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Seismic Retrofitting of Existing Stone Masonry Houses: An Overview

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Abstract

Recurrent earthquakes in the past two decades have taken thousands of lives (e.g., the Kashmir earthquake killed some 80,000 people) and destroyed millions of homes and other buildings. This colossal loss of lives was not because of the earthquake but because people were inside buildings (e.g., stone masonry structures) that were highly vulnerable. Had these buildings been retrofitted with a small fraction of the cost of reconstruction, the death count would have been much smaller. The past earthquakes have brought out many weaknesses in masonry design and construction practices as these structures behaved unsatisfactorily and sustained major damage. Hence, the safety and retrofitting of existing stone masonry houses are very important. Considerable research work has been directed towards evolving suitable methods of earthquake resistance in stone masonry houses, but despite the availability of such methods, masonry buildings have been damaged in the event of earthquakes, because of the following reasons: (i) lack of awareness, formal training and technical knowledge in earthquake-resistant construction; (ii) lack of concern about seismic safety because of the in-frequent occurrence of earthquakes; (iii) people lack financial resources to meet the earthquake-resistant requirement; and (iv) despite the availability of provisions and recommendations of earthquake-resistant measures to be applied on stone masonry buildings in the form of various codes, these are rarely being implementation in actual practice. Therefore, in the present study, an overview is presented about how the retrofitting of existing stone masonry houses using different techniques can be implemented to reduce their seismic vulnerability and loss of life.

Keywords: Existing construction, Stone masonry, Retrofitting techniques, Strengthening of structural elements