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Earthquake-proof Reinforcement of Deteriorated Framing of Existing Wooden Houses with Shear-Resistant Components

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Abstract: A practical earthquake-proof reinforcement of existing wooden houses was proposed. This study focused on deteriorated framing at the sills and columns of external walls of Japanese conventional houses. The proposed method of reinforcement is : (1) Deteriorated sills and the bottoms of columns are removed and replaced with new members. (2) Shear-resistant components with structural wood-based panels, similar to ordinary nailed shear walls used in light frame construction, are installed and nailed to the frame members. (3) The assembled shear walls are anchored to the foundation in the following ways. The bottoms of the columns are fixed to the foundation with steel plates and concrete screws to resist pull-out forces. The sills are fixed to the foundation with concrete screws to resist shear forces. We conducted full scale tests of the reinforced shear walls and single shear tests of column-to-foundation and sill-to-foundation anchor systems. The test results verified the practical applicability of the earthquake-proof reinforcement proposed in this study.

Keywords: existing wooden house, earthquake-proof reinforcement, deterioration, shear-resistant component, anchor joint

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