

## SEISMIC LOSS ESTIMATION OF LOW-RISE REINFORCED CONCRETE STRUCTURES IN KARACHI

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Volume: **XII**

No: **3**

Pages: **63-79**

Date: **July 2015**



### **Abstract:**

A comprehensive seismic loss estimation exercise is carried out for existing low-rise reinforced concrete (RC) structures in the city of Karachi. Twelve three-dimensional mathematical models were subjected to gravity load, Eigenvalue and adaptive pushover analyses. The models consisted of four structures of two, three and four storeys each, are. The results were used to develop period-height relationships for the gross and yield period of vibration; these were compared with those in the existing studies and codified relationships. Furthermore, the capacity curves corresponding to single degree of freedom idealization were developed and were transformed to the simplified bilinear form. The curves were compared with the capacity curves of low-rise structures in the Turkish building stock. Finally, the fragility curves representing the probabilistic response of the existing low-rise RC structures have been presented. Using the hazard for three return periods in the form of spectral accelerations at 0.2 and 1.0 sec and the GIS based building inventory developed for Gulshan town in Karachi, the level of damage to the existing RC structures was evaluated. The study reveals that 3 percent, 81 percent and 92 percent existing RC structures of two to four storeys in this town will undergo extensive damage in case of the hazard corresponding to return periods of 150, 475 and 1000 years, respectively. The damage level of the remaining structures is expected to fall in the category of moderate, slight or no damage, while no structure is expected to suffer a complete damage.

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