



Seismic Performance of Core-Walls for Multi-Storey Timber Buildings

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Year of Publication: 2014

Country of Publication: New Zealand

Format: Conference Paper

Material: CLT (Cross-Laminated Timber)

Application: Walls

Topic: Seismic

Keywords: Connections
Multi-Storey
Post-Tensioned
Quasi-Static
Half-Scale

Language: English

Conference: New Zealand Society for Earthquake Engineering Conference

Research Status: Complete

Notes: March 21-23, 2014, Auckland, New Zealand

Summary:

This paper describes the results of experimental tests on two posttensioned timber core-walls tested under bi-directional quasi-static seismic loading. The half-scale two-storey test specimens included a stair with half-flight landings. The use of Cross-Laminated Timber (CLT) panels for multi-storey timber buildings is gaining popularity throughout the world, especially for residential construction. Posttensioned timber core-walls for lift-shafts or stairwells can be used for seismic resistance in open-plan commercial office buildings. Previous experimental testing has been done on the in-plane behaviour of single and coupled timber walls at the University of Canterbury and elsewhere. However, there has been very little research done on the 3D behaviour of timber walls that are orthogonal to each other, and no research to date into post-tensioned CLT walls. The “high seismic option” consisted of full height post-tensioned CLT walls coupled with energy dissipating U-shaped Flexural Plates (UFPs) attached at the vertical joints between coupled wall panels and between wall panels and the steel corner columns. An alternative “low seismic option” consisted of post-tensioned CLT panels connected by screws, to provide a semi-rigid connection, allowing relative movement between the panels, producing some level of frictional energy dissipation.

Online Access: Free

Resource Link

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