Title	Effect of Design Wind Level on the Seismic Performance of Tall Buildings
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Abstract

Wind and earthquake loadings are the two major types of lateral dynamic excitations experienced by high-rise buildings. An efficient design must ensure the safety of structural and non-structural components of a building against both types of loadings.

This study evaluates the seismic performance of high-rise buildings primarily designed based on different levels of lateral wind loads. A 40-story dual system case study building is selected for this purpose.

In dual systems, the lateral load is mainly resisted by a combination of reinforced concrete core wall and the special moment resisting frame. The case study building is separately designed for wind loading using three different levels of wind speeds (low, moderate and high), which are selected to represent the anticipated hazards at various global wind zones. The detailed seismic performance exhibited by three different design cases (corresponding to different levels of wind hazard) is evaluated. The case study building is assumed to be located in a moderate-level seismic zone. The Nonlinear Response History Analysis (NLRHA) procedure is used to obtain the true inelastic seismic demands of all three design cases of the case study building.

The results showed that the level of design wind load can significantly alter the seismic performance of high-rise dual system buildings. Therefore, even for the cases where the wind demands control the design of lateral load-resisting system, the detailed performance-based seismic evaluation should still be carried out to ensure the overall structural safety and integrity.

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Keywords Wind and Earthquake loadings, Seismic Performance, Tall buildings, Nonlinear Response, History Analysis.