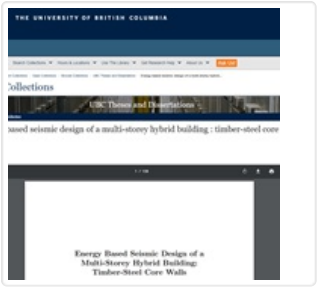

Energy Based Seismic Design of a Multi-Storey Hybrid Building: Timber-Steel Core Walls

https://research.thinkwood.com/en/permalink/catalogue1271

Author:	Goertz, Caleb
Organization:	University of British Columbia
Year of Publication:	2016
Country of Publication:	Canada
Format:	Thesis
Material:	CLT (Cross-Laminated Timber)
Application:	Hybrid Building Systems
Topic:	Seismic
	Design and Systems
Keywords:	Timber-Steel Hybrid
	Core Walls
	Multi-Storey
	High Seismic Regions
	Steel Plates
	Equivalent Static Force Procedure
	Nonlinear Time History Analysis
Language:	English
Research Status:	Complete

Summary:

This thesis discusses a novel timber-steel core wall system for use in multi-storey buildings in high seismic regions. This hybrid system combines Cross Laminated Timber (CLT) panels with steel plates and connections to provide the required strength and ductility to core walled buildings. The system is first derived from first principles and validated in SAP2000. In order to assess the feasibility of the system it is implemented in the design of a 7-storey building based off an already built concrete benchmark building. The design is carried out following the equivalent static force procedure (ESFP) outlined by the National Building Code of Canada for Vancouver, BC. To evaluate the design bi-directional nonlinear time history analysis (NLTHA) is carried out on the building using a set of 10 ground motions based on a conditional mean spectrum. To improve the applicability of the hybrid system an energy based design methodology is proposed to design the timber-core walled building. The methodology is proposed as it does not rely on empirical formulas and force modification factors to determine the final design of the structure. NLTHA is carried out on the proposed methodology using 10 ground motions to evaluate the suitability of the method and the results are discussed and compared to the ESFP results.

Online Access: Free

Resource Link

http://doi.org/10.14288/1.0228625