

Utilizing Dowel-Laminated Mass Timber Components in Residential Multifamily Structures: A Case Study

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Abstract : As cities in the United States experience critical housing shortages, mass timber presents the opportunity to address this crisis in housing supply while taking advantage of the carbon-positive benefits of sustainably forested wood fiber. Mass timber, however, currently has a low level of adoption in residential multifamily structures due to the risk-averse nature of change within the construction financing, Architecture / Engineering / Contracting (AEC) communities, as well as various agency approval challenges. This study demonstrates how mass timber can be used within the cost and feasibility parameters of a typical multistory residential structure and ultimately address the need for dense urban housing. This study will utilize The Garden District, a mixed-use market-rate housing project in Woodinville, Washington, as a case study to illuminate the potential of mass timber in this application. The Garden District is currently in final stages of permit approval and will commence construction in 2023. It will be the tallest dowel-laminated timber (DLT) residential structure in the United States when completed. This case study includes economic, technical, and design reference points to demonstrate the relevance of the use of this system and its ability to deliver “triple bottom line” results. In terms of results, the study establishes scalable and repeatable approaches to project design and delivery of mass timber in multifamily residential uses and includes economic data, technical solutions, and a summary of end-user advantages. This study discusses the third party tested systems for satisfying acoustical requirements within dwelling units, a key to resolving the use of mass timber within multistory residential use. Lastly, the study will also compare the mass timber solution with a comparable cold formed steel (CFS) system with a similar program, which indicates a net carbon savings of over three million tons over the life cycle of the building.

Keywords : DLT, dowel laminated timber, mass timber, market rate multifamily

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