EXPERIMENTAL STUDY ON DYNAMIC BEHAVIOR OF TIMBER ROOF MASONRY HOUSE MODELS RETROFITTED BY PP-BAND MESHES

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ABSTRACT

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, ¼ scale single box shape room structure with wooden roof models were used. Addition to that, effect of surface plaster on PP-band retrofitted house model also studied.

From the experimental results, it was found that a scaled dwelling model with PP-band mesh retrofitting was able to withstand larger and more repeatable shaking than that without PP band retrofitting, which all verified to reconfirm high earthquake resistant performance. When surface finishing applied above house model, due to improve bond connection between PP-band and brick wall, surface plaster kept well with wall.

Introduction

In this research, by shaking table test, we will test the model's dynamic characteristics and earthquake responses under different working stages; observe and record failure modes and failure characteristic under all intensities; evaluate seismic performance of the scale model building.

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