A Mass Timber Breakthrough?

Aligning the Pieces for Timber Construction in the South

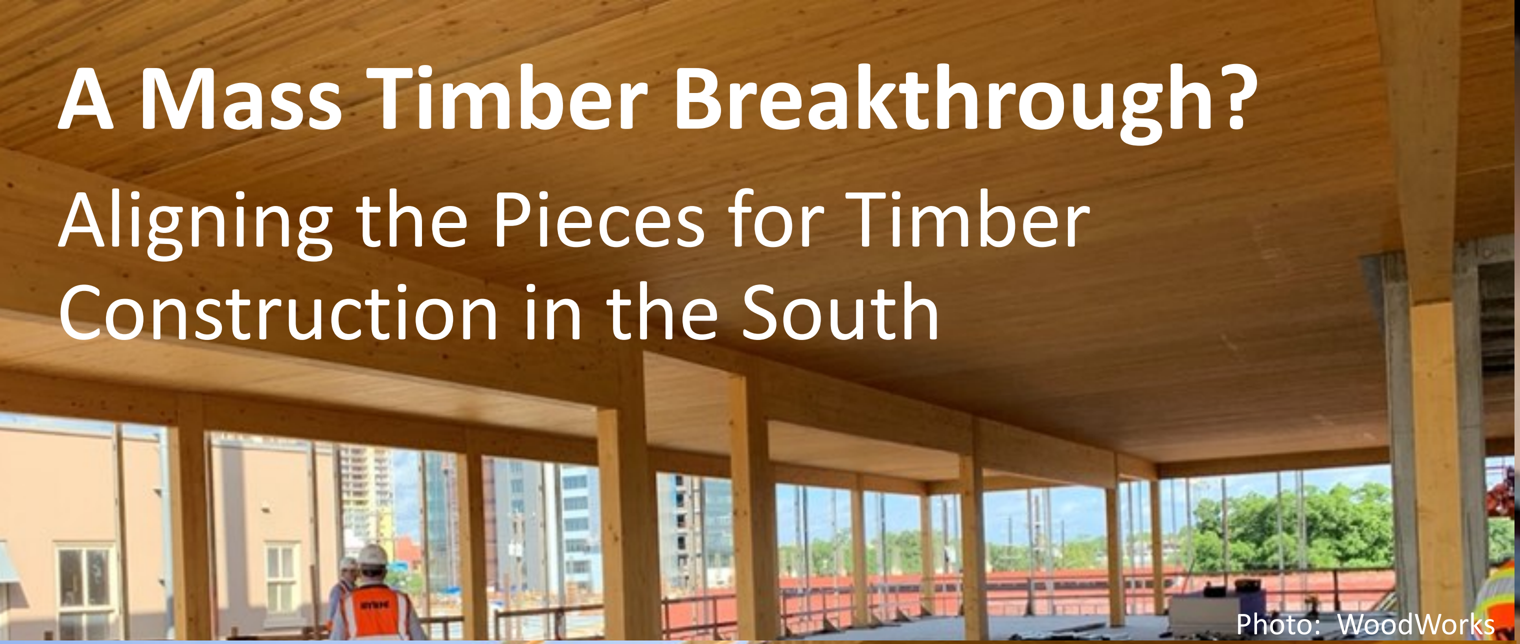

Photo: WoodWorks

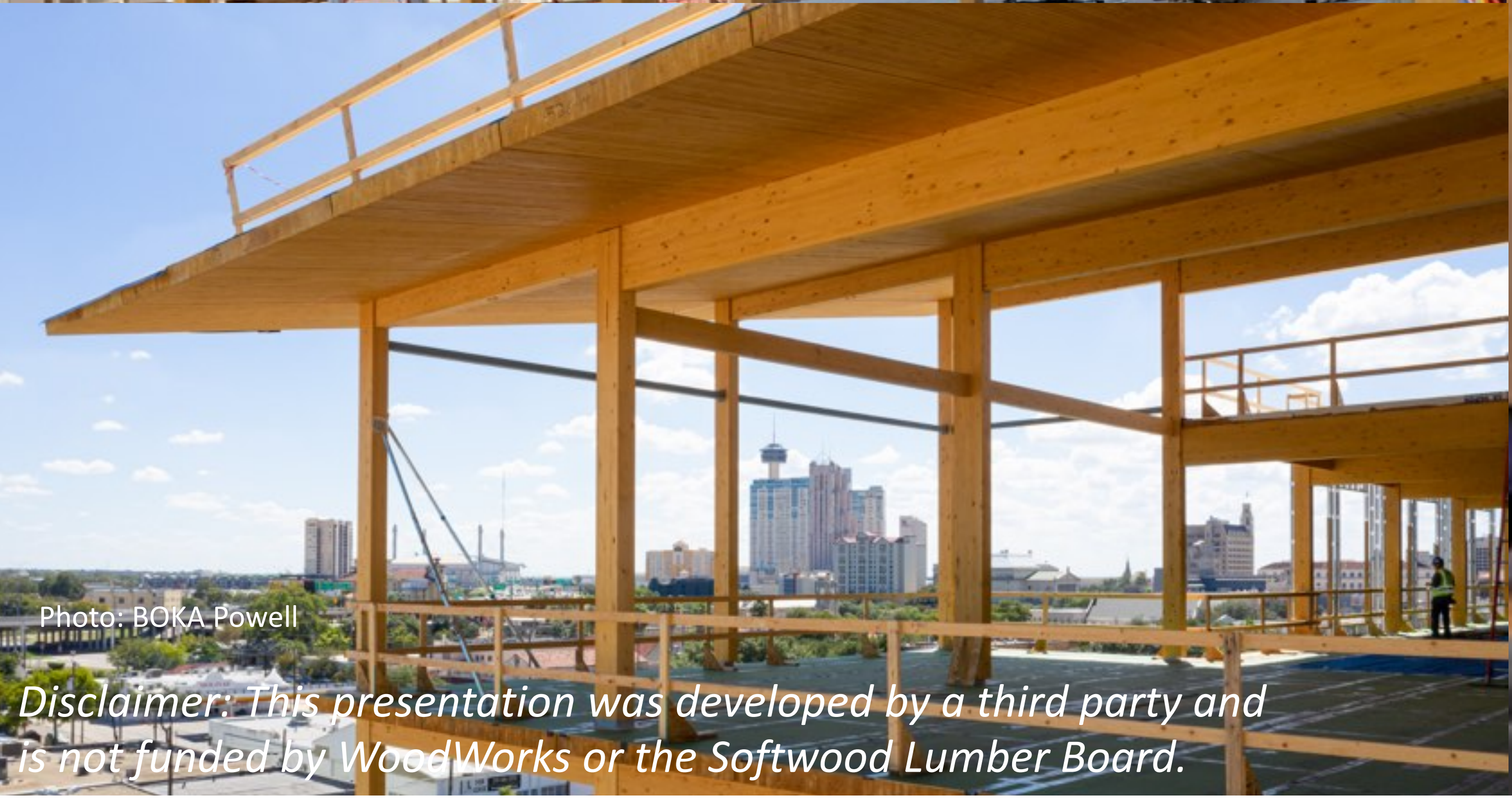

Photo: BOKA Powell

Photo: Casey Dunn

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Closing Panel:
Danielle Smyth, BOKA Powell
Michael Dupras, DCI Engineers
Darrell Whatley, Kirksey Architecture


Photo: WoodWorks


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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Course Description

There has been no lack of interest in using innovative mass timber products and technologies in Texas and the surrounding region. The combination of environmentally-minded designers, sustainably managed forests, timber framing pedigree, and desire to create structures that connect with nature has pushed the South closer and closer to a mass timber breakthrough. And yet, while several mass timber projects have been built, others have advanced through phases of design only to be switched in the end to more traditional construction materials. This dynamic panel of speakers will explore factors that have caused some mass timber projects to be built in other materials, what led to the success of others, and what we can collectively do to advance the use of mass timber in Texas and beyond.

Learning Objectives

1. Discuss available forest resources in the state of Texas and highlight the potential for sustainably utilizing these resources in mass timber production.

2. Assess the benefits of mass timber construction, including those related to occupant health, carbon reduction, schedule, labor, and waste reduction.

3. Review aspects of mass timber design, including fire resistance and energy efficiency, and explore applications for its use under current building codes.

4. Examine factors behind the success of some mass timber projects with an emphasis on cost, design team experience, building official/plan reviewer interaction, and code interpretation/compliance.

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Danielle Smyth, AIA

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BOKAPowell

Early involvement with the authority having jurisdiction

Setting up mass timber projects for success

Presented by Danielle Smyth

BOKAPowell

The Soto Experience

Involvement with the City of San Antonio

- Meetings with fire department official
- Construction Type
- Code Modification Process
- Client involvement

CoSA Correspondence

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINI

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs								
Insulation entirely above roof deck	R-20ci	R-25ci	R-25ci	R-25ci	R-25ci	R-25ci	R-30ci	R-30ci
Metal buildings[b]	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS
Attic and other	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38
Walls, above grade								
Mass[f]	R-5.7ci[c]	R-5.7ci[c]	R-5.7ci[c]	R-7.6ci	R-7.6ci	R-9.5ci	R-9.5ci	R-11.4ci
Metal building	R-13+ R-6.5ci	R-13 + R-6.5ci	R13 + R-6.5ci	R-13 + R-13ci	R-13 + R-6.5ci	R-13 + R-13ci	R-13 + R-13ci	R-13 + R-13ci
Metal framed	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci
Wood framed and other	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20
Walls, below grade								
Below-grade wall[d]	NR	NR	NR	NR	NR	NR	R-7.5ci	R-7.5ci
Floors								
Mass[e]	NR	NR	R-6.3ci	R-8.3ci	R-10ci	R-10ci	R-10ci	R-10.4ci
Joist framing	NR	NR	R-30	R-30	R-30	R-30	R-30	R-30
Slab-on-grade floors								
Unheated slabs	NR	NR	NR	NR	NR	NR	R-10 for 24" below	R-10 for 24" below
Heated slabs[d]	R-7.5 for 12" below + R-5 full slab	R-7.5 for 12" below + R-5 full slab	R-7.5 for 12" below + R-5 full slab	R-7.5 for 12" below + R-5 full slab	R-10 for 24" below + R-5 full slab	R-10 for 24" below + R-5 full slab	R-15 for 24" below + R-5 full slab	R-15 for 24" below + R-5 full slab
Opaque doors								
Nonswinging	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m², 1 pound per cubic foot = 16 kg/m³.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.
a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using R-value compliance method, a thermal spacer block shall be provided, otherwise use the U-factor c
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h·f² °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements fo
e. "Mass floors" shall be in accordance with Section C402.2.3.

C402.2.3 Floors. The thermal properties (component *R*-values or assembly *U*-, *C*- or *F*-factors) of floor assemblies over outdoor air or unconditioned space shall be as specified in Table C402.1.3 or C402.1.4 based on the construction materials used in the floor assembly. Floor framing *cavity insulation* or structural slab insulation shall be installed to maintain permanent contact with the underside of the subfloor decking or structural slabs.

"Mass floors" where used as a component of the thermal envelope of a building shall provide one of the following weights:

1. 35 pounds per square foot (171 kg/m²) of floor surface area.
2. 25 pounds per square foot (122 kg/m²) of floor surface area where the material weight is not more than 120 pounds per cubic foot. (1923 kg/m³)

Exceptions:

1. The floor framing *cavity insulation* or structural slab insulation shall be permitted to be in contact with the top side of sheathing or continuous insulation installed on the bottom side of floor assemblies where combined with insulation that meets or exceeds the minimum *R*-value in Table C402.1.3 for "Metal framed" or "Wood framed and other" values for "Walls, Above Grade" and extends from the bottom to the top of all perimeter floor framing or floor assembly members.
2. Insulation applied to the underside of concrete floor slabs shall be permitted an airspace of not more than 1 inch (25 mm) where it turns up and is in contact with the underside of the floor under walls associated with the *building thermal envelope*.

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Michael A Dupras, PE, SE, LEED® Green Associate

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A Mass Timber Breakthrough?

What's that one big thing?

What's that one big thing?

Onboarding a CLT supplier early

What’s that one big thing?

Understanding Mass Timber’s Unique Column Grid

What’s that one big thing?

Avoiding a Fire-Rated Design

(understanding construction types)

A Mass Timber Breakthrough?

Integrated Project Delivery

A Mass Timber Breakthrough?

Integrated Project Delivery

- **Team Collaboration**
- **Inclusive Design Process**
- **Leverage Technology**
- **BIM for Fabrication**
- **Digital Integration**
- **Readily Adapt to Change**
- **Holistic Approach to Cost**

https://www.aia.org/resources/64146-integratedproject-delivery-a-guide

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Aligning the Pieces for Timber Construction in the South

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Kirksey ARCHITECTURE

Austin + Houston

New Mindset

Old Paradigm

New Paradigm

Early Decisions on Final Structural Designs

Nordic Saint-Michel Environmental Complex Soccer Stadium

Efficiency of Structure Design

Larger Glulam versus smaller deck plys

First Tech Federal Credit Union

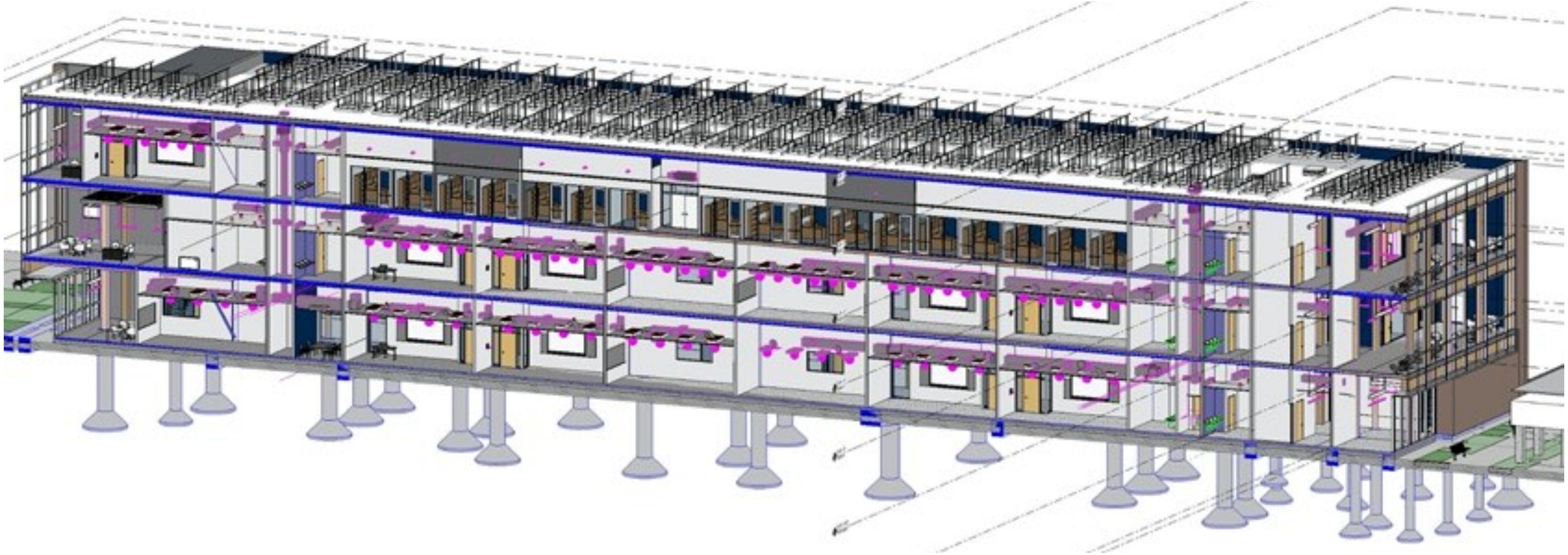
Early Collaboration with MEP and Structure

- Duct pathways
- Mechanical room locations

Learning New Design Approaches

Evaluating Who Needs to be at the Design Table

Early Modeling with Mass Timber Manufacture



Early knowledge with final MEPF designs

- Need finalized fire protection lines and locations.
- Need shop drawing level ductwork designs.

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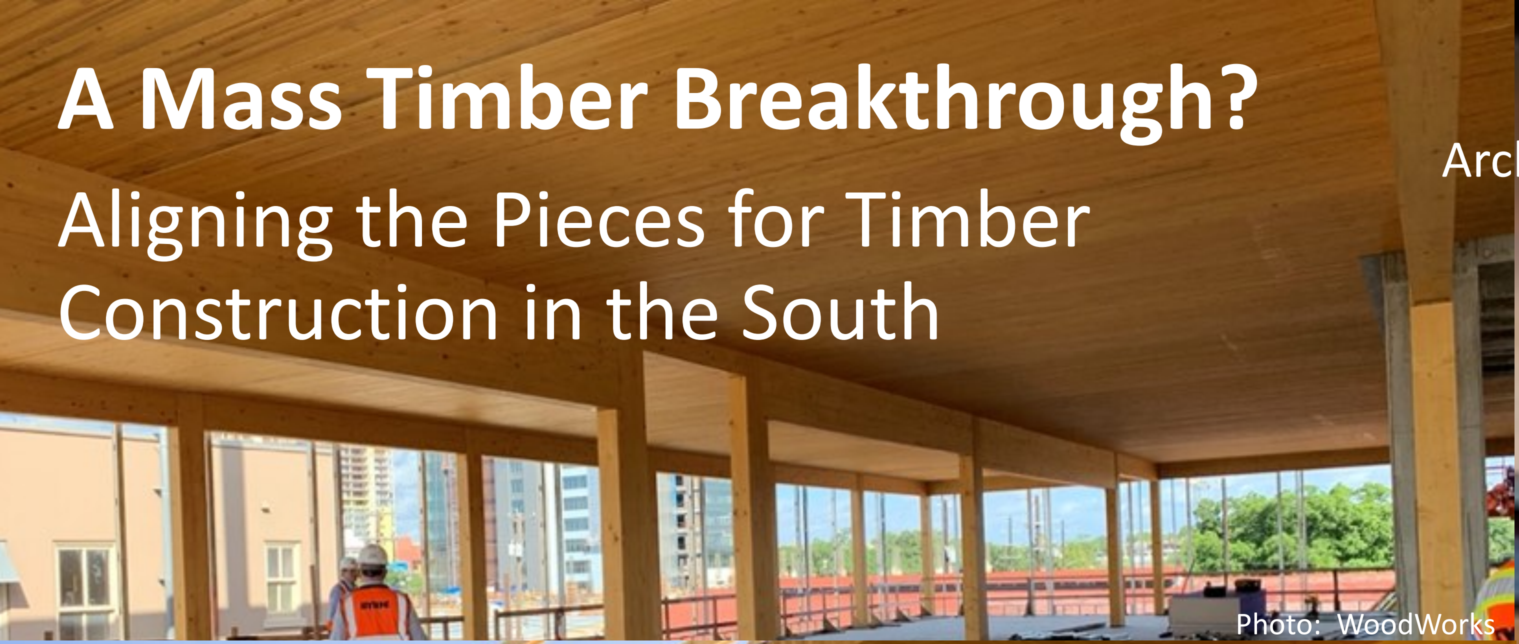
This concludes The American Institute of Architects Continuing Education Systems Course



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