

Seismic Behavior of Masonry Reinforced Concrete Composite Columns

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Abstract : To provide tall unreinforced brick masonry walls of a century-old existing building with sufficient resistance against earthquake loading actions, additional reinforced concrete columns were integrated into the building at some designated locations and jointed to the existing masonry walls through dowel shear steel bars, resulting in composite structural elements. As conditions at the interface between the existing masonry and newly added reinforced concrete parts were not well grasped and the behavior of such composite elements would be complex, the experimental investigation was carried out. Three relatively large specimens were tested to investigate the overall behavior of brick masonry-reinforced concrete composite elements under lateral cyclic loadings. Confining the brick walls on only one side or on two opposite sides, as well as providing different amounts of dowel shear steel bars at the interface were the main parameters of the investigation. Test results showed that such strengthening provide a good seismic performance even at very large lateral drifts and the investigated amount of shear dowel lead to a good performance level that would result in a considerable cost reduction of the strengthening.

Keywords : unreinforced masonry, reinforced concrete, composite column, seismic strengthening, structural testing

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020