

Seismic Behavior of 1/4 Scale Unreinforced Masonry House Models Retrofitted by PP-band Meshes

Navaratnarajah SATHIPARAN
Postdoctoral Fellow, IIS, The University of Tokyo, Japan
sakthi@iis.u-tokyo.ac.jp
Kimiuro MEGURO
Professor/Director, ICUS, IIS, The University of Tokyo, Japan
meguro@iis.u-tokyo.ac.jp

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 basic 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 JMA 7 seismic intensity. Therefore, proposed method can be one of the optimum solutions for promoting safer building construction in developing countries and can contribute earthquake disaster mitigation in the future.

Keywords: unreinforced masonry, polypropylene bands, pp-band mesh retrofitting, shaking table test, arias intensity

1. INTRODUCTION

The collapse of non-engineering masonry is one of the major causes of human casualties during recent earthquakes in developing countries. Therefore, retrofitting of low earthquake-resistant masonry structures is the key issue for earthquake disaster mitigation in developing countries to reduce the casualties significantly. When we propose the retrofitting in developing countries, retrofitting method should respond to the structural demand on 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 points, PP-band (polypropylene bands, which is worldwide available and cheap material, 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. In order to understand the dynamic response of masonry houses with and without PP-band mesh retrofitting, crack patterns, failure behavior, and overall effectiveness of the retrofitting technique, shaking table tests were carried out. In this experimental program, 1/4 scale single box shape room structure with wooden
