Vibration control in smart buildings subjected to earthquake excitation

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A novel method for semi-active stabilization of high rise adjacent structures vulnerable to seismic vibration is theoretically and experimentally studied. The stabilization is realized by changes of the stiffness parameter of the structural element represented by a hermetic, elastic envelope filled with bulk material and controlled by underpressure. The efficiency of the analytically obtained control law for the granular coupler is implemented to the test structure with a relaytype control logic. Seismic pulse excitation is submitted to the test structure as a kinematic excitation. Although simple in concept, the ease of operation and low cost of a semi-active coupler filled with granular material should attract the attention of practicing mechanical and civil engineers who seek for solutions applicable for new constructions and upgrading the existing ones.