Q-10-SC

Use of post-consumer wood waste for incorporation in wood-based panels: a state-of-the-art analysis

PI(s): L. Schimleck, M. Riggio, I. Hafez, G. Presley | **Site:** OSU

Anticipated Start Date: *10/2024* | **Expected Duration:** *9 months*

Need & Industrial Relevance | Goals & Objectives

Need & Industrial Relevance

Many countries have implemented policies prohibiting the disposal of wood in landfills and mandating the utilization of wood waste in various WBC products. In addition, the growing focus on cradle-to-grave EPDs necessitates exploring alternative end of life (EoL) scenarios for WBCs. However, integrating waste wood into new products faces numerous challenges, such as uncertainties regarding the consistency and provenance of the waste supply, as well as the presence of contaminants like preservatives, resins, and metals. **There is a need for standardized approaches for waste characterization and sorting, and for a better understanding on waste processing approaches and opportunities for utilization in new products.**

Long Term Goals

This project will provide a roadmap for future research and investments aimed at utilizing waste wood in WBC products, as well as optimizing current products to increase their recyclability, thus reducing their cradle-to-grave impacts.

Objectives

The objective of this project is to provide an updated, comprehensive and global perspective on wood waste management and utilization policies, technical solutions for waste wood quality control, segregation, decontamination, and recycling options. The focus is on waste generated from WBCs and their reuse in new WBC products.

Research Roadmap Topics

Contribution to topics related to waste utilization such as: **TOPIC 2023-4, TOPIC 2022-6, TOPIC 2021-2, and TOPIC 2020-9**

Materials and Methods

A survey of wood waste supply streams:

- Based on available data in a Pacific Northwest metro area and with a focus on WBC waste.

A systematic literature review on:

- C&D wood waste characterization and sorting methods, technologies and international standards.
- Methods and techniques for contaminant removal from different types of wood waste (including resins, treatments and metals among the contaminants).
- List of building products (both structural and non-structural) made using different wood waste streams and technologies and processes used (including additive and energy needed), and information on their environmental and technical performance.

To identify:

- Type and volume of construction and demolition (C&D) wood waste and, possibly, supply chain status (including waste sources, recycling outlets, demand trends and fluctuations).
- Most promising approaches for wood waste characterization based on wood waste categories.
- End-of-life scenarios for different wood waste categories.
- Wood waste pre-processing approaches for different contaminants and waste categories and other steps required to facilitate further reuse.
- Opportunities for improvement of current wood-waste based composite (WWBC) products and for development of new WWBCs.

Outcomes and Deliverables

Expected Outcome	Deliverable (s)	2024			2025										
		O	N	D	J	F	M	A	J	J	A	S	O	N	D
Survey of data from a PNW metro area	Wood waste supply survey														
Literature review of waste wood sorting techniques and methods	State-of-the-art analysis of waste wood characterization														
Literature review of waste wood processing (pre-recycling treatments)	State-of-the-art analysis of waste wood decontamination and processing methods														
Literature review of recycling techniques and available products using post-consumer wood fibers	State-of-the-art of waste wood – based composite products and future opportunities														
Final report identifying current best practices, challenges and opportunities for waste wood – based WBCs	Final report														

Expected Practical Implications/Impacts

The comprehensive review offered by this project will have broad positive impacts across both industry and academia. These benefits extend not only to WBC manufacturers, adhesive suppliers, coating companies, and other related sectors, but also to society as a whole. This knowledge will facilitate:

1. Identification of effective approaches for wood waste collection and segregation, particularly for contaminated waste and WBC waste.
2. Identification and enhancement of technologies and processes to increase the commercial viability of wood waste utilization, especially in the built environment.
3. Improved understanding of the opportunities presented by wood waste as a resource alternative to traditional wood sources.
4. Development of products with more competitive cradle-to-gate and cradle-to-grave environmental advantages.

Budget

Budget justification & request for funding

Funds are requested for a Graduate student at 0.49 FTE during academic year with equivalent summer appointment costs in year 1 using a base monthly salary of $4,874 for a total of $21,494. The graduate student will be responsible for the literature review and survey.
Fringe benefits (34%) for graduate student follow institutional approved guidelines and total $7,308.

Graduate student tuition and fees are budgeted for 3 terms with the per term academic year cost at $5,187 (per institutional guidance), for a total of $15,561.

$637 are requested for travel expenses incurred by the student.

BUDGET	AMOUNT
First Year Expenses	
GRA & Benefits	$ 28,802
Tuition & Fees	$ 15,561
Materials/Supplies	
Travel	$ 637
Other;	
YEAR 1 TOTAL:	$ 45,000
Expected future request amounts:	$ 0

Thank You

Questions?