

## On the Stability Exact Analysis of Tall Buildings with Outrigger System

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**Abstract :** Many structural lateral systems are used in tall buildings such as rigid frames, braced frames, shear walls, tubular structures and core structures. Some efficient structures for drift control and base moment reduction in tall buildings is outrigger and belt truss systems. When adopting outrigger beams in building design, their location should be in an optimum position for an economical design. A range of different strategies has been employed to identify the optimum locations of these outrigger beams under wind load. However, there is an absence of scientific research or case studies dealing with optimum outrigger location using buckling analysis. In this paper, one outrigger system is considered at the middle of height of structure. The optimum location of outrigger will be found based on the buckling load limitation. The core of structure is modeled by a clamped tapered beam. The exact stiffness matrix of tapered beam is formulated based on the Euler-Bernoulli theory. Finally, based on the buckling load of structure, the optimal location of outrigger will be found.

**Keywords :** tall buildings, outrigger system, buckling load, second-order effects, Euler-Bernoulli beam theory

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