





# Framework - A Tall Re-Centering Mass Timber Building in the United States

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## Summary:

Framework is a 12-story, 140ft (43m) tall mixed use building to be constructed almost entirely out of mass timber, including both the gravity and lateral force-resisting systems, in a region of high seismicity in the United States (Portland, Oregon). Utilizing performance-based seismic design and nonlinear response history analysis, the structure's rocking/re-centering cross laminated timber walls were designed for enhanced, beyond-code-level seismic objectives. These enhanced objectives were targeted through more stringent criteria on deformation-controlled elements, design for replacement of energy dissipaters, limitations on residual drift, and a project-specific testing program completed at Oregon State University and Portland State University. The momentum behind construction of mass timber buildings in the United States provides an opportunity to promote resilient/low-damage design which is consistent with the sustainability goals of many of these projects. This also follows naturally from the inherent rocking/re-centering behavior of mass timber walls. Furthermore, extending rocking mass timber walls to taller buildings is feasible; however, it requires an additional level of thoughtful design, explicit analysis and testing, and careful detailing, including consideration of the effective shear modulus of CLT, wall shear amplification due to higher mode effects, deformation compatibility of gravity connections, and CLT diaphragms.

Online Access: Free

## Resource Link

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