Expanding wood use towards 2025: development of mass timber midply wall systems, year 1

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Abstract: n the first year of this project, literature reviews were conducted to identify the code requirements on MT components and to survey the available LLRSs used in the MT structures. Conceptual MT midply wall systems meeting structural, fire, and acoustical performance requirements were proposed. An advisory group meeting was held to evaluate the practicability of the proposed MT midply systems. In the next fiscal year, the proposed MT Midply will be optimised further according to the comments and suggestions from the advisory group. Analytical evaluation of the proposed MT Midply wall systems along with necessary tests will be conducted. Based on the evaluation, a go / no-go decision will be made as to whether the study should be continued for the proposed MT Midply.

Documents

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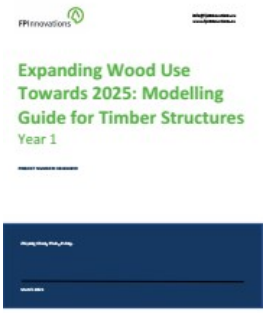

Expanding wood use towards 2025: modelling guide for timber structures, year 1

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Abstract: Computer modelling is an essential part in the analysis and design of mid- and high-rise residential and commercial buildings as well as long-span structures. It is also a valuable tool in the optimisation of wood-based products, connections, and systems. An FPInnovations' survey shows that practicing engineers are unfamiliar with timber structure modelling, and researchers generally lack resources for advanced modelling of timber systems. Furthermore, wood analysis and design modules currently implemented in a few structural analysis software are usually not suitable for complex or hybrid timber structures. This does not bode well given that performance-based design which is the future direction of building codes and material standards will rely even more on demonstrating the structural performance through computer modelling. In this project, a modelling guide for timber structures is being developed by FPInnovations with a global collaborative effort involving experts in various areas, with the aim of (a) assisting practicing engineers apply computer modelling to timber structures; (b) enriching researchers' resources for advanced computer modelling of timber systems; and (c) assisting software companies to identify the gaps and upgrade their programs accordingly to accommodate advanced computer modelling of timber structures.

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Expanding wood use towards 2025: seismic performance of midply shear walls

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Language:	English
Abstract:	Midply shear wall (hereafter Midply), which was originally developed by researchers at Forintek Canada Corp. (predecessor of FPInnovations) and the University of British Columbia, is a high-capacity shear wall system that is suitable for high wind and seismic loadings. Its superior seismic performance was demonstrated in a full-scale earthquake simulation test of a 6-storey wood-frame building in Japan. In collaboration with APA–The Engineered Wood Association and the American Wood Council (AWC), a new framing arrangement was designed in this study to increase the vertical load resistance of Midply and make it easier to accommodate electrical and plumbing services. In this study, a total of 14 Midply specimens in six wall configurations with different sheathing thicknesses and nail spacing were tested under reversed cyclic loading. Test results showed that Midply has approximately twice the lateral load capacity of a comparable standard shear wall. The drift capacity and energy dissipation capability are also greater than comparable standard shear walls. For Midply to use the same seismic force modification factors as standard shear walls, seismic equivalency to standard shear walls in accordance with ASTM D7989 was also conducted. Although Midply has superior lateral load and drift capacities, it does not seem to be as ductile as the standard shear walls at the same over-strength level. Additional testing and dynamic analysis are recommended to address this issue.

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Expanding wood use towards 2025: seismic performance of midply shear walls, year 2

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Abstract: Midply shear wall, which was originally developed by researchers at Forintek Canada Corp. (predecessor of FPInnovations) and the University of British Columbia, is a high-capacity shear wall system that is suitable for high wind and seismic loadings. Its superior seismic performance was demonstrated in a full-scale earthquake simulation test of a 6-storey wood-frame building in Japan. In collaboration with APA–The Engineered Wood Association and the American Wood Council (AWC), a new framing arrangement was designed in this study to increase the vertical load resistance of midply shear walls and make it easier to accommodate electrical and plumbing services. In this study, a total of 12 midply shear wall specimens in four wall configurations with different sheathing thicknesses and nail spacing were tested under reversed cyclic loading. Test results showed that the modified midply shear walls have approximately twice the lateral load capacity of a comparable standard shear wall. The drift capacity and energy dissipation capability are also greater than comparable standard shear wall. Seismic equivalency to standard shear walls in accordance with ASTM D7989 was also conducted. Results show that an overstrength factor of 2.5 and can be used to assign allowable design strengths of midply shear walls with 7/16” and nail spacing at 4” or 3” on center. For midply shear walls with 19/32” OSB, a higher overstrength factor must be used to meet the ductility criteria. The information from this study will support code implementation of the midply shear walls in Canadian and US timber design standards, thereby providing more design options for light wood frame structures in North America.

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