Shear Connections with Self-Tapping-Screws for Cross-Laminated-Timber Panels

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Summary:

The research presented in this paper examines the performance of 3-ply and 5-ply Cross-laminated Timber (CLT) panels connected with Self-tapping Screws (STS). Different conventional joint types (surface spline with STS in shear and half-lap joints with STS in either shear or withdrawal) along with two innovative solutions were evaluated in a total of 198 quasi-static tests. The first novel assembly used STS with double inclination of fasteners in butt joints; the second was a combination of STS in withdrawal and shear in lap joints. The joint performance was evaluated in terms of capacity, stiffness, yield strength, and ductility. The results confirmed that joints with STS in shear exhibited high ductility but low stiffness, whereas joints with STS in withdrawal were found to be stiff but less ductile. Combining the shear and withdrawal action of STS led to high stiffness and high ductility.

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