SHANKING TABLE TESTS ON PP-BAND RETROFITTING OF 1/4 SCALE UNREINFORCED STONE MASONRY MODELS

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ABSTRACT: This paper introduces a technically feasible and economically affordable PP-band (polypropylene bands) retrofitting for low earthquake resistant masonry structures in developing countries. Results of the material tests and shaking table tests on building models show that the PP-band retrofitting technique can enhance safety of both existing and new masonry buildings even in worst case scenario of earthquake ground motion like JMA7 seismic intensity. Therefore, proposed method can be one of the optimum solutions for promoting safer building construction in developing countries and contribute earthquake disaster mitigation in the future.

Key Words: stone masonry, polypropylene band, shaking table test, arias intensity

INTRODUCTION

Masonry is the oldest building material. In spite of this, the technological development of masonry in earthquake engineering has lagged behind compared to other structural materials like concrete and steel. Therefore, in earthquake prone regions of the world have resulted in a large number of casualties due to the collapse of this type of structures. This is a serious problem for the societies. Apparently, its solution is straight forward: retrofitting the existing structures. When we propose the retrofitting in developing countries, retrofitting method should respond to the structural demand on the strength and/or deformability as well as to availability of material with low cost, including manufacturing and delivery, practicability of construction method and durability in each region. Considering these issues of developing appropriate seismic retrofitting techniques for masonry buildings to reduce the possible number of casualties due to future earthquakes in developing countries, a technically feasible and economically affordable PP-band (polypropylene bands; PP-band is commonly used for packing.) retrofitting technique has been developed and many different aspects have been studied by Meguro Laboratory, Institute of Industrial Science, The University of Tokyo.

Masonry walls made of regular shape brick units have been widely studied both from experimental and numerical point of view, but scarce experimental information is available for shapeless stone masonry walls that constitute the material still used in the construction of non-engineering structures. Therefore, the present work aims at increasing the insight about the behavior of typical shapeless masonry structure under static and dynamic loading.

Basic experimental study of PP-band retrofitted masonry wallette made of shapeless stone has been done, and some aspects have been studied by Meguro lab (Sakurai 2009). In order to verify the

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