" Gyp-Crete®	53	STC	52 IIC	Maxxon / Intertek Report # K3094.69-113-11-R0 Contact Product Manufacturer for More Information
5-layer 5.40" CLT	2.25" Concrete	Maxxon Acousti-Mat® SBR over Maxxon Acousti-Mat® 3/4 Premium	1.5" Gyp-Crete®	56	STC	57 IIC	Maxxon / Intertek Report # K3094.98-113-11-R0 Contact Product Manufacturer for More Information
5-layer 5.40" CLT	2.25" Concrete	Maxxon Acousti-Mat® SBR over Maxxon Acousti-Mat® 3/4 Premium	1.5" Gyp-Crete®	57	STC	61 IIC	Maxxon / Intertek Report # K4507.06-113-11-R0 Contact Product Manufacturer for More Information
5-layer 5.40" CLT	2.25" Concrete	Maxxon Acousti-Mat® SBR over Maxxon Acousti-Mat® 3/4 Premium	2" Gyp-Crete®	60	STC	61 IIC	Maxxon / Intertek Report # K3094.86-113-11-R0 Contact Product Manufacturer for More Information
5-layer 5.40" CLT	2.25" Concrete	Maxxon Acousti-Mat® SBR over Maxxon Acousti-Mat® 3/4 Premium	2" Gyp-Crete®	58	STC	63 IIC	Maxxon / Intertek Report # K3094.86-113-11-R0 Contact Product Manufacturer for More Information
5-layer 5.40" CLT	2.25" Concrete	5/8" OSB on 5/8" Georgia Pacific Dens Deck® on Kinetics® Ultra Quiet SR	None	60	STC	62 IIC	Veneklasen Associates / Intertek Report # K3094.19-113-11-R0 Contact Product Manufacturer for More Information

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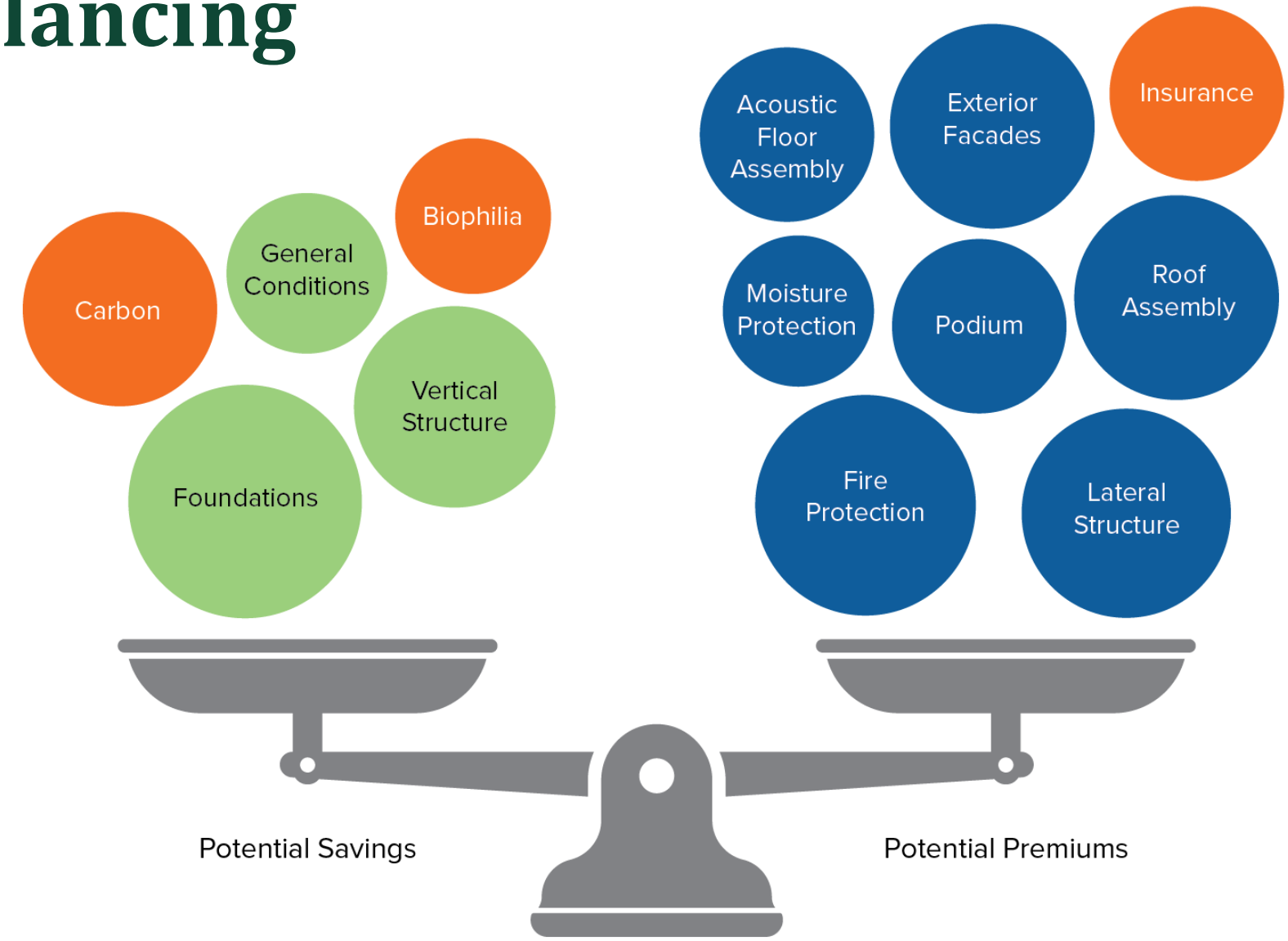
Mass Timber Construction Cost Balancing



Need to Consider Holistic Costs, Not Structure Only

$/SF

$/SF

Image: GBD Architects

Structural Grid - Panels

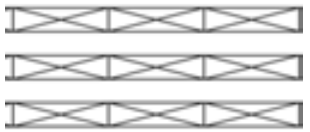
» Cost and Construction Type – Panel selection

TABLE 601: Fire Resistance Rating Requirements for Building Elements (Hours)

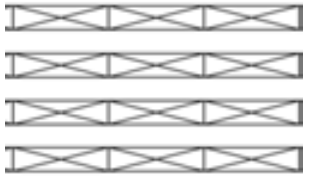
Building Element	I-A	I-B	III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
Primary Structural Frame	3*	2*	1	0	3*	2	2	HT	1	0
Ext. Bearing Walls	3*	2*	2	2	3*	2	2	2	1	0
Int. Bearing Walls	3*	2*	1	0	3*	2	2	1/HT	1	0
Floor Construction	2	2*	1	0	2	2	2	HT	1	0
Roof Construction	1.5*	1*	1	0	1.5	1	1	HT	1	0
Exposed Mass Timber Elements					None	20-40%	Most	All		

Baseline
0hr & HT

+$10/SF over 3-ply
1hr & maybe 2hr



+$12-15/SF over 5-ply
2hr FRR

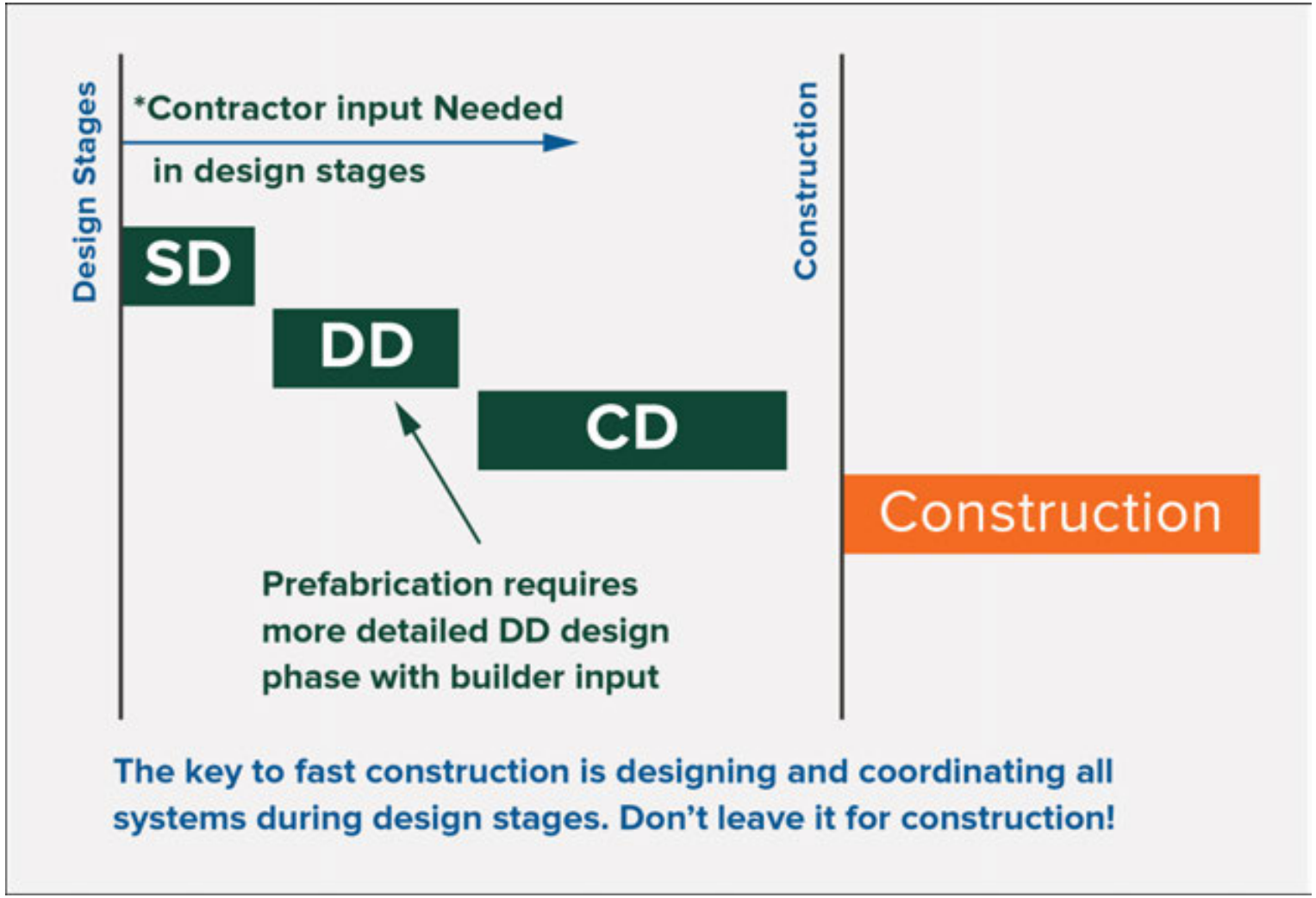


Cost Source: Swinerton

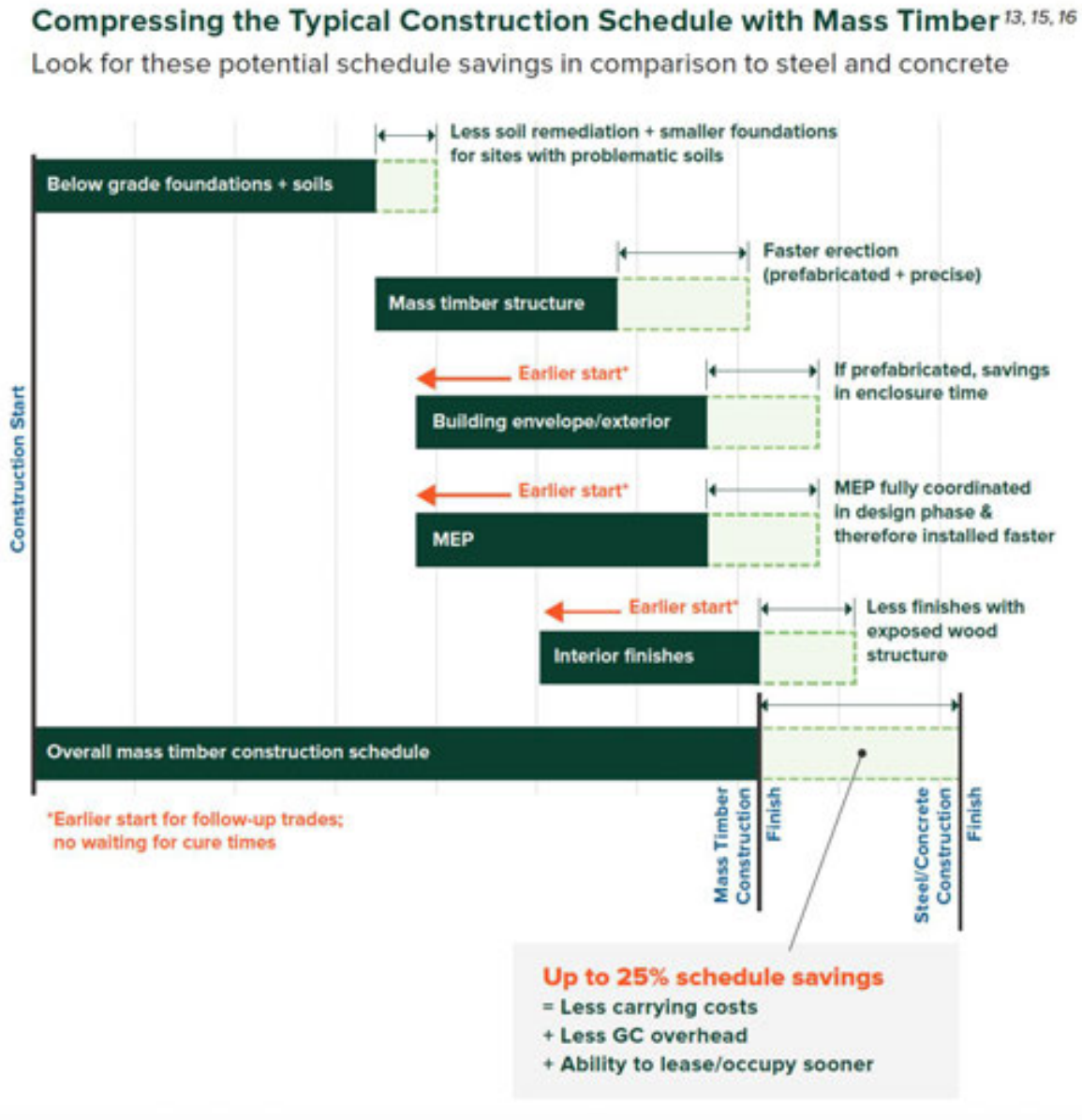
*These values can be reduced based on certain conditions in IBC 403.2.1, which do not apply to Type IV buildings.

More Work Up Front / Less Later

- Early planning and coordination among all project team members
- Builder input early in design
- All engineering completed before mass timber products are produced



Procurement Approach Determines Schedule



Source: WoodWorks

Manage Project Costs

Other Non-Timber Design Cost Levers

- Cost saving opportunities can be offset by increases in other areas of the construction budget.
- Compensating for these incremental increases and achieving real savings requires a focused effort to both actively leverage opportunities and minimize (in order of effect);

Lateral systems
Fire protection
Acoustic floor assemblies
Exterior facades

Wellesley College Science Complex / Skidmore, Owings & Merrill / Le Messurier / Photo Dave Burk © SOM

https://www.woodworks.org/search/?query=Exterior%20Walls%20in%20Mass%20Timber%20Buildings

EXPERT TIP

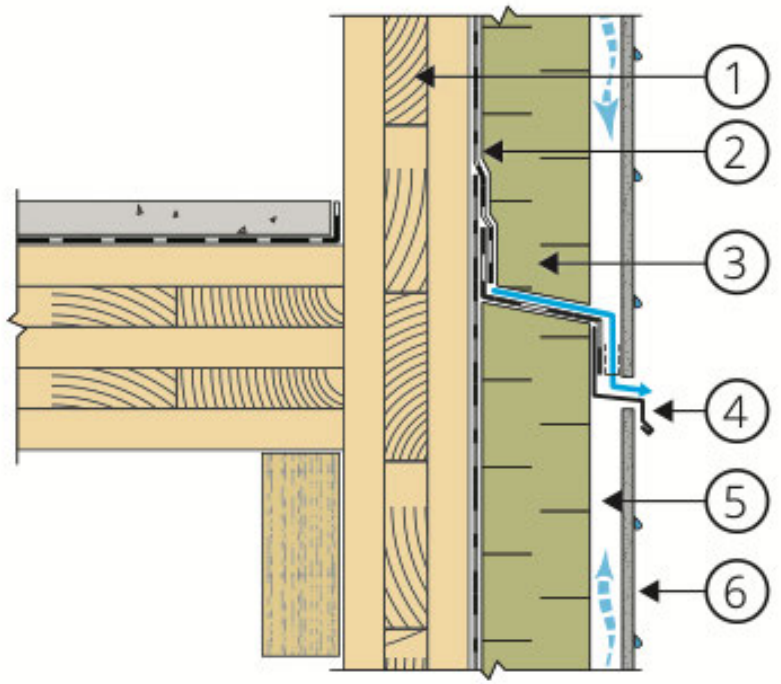
Exterior Walls in Mass Timber Buildings

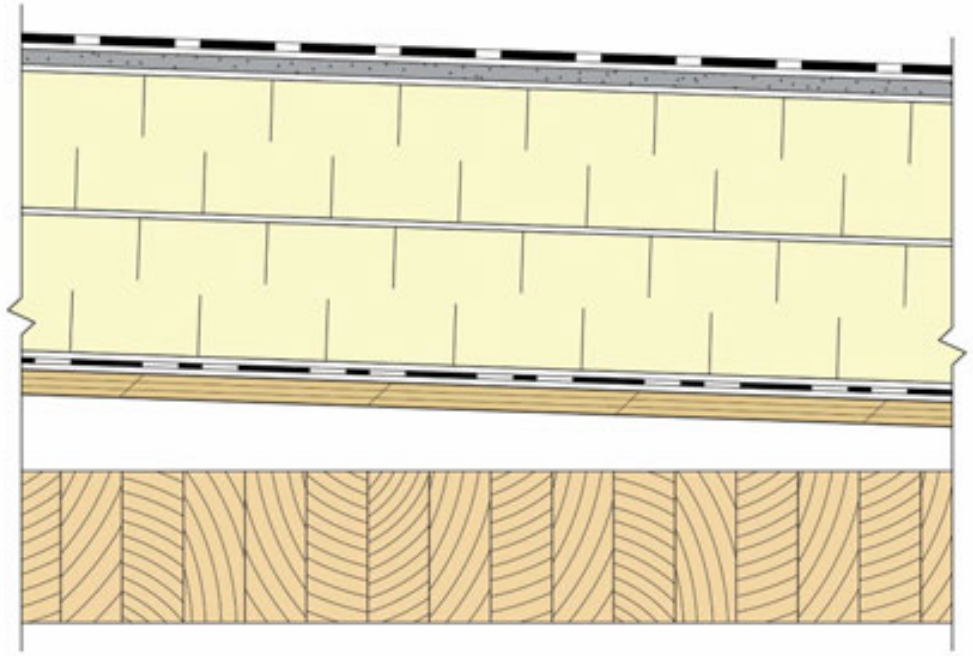
4-part series covers codes and materials, floor-to-wall intersection details, cladding and panelization

Brook Street Residence Hall / TenBerke
Photo Chris Cooper

Mass Timber Project Risk Mitigation

- Long term moisture protection achieved through good building enclosure assemblies and details
- Enclosure installation as soon as possible also aids in construction phase moisture protection of interior elements





Photos: RDH Building Science

11 E Lenox / Monte French Design Studio / H+O Structural Engineering
Photo H+O Structural Engineering

The Mass Timber Insurance Playbook

U.S. Edition

A guide to insuring mass timber buildings

Co-authored by Philip Cellow and Jim Glockling
Adapted for the United States by Mike Hastings in collaboration with WoodWorks – Wood Products Council
U.S. Edition published by WoodWorks

Planning for Environmental Exposures

- Plan Early
- Risk Evaluation
- Develop Construction
- Phase Plan
- Execute the Design and Moisture Management Plan
- Monitor

RDH Moisture Management Guide 1st Ed

Potential Benefits	Project Goal ✓	Value Add ✓
Fast construction		
Aesthetic Value (Potential leasing velocity/ premiums) Healthy Building / Biophilia		
Lightweight structure (multi-story, poor soils, tilt-walls, vertical additions)		
Labor shortage solution • small crews • entry level workers		
Just-in-time delivery (ideal for dense urban sites)		
Environmentally friendly (low carbon footprint)		
Healthy forests/ wildfire resiliency & support rural economies		

Questions? Ask us anything.

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901 East Sixth, Thoughtbarn-Delineate Studio, Leap!Structures, photo Casey Dunn

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