NEW RESEARCH PROPOSALS

LIFE FORMS REVIEW SUMMARY

We received six (6) New Research Proposals, which include one special project (SWEETWATER-21). We received input from 4 members (44% return rate). The proposals were rated according to the level of interest of our members as:

Very Interested **(VI)** | Interested **(I)** | Interested with Change **(I w/C)** | Not Interested **(NI)** | Abstain **(A)**

NEW PROPOSALS: LEVEL OF INTEREST

IDEA #	NEW RESEARCH PROPOSAL	LEVEL OF INTEREST				
		VI	I	I w/C	NI	A
001	**SWEETWATER-21:** *Investigating Lignin Consistency Batch-to-Batch* Mojgan Nejad, Maria Soledad Peresin, and John Simonsen |MSU, AUB **&** VT	0	2	1	1	0
002	**N-03-PE:** *Pectins as rheology modifiers in resol resins* Maria Soledad Peresin & Chip Frazier |AUB **&** VT	0	3	0	1	0
003	**N-04-***PR: Effectively Incorporating Pressure-Treated Fire Retardant Lumber into Mass Timber Panels* Gerald Presley & Matthew Konkler|OSU	0	3	0	1	0
004	**N-05-MU:** *Understanding the Effect of Thickness Tolerances on Bond Integrity in CLT* Lech Muszynski & John Nairn |OSU	0	3	0	1	0
005	**N-06-CA:** *Bench-Scale Characterization of Joints and Coatings* Scott Case & Brian Lattimer|VT	0	4	0	0	0
006	**N-02-MU:** *Long-Term Response of wood-based composites in variable climate conditions* Lech Muszynski, John Nairn, Mariapaola Riggio |OSU	0	2	1	1	0

OSU=Oregon State Univeristy | **VT**=Virginia Tech | **MSU**=Michigan State University | **AUB**=Auburn University

MEMBER FEEDBACK AND COMMENTS - SUMMARY

Project: (001) SWEETWATER-21: *Investigating Lignin Consistency from Batch-to-Batch*
Project Phase: New Proposal
Project PI: Mojgan Nejad (Michigan State University)

Level of Interest
Very Interested - 2
Interested - 2
Interested with Change - 0
Not Interested - 0
Abstain - 0

Summary of Responses to IAB Comments

Questions

Suggestions

Comments

Project: (002) N-03-PE: *Pectins as rheology modifiers in resol resins*

Project Phase: New Proposal

Project PI: Maria Soledad Peresin and Chip Frazier (Auburn University and Virginia Tech)

Level of Interest
Very Interested - 0
Interested - 3
Interested with Change - 0
Not Interested - 1
Abstain - 0

Summary of Responses to IAB Comments

Questions

How stable are esters assumed to be in a resole resin? What is seasonal availability of cannabis pectin? Is this a limited harvest season.

Response 1: *Esters are not stable; so more of the free acid is expected. Some hemp producers are seasonal and some are indoor producers. -Chip Frazier*

Suggestions

We would suggest changing this project to look at using the material in a ready to use adhesive mix instead of in a neat resin. Neat resins are not typically used in veneer composites where tack is of primary concern.

Response 1: *Thanks yes. We wanted to start simply. -Chip Frazier*

Comments

Project: (003) N-04-PR: *Effectively Incorporating Pressure-Treated Fire Retardant Lumber into Mass Timber Panels*

Project Phase: New Proposal

Project PI: Gerald Presley and Matthew Konkler (Oregon State University)

Level of Interest
Very Interested - 0
Interested - 3
Interested with Change - 0
Not Interested - 1
Abstain - 0

Summary of Responses to IAB Comments

Questions

Suggestions

Comments

- Seems to be a specific product development readily tested in a lab.

Project: (004) N-05-MU: *Understanding the Effect of Thickness Tolerances on Bond Integrity in CLT*

Project Phase: New Proposal

Project PI: Lech Muszynski and John Nairn (Oregon State University)

Level of Interest
Very Interested - 0
Interested - 3
Interested with Change - 0
Not Interested - 1
Abstain - 0

Summary of Responses to IAB Comments

Lech's Response: *Thank you for your interest in the project. Our aim is to enable better diagnostics of delamination failures and better understanding of the role of manufacturing conditions contributing to the formation of adhesive bonds, which are currently neglected or taken for granted based on deceptive similarity to glulam, plywood and LVL. Cross-lamination of lumber with a level of thickness tolerance is one of such conditions.*

Questions

What adhesive systems are being considered?
Response 1: *Currently most common adhesives used in CLT industry are PUR and MF based systems. Both are proven to perform well when the nominal bonding conditions are maintained as prescribed. So, in a sense the selection of a specific adhesive system is of secondary importance. We may use either or both, though it will unnecessarily double the workload. The Emmerson Lab pilot line is set up for either system, however our experience is that on this line 2-part MF system is somewhat easier to work with (and clean after). HOWEVER: The crux of the problem is not the performance of the adhesive system alone but in the context of the thickness tolerances in the laminations. Tight tolerances are notoriously difficult to achieve in lab conditions, and rarely controlled in the industrial settings. This creates situation where promising new adhesive systems or adhesive-wood specie formulations are dismissed based on excessive delamination even if it is not certain whether the adhesive is really to blame. -Lech*

Response 2: *Currently most common adhesives used in CLT industry are PUR and MF based systems. Both are proven to perform well when the nominal bonding conditions are maintained as prescribed. So, in a sense the selection of a specific adhesive system is of secondary importance. We may use either or both, though it will unnecessarily double the workload. The Emmerson Lab pilot line is set up for*

either system, however our experience is that on this line 2-part MF system is somewhat easier to work with (and clean after). HOWEVER: The crux of the problem is not the performance of the adhesive system alone but in the context of the thickness tolerances in the laminations. Tight tolerances are notoriously difficult to achieve in lab conditions, and rarely controlled in the industrial settings. This creates situation where promising new adhesive systems or adhesive-wood specie formulations are dismissed based on excessive delamination even if it is not certain whether the adhesive is to blame. -Lech

Response 3: *Currently most common adhesives used in CLT industry are PUR and MF based systems. Both are proven to perform well when the nominal bonding conditions are maintained as prescribed. So, in a sense the selection of a specific adhesive system is of secondary importance. We may use either or both, though it will unnecessarily double the workload. The Emmerson Lab pilot line is set up for either system, however our experience is that on this line 2-part MF system is somewhat easier to work with (and clean after). HOWEVER: The crux of the problem is not the performance of the adhesive system alone but in the context of the thickness tolerances in the laminations. Tight tolerances are notoriously difficult to achieve in lab conditions, and rarely controlled in the industrial settings. This creates situation where promising new adhesive systems or adhesive-wood specie formulations are dismissed based on excessive delamination even if it is not certain whether the adhesive is really to blame. -Lech*

Response 4*: Sorry for generating the multiple responses here. The system was slow and I hit the submit button couple times... -Lech*

Suggestions

Comments

Project: (005) N-06-CA: *Bench-Scale Characterization of Joints and Coatings*

Project Phase: New Proposal

Project PI: Scott Case and Brian Lattimer (Virginia Tech)

Level of Interest
Very Interested - 0
Interested - 4
Interested with Change - 0
Not Interested - 0
Abstain - 0

Summary of Responses to IAB Comments

Questions

Can material be defined?

Suggestions

Comments

Our one concern is how the joints will be scaled to still be relevant for full scale predictions.

Project: (006) N-02-MU: *Long-Term Response of wood-based composites in variable climate conditions*

Project Phase: New Proposal

Project PI: Lech Muszyński, John Nairn, Mariapaola Riggio (Oregon State University)

Level of Interest
Very Interested - 0
Interested - 2
Interested with Change - 1
Not Interested - 1
Abstain - 0

Summary of Responses to IAB Comments

Lech's Response: *Thank you for your interest for the project and interesting comments and questions in both rounds of LIFE forms and during the live meeting. The most general response to the comments and questions I can offer right now is that the principal goal of the project is to propose and validate a new integrated (and thus much easier to use in lab and R&D practice) numerical model for simulation and prediction of performance of wide range of WBCs and other plant-based anisotropic and hygroscopic materials. The selection of specific materials for validation of this model is partially locked (mid- and full-scale projects conducted in parallel at no cost to WBC), and partially open for negotiation with the project advisors (small-scale tests).*

Questions

What are you comparing too or what is your control? What properties will you be testing and do you plan to look at multiple adhesive types to achieve objective 2?

Response 1*: We will conduct viscoelastic experiments (creep or relaxation) at different scales (lab scale to structural scale) and try to predict results with new 3D, anisotropic, viscoelastic model for wood composites that includes moisture and moisture rate effects. Ideally, the small-scale samples could use different adhesive types. The large scale tests on a parallel project did not have an option to test different adhesives. -John Nairn*

Response 2: *I agree with John that given the wide applicability of the proposed model to a variety of materials within and outside of the realm of WBC, the question of a control system is very relative. This*

said, we may agree that the easiest controls are the constitutive elements of the composite: solid wood, and thin resin films, both sensitive to MC like PRF (Muszynski et al. 2000), or insensitive to MC (which may validate purely viscoelastic aspect of the model). The small scale tests can be used for both, and for a variety of adhesive bonded materials. As John said, we do not have much choice in the material selection for the medium- and full-scale tests, but these are conducted on quite exciting materials: CLT and MPP. Aside of glulam (for which a substantial literature exists) it is hard to imagine scaling up to this level (continuous 28 ft compression elements) with other WBCs. –Lech

Response 3: *To respond to the second part of the question: there are already three adhesive systems between the CLT and MPP specimens used in mid- and full scale tests. As for the small-scale tests, the specific types of WBCs and adhesive systems used may be negotiated with the project advisors. The material specific results will be a bonus, a side product of the project. The principal goal is the general integrated model capable of simultaneous resolution of the effect of time, temperature, moisture and moisture content rate in plant-based anisotropic adhesive-bonded hygroscopic composite materials, where WBCs belong. -Lech*

Suggestions

Comments
