

EVALUATION OF THE SEISMIC PERFORMANCE IN TERMS OF THE AMOUNT OF RETROFITTING WITH STEEL MESH AND CEMENT-SAND MORTAR IN CONFINED MASONRY DWELLINGS IN LIMA METROPOLITAN AREA

Luis LÓPEZ^{1,2}, Miguel DIAZ^{1,2}, Michel AMANCIO^{1,2}, Erika Flores^{1,2}

¹Civil Engineering Faculty, National University of Engineering, Lima, Peru

²Japan-Peru Center for Earthquake Engineering Research and Disaster Mitigation, Lima, Peru

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ABSTRACT

In the last decades the population in Lima metropolitan area growth rapidly because of migration from the countryside to the city leading the need for new dwellings for population. Most of them are non-engineered confined masonry dwellings built with two types of masonry units, namely handmade and tubular bricks. Experimental results carried out by the Japan Peru Center for Earthquake Engineering Research and Disaster Mitigation (CISMID) showed that the confined masonry walls with handmade and tubular bricks do not reach the drift limit established by Peruvian Standard E030 for masonry buildings and also their inelastic behavior is different. In that sense, a damage index is proposed to calculate the dwelling seismic performance. This research evaluated dwellings with different wall densities using no-linear dynamic analysis. First, the un-retrofitted dwelling capacity curves were calculated using equations proposed by CISMID for confined masonry walls, then the retrofitted dwelling capacity curve were calculated using experimental database. The retrofitting technique consists of steel mesh and cement-sand mortar. Seven earthquake records were considered in the analysis and each one were scaled according to Peruvian standard E030 for Six different seismic demand level according to table C2-1 of the ASCE-41-13. Simulations results shows that the un-retrofitted confined masonry dwellings collapse under severe seismic demand level. However, results of the retrofitted confined masonry dwellings under very rare seismic demand level for one story dwellings reach no damage level, two story dwellings reach moderate damage level, three story dwellings reach extensive damage level.

Keywords: confined masonry walls, capacity curve, retrofitting, damage index, seismic demand level.
