

High Performance Wood Shear Walls and Dissipative Anchors for Damage Limitation

Authors : Vera Wilden, Benno Hoffmeister, Georgios Balaskas, Lukas Rauber, Burkhard Walter

Abstract : Light-weight timber frame elements represent an efficient structural solution for wooden multistory buildings. The wall elements of such buildings - which act as shear diaphragms- provide lateral stiffness and resistance to wind and seismic loads. The tendency towards multi-story structures leads to challenges regarding the prediction of stiffness, strength and ductility of the buildings. Lightweight timber frame elements are built up of several structural parts (sheeting, fasteners, frame, support and anchorages); each of them contributing to the dynamic response of the structure. This contribution describes the experimental and numerical investigation and development of enhanced lightweight timber frame buildings. These developments comprise high-performance timber frame walls with the variable arrangements of sheathing planes and dissipative anchors at the base of the timber buildings, which reduce damages to the timber structure and can be exchanged after significant earthquakes. In order to prove the performance of the developed elements in the context of a real building a full-scale two-story building core was designed and erected in the laboratory and tested experimentally for its seismic performance. The results of the tests and a comparison of the test results to the predicted behavior are presented. Observation during the test also reveals some aspects of the design and details which need to consider in the application of the timber walls in the context of the complete building.

Keywords : dissipative anchoring, full scale test, push-over-test, wood shear walls

Conference Title : ICSSCE 2022 : International Conference on Steel Structures and Construction Engineering

Conference Location : Montreal, Canada

Conference Dates : May 23-24, 2022