

## Reduction of Differential Column Shortening in Tall Buildings

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**Abstract :** The differential column shortening in tall buildings can be reduced by improving material and structural characteristics of the structural systems. This paper proposes structural methods to reduce differential column shortening in reinforced concrete tall buildings; connecting columns with rigidly jointed horizontal members, using outriggers, and placing additional reinforcement at the columns. The rigidly connected horizontal members including outriggers reduce the differential shortening between adjacent vertical members. The axial stiffness of columns with greater shortening can be effectively increased by placing additional reinforcement at the columns, thus the differential column shortening can be reduced in the design stage. The optimum distribution of additional reinforcement can be determined by applying a gradient based optimization technique.

**Keywords :** column shortening, long-term behavior, optimization, tall building

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