

## Simulation of Scaled Model of Tall Multistory Structure: Raft Foundation for Experimental and Numerical Dynamic Studies

**Authors :** Omar Qaftan

**Abstract :** Earthquakes can cause tremendous loss of human life and can result in severe damage to a several of civil engineering structures especially the tall buildings. The response of a multistory structure subjected to earthquake loading is a complex task, and it requires to be studied by physical and numerical modelling. For many circumstances, the scale models on shaking table may be a more economical option than the similar full-scale tests. A shaking table apparatus is a powerful tool that offers a possibility of understanding the actual behaviour of structural systems under earthquake loading. It is required to use a set of scaling relations to predict the behaviour of the full-scale structure. Selecting the scale factors is the most important steps in the simulation of the prototype into the scaled model. In this paper, the principles of scaling modelling procedure are explained in details, and the simulation of scaled multi-storey concrete structure for dynamic studies is investigated. A procedure for a complete dynamic simulation analysis is investigated experimentally and numerically with a scale factor of 1/50. The frequency domain accounting and lateral displacement for both numerical and experimental scaled models are determined. The procedure allows accounting for the actual dynamic behave of actual size porotype structure and scaled model. The procedure is adapted to determine the effects of the tall multi-storey structure on a raft foundation. Four generated accelerograms were used as inputs for the time history motions which are in complying with EC8. The output results of experimental works expressed regarding displacements and accelerations are compared with those obtained from a conventional fixed-base numerical model. Four-time history was applied in both experimental and numerical models, and they concluded that the experimental has an acceptable output accuracy in compare with the numerical model output. Therefore this modelling methodology is valid and qualified for different shaking table experiments tests.

**Keywords :** structure, raft, soil, interaction

**Conference Title :** ICGECM 2018 : International Conference on Geotechnical Engineering, Computing and Modeling

**Conference Location :** Vancouver, Canada

**Conference Dates :** September 17-18, 2018