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| **Title** | Effect of Common Podium on the Seismic Performance of Two Equal High-rise Towers |
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**Abstract**

In this study, forty-five stories building including two high-rise towers on a common podium which is assumed to be in Philippines, a high seismic hazard region is selected to consider the effect of common podium on seismic performance of two equal height towers. The seismic design will be used to determine the responses of the structure. To achieve the objectives, the preliminary studies of the selected model is designed into different configuration to consider (1) the effects of individual modelling with multi-tower models versus single-tower model, (2) effect of tower direction with symmetric towers model versus asymmetric towers model and (3) effect of tower distance with 5 symmetric towers models and 4 asymmetric towers models. Response Spectrum Analysis (RSA) at DBE level evaluation and Linear Time History Analysis will be analyzed in ETABS and used for preliminary design. From preliminary design results, tower responses of single-tower model show the overestimation of results in story shear and moment, compared to multi-tower model. Moreover, variation of distance between towers above podium affect the ground level shear of both symmetric and asymmetric models. Therefore, two models of different distance of asymmetric configuration are selected to detect the effect of individual modeling and effect of tower distance. Selected models are analyzed with PERFORM-3D using Nonlinear Time History Analysis (NLTHA). The responses are checked in global and local results to detect the interaction between towers through podium and effect of variation of tower position. Based on the results obtained from nonlinear time history analysis, in the case of individual modelling, the difference between single-tower model and multi-tower model is narrower in global responses compared to preliminary results. However, the higher local responses, as in coupling beams and podium top level diaphragm forces, can be detected in individually-designed single-tower model which can lead to uneconomical design of components. Moreover, the variation of distance between towers above podium affect the local responses of coupling beams and diaphragm forces which demands the higher reinforcement in model of two towers situated near the center of podium than model of two towers situated near the edge of podium. Based on this study, multi-towers on the common podium should be designed as full model with complete buildings using Nonlinear Time History Analysis. Furthermore, the responses mechanism of two towers on a common podium can be idealized for design and architectural purposes based on this study

**Keywords** Nonlinear Time History Analysis, high-rise towers, Response Spectrum Analysis, common podium, seismic design