



Experimental-Numerical Analyses of the Seismic Behaviour of Cross-Laminated Wall Systems

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Author: Gavric, Igor
Rinaldin, Giovanni
Amadio, Claudio
Fragiacomo, Massimo
Ceccotti, Ario

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Summary:

The paper discusses experimental and numerical seismic analyses of typical connections and wall systems used in cross-laminated (X-Lam) timber buildings. An extended experimental programme on typical X-Lam connections was performed at IVALSALSA Trees and Timber Institute. In addition, cyclic tests were also carried out on full-scale single and coupled X-Lam wall panels with different configurations and mechanical connectors subjected to lateral force. An advanced non-linear hysteretic spring to describe accurately the cyclic behaviour of connections was implemented in ABAQUS finite element software package as an external subroutine. The FE model with the springs calibrated on single connection tests was then used to reproduce numerically the behaviour of X-Lam wall panels, and the results were compared with the outcomes of experimental full-scale tests carried out at IVALSALSA. The developed model is suitable for evaluating dissipated energy and seismic vulnerability of X-Lam structures.

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