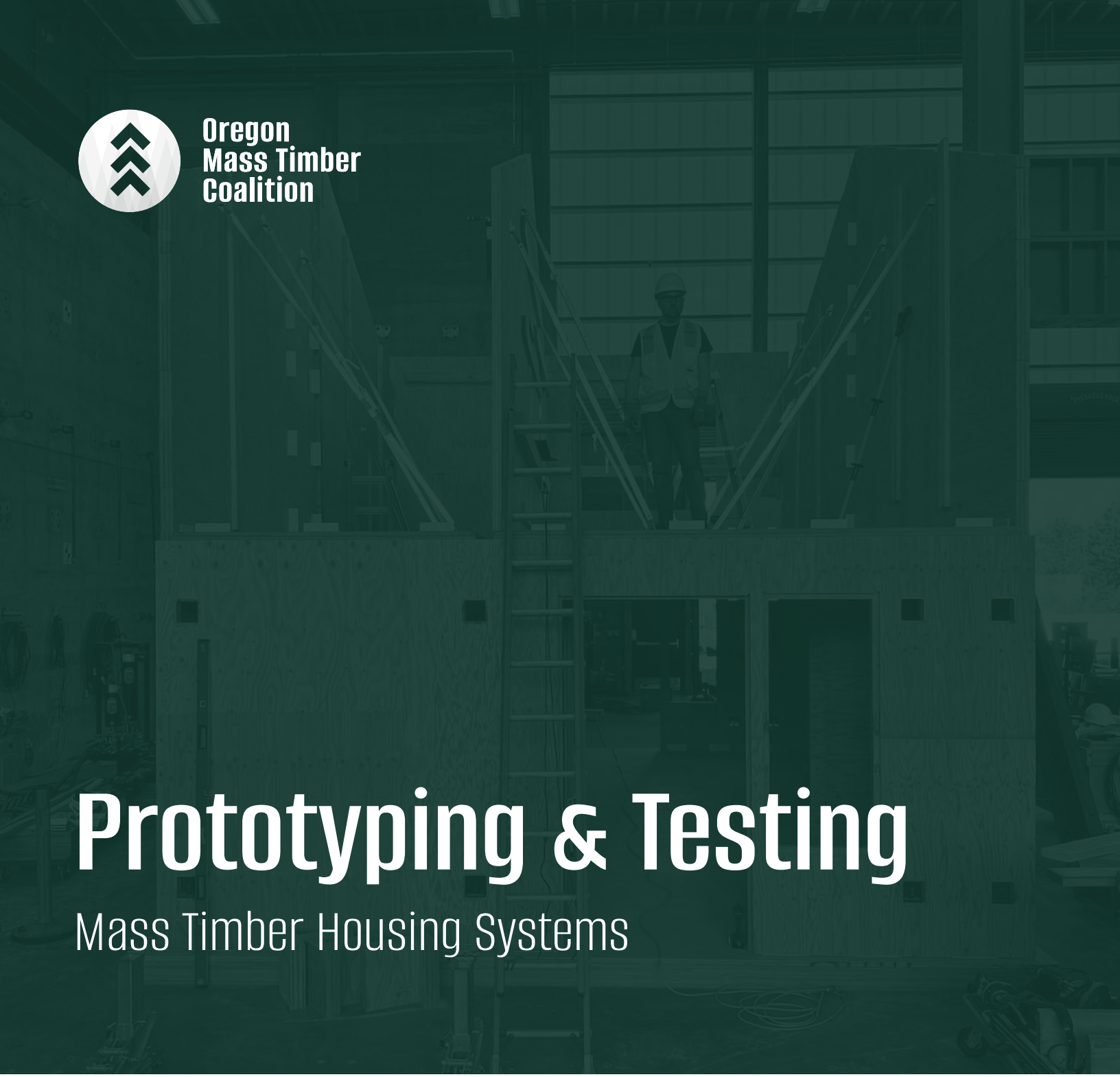

Oregon
Mass Timber
Coalition

Prototyping & Testing

Mass Timber Housing Systems

Oregon State University

PROJECT LEAD:

Iain Macdonald

iain.macdonald@oregonstate.edu

503-737-5096

Prototyping & Testing Mass Timber Housing Systems

Project Summary

This project aims to help Oregon companies develop and bring to market innovative prefabricated housing solutions that utilize mass timber. 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, constructibility 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.

Progress to Date

COMPANY PARTNERSHIPS

Since the project's inception, our team has worked with a number of companies:

- OSU experts have engaged with PathHouse LLC to provide advice on ways to address code requirements and achieve optimal seismic and fire-resilience performance
- We have entered discussions with Blazer Industries to advise on how mass timber components can be incorporated into the firm's existing modular product line
- We have brought our close partners at the University of Oregon's Energy Studies in Buildings Lab on board to carry out acoustic testing of a hybrid modular housing design developed by Portland firm MODS PDX. The design utilizes mass ply panels for floors and ceilings, paired with a panelized factory-built light frame wall
- MODS PDX has entered a partnership with USDA Rural Development to provide 18 homes to an affordable housing development in John Day, a forest-dependent community whose lumber industry has been severely challenged by a lack of such housing

IAIN MACDONALD | IAIN.MACDONALD@OREGONSTATE.EDU

VENEER-BASED MASS TIMBER PANELS

Another activity funded by the project is being led by OSU researcher Ari Sinha, whose team is working to optimize the technical and cost performance of veneer-based mass timber panels suitable for use in housing.

The industry partners in this work are Boise Cascade, who manufacture veneer-laminated timber product in White City, Oregon, and Freres Engineered Wood, a manufacturer of mass ply panels located in Lyons, Oregon. These are the first two companies in the United States to produce mass timber using wood veneers (as opposed to lumber, which is a more common input, and used in cross laminated timber). The project activities will enable these companies to enter the prefabricated housing market, and other companies are expected to benefit in the future, as veneer-based mass timber products become more commonplace.

The scope of this component of our project involves:

- Performing studies and conducting tests to optimize the layup for veneer-based panels to cater to modular housing structural demands
- Carrying out structural testing of components and full modules to evaluate their performance under transportation, seismic, and wind loads

This testing is now underway. Next steps will be to evaluate fastener and connection systems to obtain performance data for code approval, then to look at constructibility, deconstructibility, weathering and durability. As with the other components of our testing project, the data generated will be made available to manufacturers and in turn to developers, code officials, architects, and structural engineers to validate design assumptions and streamline code approvals (including permits for housing).

MASS PLY WORKFORCE HOUSING

The TDI technical team assisted University of Oregon researchers in 2024 to construct their Mass Ply Workforce Housing unit in OSU's Emmerson Advanced Wood Products Lab. The OSU team performed digital fabrication work on the large mass ply panels using our large-format CNC machine and assisted with material handling, erection, installation, and coordination. TDI's Marketing & Communications Specialist promoted the project to the industry and coordinated and hosted numerous technical tours for several hundred visitors from industry and all levels of government.

IAIN MACDONALD | IAIN.MACDONALD@OREGONSTATE.EDU