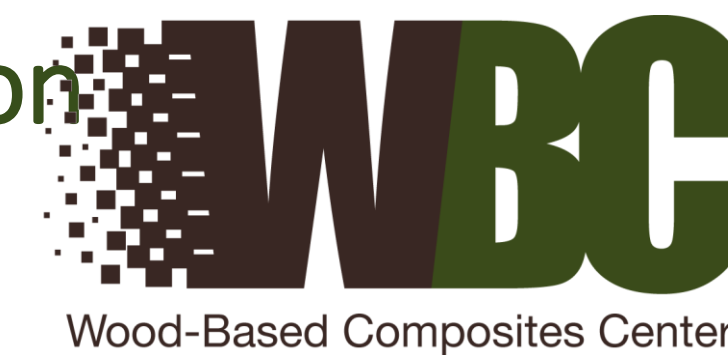


P-03-PR: : Developing methods for determining maximum tolerance and mechanisms of interaction between fire retardants, preservatives, and wood adhesives



Student: Shane Johnson | **PI(s):** Gerald Presley | **Site:** OSU

WBC Spring Meeting | Corvallis, OR | Date of Meeting April 17-18



Need and Industrial Relevance:

Improving fire resistance and durability of wood composites is essential for maintaining and expanding the use of these materials

Project Goals:

- Improve wood composite durability and fire resistance
- Identify maximum chemical tolerances of common resins that maintain bond performance
- Mechanisms of resin-chemical interactions

Current Goals:

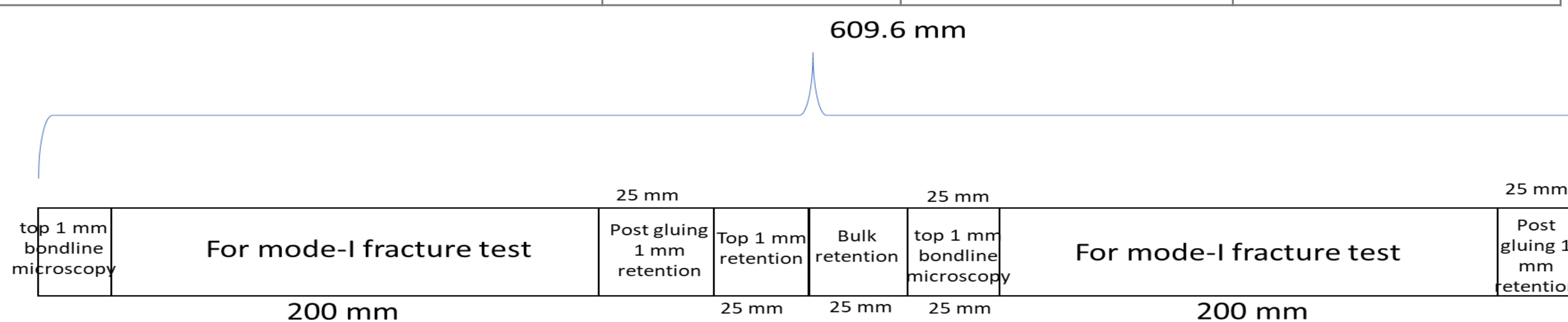
- Complete Chemical treatments and move onto Mechanical testing
- Continue literature review

Project Outcomes and Deliverables:

Planned Deliverable(s)	Actual Achievement(s)	Completed	Progressing	Upcoming
Background review	Literature review of current knowledge		X	
Retentions for veneer specimens	Chemical treating of veneer samples		X	
Mode-1 sample preparation	Selection and sizing of samples		X	
Mode-1 sample Retentions	Chemical treatment of Mode-1 Fracture samples			X
DMA Characterizations	Test adhesive properties on Veneer samples			X
Mode-1 tests	Test Samples using Mode-1 fracture tests			X
Develop modeling for adhesive preservative interactions	Decipher results to determine tolerances for adhesive-preservative balance			X
Introduce findings	Produce final report			X

Research and Data Analysis

Veneer and Wood Chemical Retentions for Tests	
Borate (%)	FRT (%) recommended treatment
1.24	9.95
0.74	5.97
0.37	2.98
0.18	1.49
0.09	0.74
0.0	0



Compound	Retention in kg/m ³				
SBX retention target	4.50	2.70	1.35	0.68	0.34
Borate Treatment					
Disodium octaborate tetrahydrate (DOT)	6.67	4.00	2.00	1.00	0.50
AWPA P50 fire retardant					
H3BO3	7.99	4.80	2.40	1.20	0.60
DAP	35.23	21.14	10.57	5.28	2.64
MAP	10.23	6.14	3.07	1.53	0.77

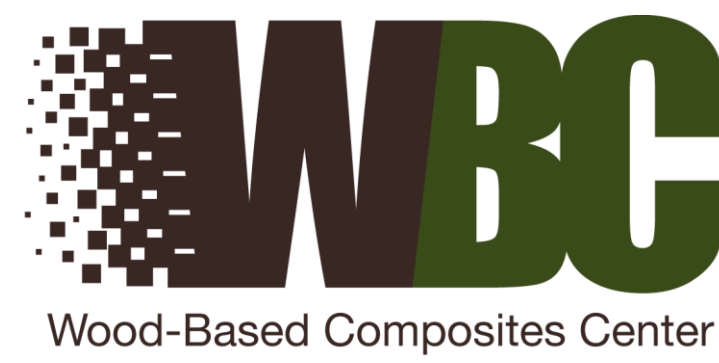
Challenges / Opportunities

- This project has had a couple challenges so far which have delayed progress, but things are back on track and are developing quickly.
- Due to unforeseen issues with machinery repairs and delays regarding equipment for repairs
- The delays have cause hold ups in the production of mode 1 fracture samples

Planned Deliverables & Timeline

Expected Outcome	Deliverable (s)	2023				2024												
		S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
Review existing literature on chemical interactions	•Research review in the form of a masters thesis chapter,																	
Test MF and PUR tolerance for borates alone and commercial fire retardant	•Protocol for mode-I fracture test using treated lumber •Data on chemical tolerances of resins																	
Test results MF and PUR tolerance for borates alone and commercial fire retardant-sapwood and heartwood veneer	•DMA protocol for treated Douglas-fir veneers •Data on chemical tolerances of resins																	
	•Final WBC report P-03-PR																	
Peer Reviewed Publication	•Publish data summary in 1-2 publications																	

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Award Date: Winter 2023 Start Date: Fall 2024 Anticipated End Date: Spring 2025

Research Team & Technical Advisors

Research Team	IAB Technical Advisors
Shane Johnson-Student Gerald Presley-PI John Simonsen-Advisor	Your IAB Lead (IAB Lead) Technical Advisor 2: Jesse Paris Technical Advisor 3: Sudip Chowdhury Technical Advisor 4: Tim Zattau Technical Advisor 5: Sarath Vega

Interim Conference Call Record: TBD

Date:

Participants:

Outcomes:

Response to Recent IAB TC Feedback (from prior meeting):

Use last LIFE Form Summary for specific feedback, found on website www.wbc.center/research/planning/research-planning-site/

Expected Project Outcomes and Deliverables (from proposal):

For continuation funding requests, include any comments with budget showing request. Note any leveraged funding received or expected.

(Insert updated budget here)

Budget Justification & Request for Funding:

GRA & Benefits: 7 Months

Tuition: 2.3 Terms

Materials costs: General Lab Supplies

BUDGET	
First Year Expenses	\$ Amount
GRA & Benefits	\$22,576
Tuition & Fees	\$12,560
Materials/Supplies	\$2,000
Year 1 Total:	\$37,127

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