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Development of a passive damper device with high damping rubber for wooden houses

Masato Nakao, Nobuyoshi Yamaguchi, Tomoki Furuta

Abstract

A new passive damper device which includes high damping rubber has been developed. To investigate the performance of the new damper device, static shear loading test, shaking table test and earthquake response analysis were conducted. On the static shear loading test, wood frame with the new damper device showed stable hysteresis without a decline of stiffness under repeated cyclic lateral loads. It was found that the shear force of wood frame with the damper device at 0.5% of drift is 3.52kN which is corresponding to 79% of the one with nailed plywood. From the shaking table test of wood frame with single damper device in addition to single nailed plywood or double wood braces, it was found that addition of the damper device reduced maximum response drift by approximately 50%, while no remarkable increase of maximum shear force was detected due to the stable damping effect of the damper device. The result of earthquake response analysis showed that replacing optimum number of nailed plywood or wood brace by the damper device decreases response drift by from 20% to 30%. The new developed damper device has stable force-displacement relationship even under repeated cyclic loads. However shear stiffness of wood frame with the damper device is relatively low compared to the one with

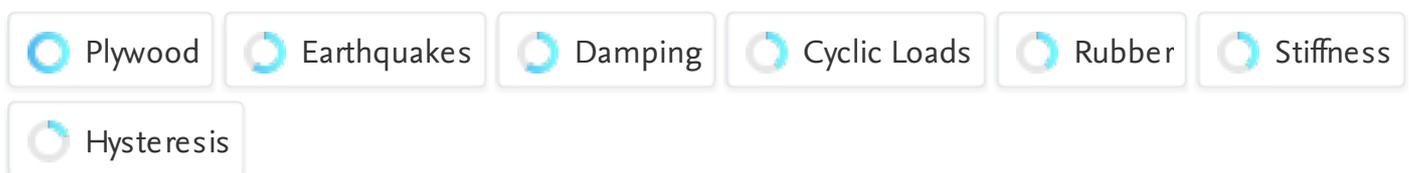
nailed plywood or wood brace, replacing some plywood or wood brace by the optimum number of the damper device is able to reduce earthquake response of wooden houses effectively.

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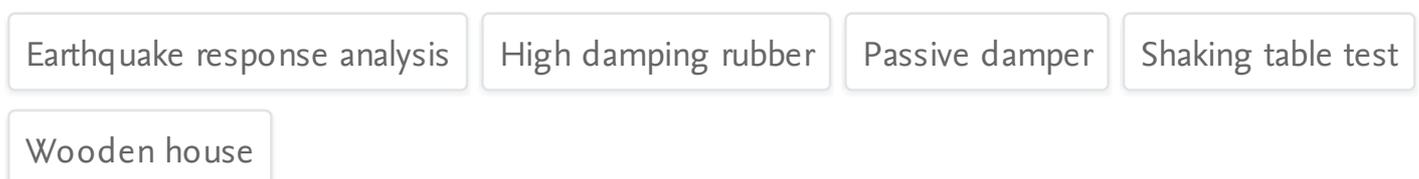
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