

# Dynamic Testing of Masonry Houses Retrofitted by Bamboo Band Meshes

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The collapse of unreinforced masonry structures, which are widely distributed around the earthquake prone regions of the world, is one of the greatest causes of death in major earthquake disasters. This paper presents an innovative retrofitting method for masonry structures, which uses bamboo band arranged in a mesh fashion and embedded in a mortar overlay. In order to evaluate the effectiveness of the proposed retrofitting technique, shake table tests were conducted using retrofitted and non-retrofitted 1/4 scaled masonry houses with sinusoidal ground motion inputs. Based on the experimental results, the retrofitted specimen exhibited good seismic performance withstanding over twice larger input energy than what non-retrofitted specimen could do.

**Key Words:** unreinforced masonry, bamboo-band mesh, shaking table test, PP-band mesh  
seismic retrofit

## 1. INTRODUCTION

The collapse of the unreinforced masonry buildings due to ground motion is one of the greatest causes of the human casualties during earthquake disasters around the world. The failure of unreinforced masonry structures contributes to more than 60 % of the structural damage of masonry structures<sup>1)</sup>. Around 30 % of the world's population live in adobe construction<sup>2)</sup> and large proportion of the structures are located in earthquake prone regions. Thus, strengthening of unreinforced masonry structure is indispensable to reduce the casualties significantly. Till date, several types of retrofitting methods have been developed for

unreinforced masonry structures. Retrofitting technique for developing countries should consider not only the effectiveness in terms of seismic performance but also the issues like economic viability, cultural adoptability and material as well as technological availability. Under the aforementioned circumstances, PP-Band Retrofitting Technique is one of the appropriate retrofitting techniques and different aspects of this method have already been studied in Meguro Laboratory, the Institute of Industrial Science (IIS), The University of Tokyo<sup>3), 4), 5), 6)</sup>. On the other hand, another strengthening technique, which uses bamboo band meshes as a strengthening system, has been proposed and different aspects are being researched