DIAGONAL TENSION (SHEAR) TEST OF FULL-SCALE CONCRETE HOLLOW BLOCKS MASONRY ASSEMBLAGES RETROFITTED BY FIBER-REINFORCED PAINT

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1. INTRODUCTION

Masonry is one of the most popular construction materials due to its durability, affordability, and availability. However, masonry building is vulnerable to earthquakes. In developing countries, many masonry structures were built without reinforcement (Unreinforced Masonry (URM)); unfortunately, these buildings have been widely constructed in earthquake-prone areas. Building collapse contributes to an enormous number of (about 75%) human casualties in earthquakes [1]. Concrete hollow block (CHB) has become a popular material for construction in developing countries. However, CHB has a low compressive strength of 1 MPa [2]. Therefore, this study attempts to increase the seismic capacity of URM house models.

2. EXPERIMENTAL PROGRAM

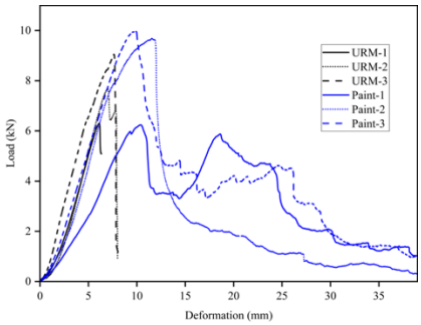
Two types of masonry assemblages were constructed to represent the Unreinforced Masonry (URM) house model and retrofitted by the fiber-reinforced paint house model. Masonry assemblages consist of two 4-inch Concrete Hollow Blocks. The dimension of all samples was 420x200mm with a thickness of 100mm. Mortar was used to fill joints and holes on the blocks with a mix ratio of 1:1:4 (water, cement, sand). In this study, fiber-reinforced paint was used as retrofitting material; it has a large deformation capacity [3]. This test method was used to determine the shear strength of masonry assemblages by applied loading in compression according to ASTM E519/E519 –15, as shown in Figure 1.

Figure 1. Experimental setup of diagonal tension (shear) in masonry assemblages.

3. RESULTS

From Figure 2, URM shows a sudden drop after reaching the peak load. URM specimens have an average peak load of 7.68 kN with vertical deformation from 5.8mm to 7.6mm. However, retrofitted specimens show a large deformation capacity with an average peak load of 8.62 kN.

Figure 2. Load-displacement curves of URM and retrofitted house models.



4. CONCLUSION

URM was highly brittle and suddenly collapsed after reaching the peak load. It is very dangerous and can increase the number of victims during earthquakes. On the other hand, fiber-reinforced paint exhibits a large deformation capacity. Moreover, the paint minimizes the dust from masonry; dust may lead to an increased number of victims due to suffocation. Other advantages of fiber-reinforced paint are that this method can be implemented easily for existing and new masonry houses and does not require high skills.

5. REFERENCES

Reference to a journal publication:

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