



# A Comparative Study on Seismic behavior of Tall Structures with Hexagrid and Diagrid Systems by using Non-linear Dynamic Analysis

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## ABSTRACT

Today, tall structures are the most dominating symbol of the cities. The tall structures should be design for strength against gravity and lateral loads, stiffness, ductility and system efficiency. Ever increasing number of stories, height to depth ratio and complexity of form, need for robustness coupled to economy, awareness of limited material resources and sustainability, are all new demanding questions to be tackled with fresh approaches, novel structural systems. Modern structural system provides significant progress in establishing the necessary flexibility in design. In this study, a numerical study is conducted to estimate the seismic performance of horizontal hexagrid structural and diagrids systems. To this end, two models of twenty-story steel structures were designed. The models with horizontal hexagrid cells which transitioned to vertical cells using a transitional story, and a model of the diagrid system have been designed by using SAP2000 software. Also, nonlinear dynamic analyses are performed on buildings. Results indicate that roof displacement of the horizontal hexagrid structural system under nonlinear dynamic analyses is less than the diagrid structure. Also, there is no difference between the two systems for maximum drift at first floor, but increasing height, the drift values of the hexagrid structural system are less than the diagrid system. According to the results, the tall structure with a hexagrid structural system performs better than the diagrid system against earthquakes.

## Keywords:

Tall Building, Nonlinear Static and Dynamic Analysis, Hexagrid System.