



High Performance Cross-Laminated-Timber Shear Connection with Self-Tapping Screw Assemblies

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Summary:

The research presented in this paper examines the performance of a shear connection using self-tapping screws (STS) in 3-ply Cross-Laminated Timber (CLT) panels. CLT panels were connected with STS assemblies at an inclined angle in two directions. The capacity of the STS assemblies was tested for the purpose of designing a CLT roof diaphragm of a large storage facility where a high-performance and low-manufacturing-cost solution was required. A total of eleven full-scale specimens were subjected to quasi-static and reversed-cyclic shear loading. Resulting forcedisplacement and hysteretic curves were used to determine an equivalent energy elastic-plastic curve based on ASTM E2126-11 procedures to estimate assembly yield strength, yield displacement, and ductility ratio. The performance in terms of strength and stiffness was excellent, and the STS provided the required ductility for the system to be used in seismic applications. Static yield strength averaged 80kN/m with an average ductility ratio of 7.7 while cyclic yield strength averaged 68kN/m with an average ductility ratio of 4.1. The data obtained allows engineers to specify low-cost lateral load resisting connection systems for large scale CLT structures.

Online Access: Free

Resource Link

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