



A Simplified Non-Linear Procedure for Seismic Design of CLT Wall Systems

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Author: Tamagnone, Gabriele
 Rinaldin, Giovanni
 Fragiaco, Massimo

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Summary:

In this paper, a simplified non-linear procedure for seismic design of CLT (cross-laminated timber) wall systems is presented. The proposed method considers both axial force and bending moment applied on the wall systems as result of applied loads. Timber is modelled as an elastic-brittle material, whereas metal connections (hold-downs and angle brackets) are modelled with an elastic-plastic behaviour. The reaction force in each connection is iteratively calculated by varying the position of the neutral axis at the base of the wall using a simple algorithm that has been implemented in a purposely-developed software. This method is based on the evaluation of five different failure mechanisms at ultimate limit state similarly to reinforced concrete (RC) rectangular section design. By setting the mechanical properties of timber and metal connections, and the geometry of the CLT panel, the algorithm calculates, for every possible axial load, the position of the neutral axis and the ultimate resisting moment of the system. Furthermore, this method also allows the designer to have an indication on the failure mechanism of the wall.

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