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Square Concrete Columns under Axial Compression

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Abstract : This is a well-known fact that the actual latera forces due to natural disasters, for example, earthquakes, floods and storms are difficult to predict accurately. Among these natural disasters, so far, the highest amount of deaths and injuries have been recorded for the case of earthquakes all around the world. Therefore, there is always an urgent need to establish suitable strengthening methods for existing concrete and steel structures. This paper is investigating the structural performance of square concrete columns strengthened using low cost and easily available steel clamps. The salient features of these steel clamps are comparatively low cost, easy availability and ease of installation. To achieve research objectives, a large-scale experimental program was established in which a total number of 12 square concrete columns were constructed and tested under pure axial compression. Three square concrete columns were tested without any steel lamps to serve as a reference specimen. Whereas, remaining concrete columns were externally strengthened using steel clamps. The steel clamps were installed at a different spacing to investigate the best configuration of the steel clamps. The experimental results indicate that steel clamps are very effective in altering the structural performance of the square concrete columns. The square concrete columns externally strengthened using steel clamps demonstrate higher load carrying capacity and ductility as compared with the control specimens.

Keywords : concrete, strength, ductility, pre-stressed, steel, clamps, axial compression, columns, stress and strain
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