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A SIMPLIFIED ANALYTICAL PROCEDURE FOR SEISMIC ANALYSIS OF TIMBER LIGHT-FRAME SHEAR WALLS

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Abstract:
The seismic performance of timber light-frame shear walls is investigated in this paper with a focus on energy dissipation and ductility ensured by sheathing-to-framing connections. An original parametric finite element model has been developed in order to perform sensitivity analyses. The model considers the design variables affecting the racking load-carrying capacity of the wall. These variables include aspect ratio (height-to-width ratio), fastener spacing, number of vertical studs and framing elements cross-section size. A failure criterion has been defined based on the observation of both the global behaviour of the wall and local behaviour of fasteners in order to identify the ultimate displacement of the wall. The equivalent viscous damping has been numerically assessed by estimating the damping factor which is in use in the capacity spectrum method. Finally, an in-depth analysis of the results obtained from the sensitivity analyses led to the development of a simplified analytical procedure which is able to predict the capacity curve of a timber light-frame shear wall.

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