ORIGINAL RESEARCH PAPER

Experimental investigation on the seismic performance of PP-band strengthening stone masonry houses

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Abstract The collapse of stone masonry is one of the greatest causes of death in major earthquake events around the world. This paper investigates a recently developed retrofitting technology specifically aimed at preventing or prolonging the collapse of stone masonry buildings under strong earthquakes. This technology uses common polypropylene packaging straps to form a mesh, which is then used to prevent or prolong collapse. This paper examines the findings from static and dynamic testing of the proposed retrofit. It is shown that the proposed technique effectively prevents brittle masonry collapse and the loss of debris.

Keywords Stone masonry · PP-band retrofitting · Dynamic loading · Shaking table test

1 Stone masonry

Stone masonry buildings tend to perform poorly in earthquakes owing to the low strength of the stone and mortar used and the lack of adequate wall connections. Typically, stone masonry houses are built by building owners themselves or by local builders without any formal training. The quality of local construction is often very low due to the lack of skilled engineers involved. The heavy walls in stone housing cause a greater resultant force on the building from the lateral movement of the ground during an earthquake. In addition, stone structures lack ductility and are consequently very brittle resulting in sudden catastrophic failures under seismic loading.

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