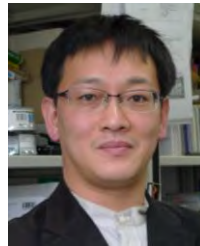




Study on Shear Capacity and Behaviors of Bamboo Reinforced Masonry Shear Walls

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Summary

Bamboo, low cost, fast growing, and broad distribution of growth, is expected to contribute significantly to earthquake-resistant construction and seismic retrofit technology for developing countries. The authors also have been studied for understanding the mechanical behavior of bamboo reinforced concrete member and clarifying the differences of structural properties from steel reinforced concrete and bamboo reinforced concrete. Based on these research results, in this study, it is investigated that bamboo is used as reinforcement materials for masonry structures. To evaluate the beneficial effects of bamboo for reinforcement of masonry structures, diagonal shear tests were carried out. It compared these experimental results of bamboo reinforced masonry members with the steel reinforced ones, and the mechanical property of the bamboo reinforced masonry was studied.

Keywords: cavity masonry wall; bamboo reinforcement; diagonal compression test; shear; dowel action.

1. Introduction

In recent years, steel prices have soared. For developing countries, steel is difficult to obtain because of expensive prices, and for the construction industry, usage of steel is currently limited heavily. The production of steel has high consumption of fossil fuels, so, the steel discharge in the construction of structures has been presented, showing the possibility of drastic reduction by research institutes.

Recently, in the attention in response to global warming issues and sustainable society, the manufacturing using natural materials has become actively. In recent years, many researches around the world are begun to explore the use of low-cost and low-energy substitute construction materials. Among the many possibilities for such substitutions, bamboo, which is one of the fastest growing plants, has got a great economic potential. Bamboo has been used in constructions of bridges and houses for thousands of years in Asia. Bamboo takes less energy to harvest and transport. Therefore, Bamboo has low manufacturing costs compared with steel, bamboo is widely expected to be possible even in countries and regions that do not have advanced manufacturing technology and construction techniques. In Asia and Latin America countries, there are several kinds of the bamboo reinforced masonry that has a difference in the material, the construction scale, etc. The authors also have been studied for understanding the mechanical behavior of bamboo reinforced concrete member and clarifying the differences of structural properties from steel reinforced concrete and bamboo reinforced concrete [1], [2], and [3].

Masonry buildings are generally exposed to a very high seismic risk due to high probability of earthquake occurrence. To reduce the seismic risk of these masonry buildings, masonry structures should be constructed according to the rules of good mason workmanship and guideline of engineered structure. However, for developing countries, it is important to make the development of buildings construction; low cost, no requirement of sophisticated technologies and reliable