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**Experimental and Numerical Investigation on Seismic Behavior of Reinforced Concrete Columns Subjected to Varying Axial Load**

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**Abstract.**

This paper presents findings on the effects of varying axial load on seismic performance of reinforced concrete (RC) columns by conducting an experimental program on five full-scale RC columns. The key variable of this paper is the applied axial load pattern. The study assessed the columns' seismic performance in terms of crack patterns, failure modes, hysteretic response, and drift and energy dissipation capacities. The results showed that the lateral load-displacement hysteresis loops of RC columns with varying axial load were unsymmetrical, and that the columns had a different seismic performance compared to those subjected to constant axial load. Different failure modes were also observed between columns under constant and varying axial loads. The strength and deterioration of the columns were strongly influenced by both the fluctuating range and intensity of the applied axial load. To complement the experimental results, a three-dimensional (3-D) finite element (FE) model was proposed to further investigate the effects of varying axial load on the seismic behaviour of RC columns subjected to varying axial force. The study found that the intensity and fluctuation of the applied axial load significantly affected the strength and drift capacity of RC columns.

**Keywords:** Reinforced concrete column, varying axial load, strength, drift capacity, energy dissipation capacity, failure mode.