# Prototyping and Testing Mass Timber Housing Systems

**AWARD AMOUNT:**
**$1,120,000**

**NON-FEDERAL MATCH**
**$280,000**

## Why prototyping and testing of mass timber systems?

The development of effective and efficient modular mass timber systems requires thorough and rigorous testing to validate key design parameters including material-efficiency, structural and seismic resilience, moisture-related durability, quality, constructability and energy-efficiency. The resulting data will be used by the entity selected to operate the mass timber housing factory at Port of Portland's Terminal 2, as well as by other Oregon modular manufacturers. The test data will be available as open source for the benefit of the industry at large.

## Planned actions

The TDI Technical Team will test the performance of modular mass-timber housing. The team will collaborate with faculty from OSU Forestry and Engineering. The team will collaborate with the UO Architecture labs on energy-efficiency, indoor air quality and acoustic performance testing and evaluation. The following technical tests are envisaged, with specific workplans dependent on input from designers and manufacturers.

1. Fabrication of mass timber components at the Emmerson Lab using a largescale CNC (computer numerical control) milling machine, robotic cell, and associated breakout equipment, planer, adhesive application systems and hydraulic press.
2. Test assembly of housing modules and sub-assemblies to evaluate constructability, time-and-motion studies to assess manufacturing efficiency.
3. Structural testing of housing modules to assess stress impacts of road transportation on connector and fastener strength.
4. Weather resilience testing to evaluate climate-related durability.
5. Structural testing to simulate and test the effects of seismic forces on stacked housing modules.
6. Door-blower tests to assess energy-efficiency of modules.
7. Assessment of off-gassing from finish materials and impacts on indoor air quality.
8. Acoustic testing of housing module sub-assemblies.
9. Assessment of vibration characteristics of housing module floors and their expected impact on occupant comfort.

Oregon Mass Timber Coalition

Oregon State University

**CONTACT INFORMATION:**
Project Lead: Iain Macdonald
iain.macdonald@oregonstate.edu
503-737-5096 desk