FUNDING DETAILS

Application of Nailed-Laminated Timber (NLT) and Dowel-Laminated Timber (DLT) Panels in House Basement

The project aims to use NLT and DLT panels for foundation walls to advance the structural, geotechnical, and hygrothermal understanding. The project will begin with laboratory studies and desktop investigations, followed by field study in which a 3m by 6m test hub will be built with 2 DLT walls, 2 NLT walls, 2 insulation materials and 2 water barrier materials. The test hub will provide valuable field data on the structural behaviors of the panels, the geotechnical behaviors of the surrounding soils and water barriers, the thermal and moisture effects of the surrounding environment on the DLT and NLT panels.

Moisture barrier
MTP basement wall
Thermal insulation
Bottom plate
Footing plate
Granular drainage layer
Plywood sheathing

RECIPIENT:

Dr. Hossein Daneshvar

University of Alberta

PARTNERS:

Landmark Group of Companies and Timber Engineering

TOTAL BUDGET:

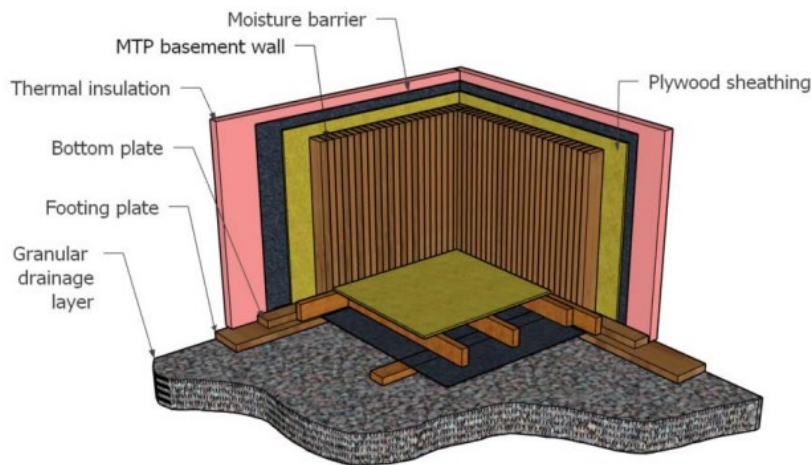**$830,000**

AI FUNDING:

$407,500

PROJECT DATES:

JAN 2024 – MAR 2027

PROJECT TRL:

Start: 4
End: 7

APPLICATION

The project will be applicable in residential housing with the aim to replace other typical concrete basement materials with mass timber products to reduce greenhouse gas emissions, provide building energy efficiency, and revolutionize construction practices through off-site fabrication of the wood panels.

Learn how albertainnovates.ca

PROJECT GOALS

- Provide a comprehensive comparison between NLT and DLT to Cross-Laminated Timber (NLT) and concrete as basement materials on the structural, geotechnical, and hygrothermal performances.
- Provide best practice recommendations to enhance durability for the NLT and DLT systems.
- Provide a preliminary cost analysis to understand the economic feasibility of the proposed systems.
- Develop effective moisture and water barrier systems to ensure long-term durability in real-world applications.
- Develop a resilient structural system: panel-to-panel connections, base shear connections, and corner connections.

BENEFITS TO ALBERTA

- Reduce the greenhouse gases emitted by Alberta and Canada in general if the NLT/DLT basements are implemented and replace concrete basements.
- Improve air and water quality through the reduction of greenhouse gases and waste associated with traditional construction methods.
- Promote the lumber industry and manufacturing industry to increase the production of mass timber panels (MTP).
- Increase local employment through the promotion of the lumber, manufacturing, and construction industries.
- Create new opportunities for exports and economic growth for Alberta once the NLT/DLT technologies are adopted in the international market.

5 Future Publications

2 Students (MSc and PhD) will be trained

1-10 Project Jobs

11-100 Future Jobs

Potentially 70% of GHGs Reduced Compared to Concrete

CURRENT STATUS

April 2025 – In progress

Currently, one student has been recruited for the project and another student has been admitted (starting September 2024). The first draft of the basement test hub requirements has been created and sent to the University of Alberta's Facility and Operation. The maximum backfills height tables for the NLT/DLT basement systems using CSA S406-19 and O86:24 have been calculated.

Classification: Protected A