

Response modification of steel moment frame structures in the displacement-based design

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In general, there are two views among structural seismic design methods. One, the force-based design method; and another, performance-based design. One of the important responses of the structure is the relocation of the floor. Today, relocation-based design is an important subset of performance-based design. In this regard, the design regulations based on relocation have specified rules and regulations for the design of the structure. However, the relations mentioned in this regulation have shortcomings and defects. Among these shortcomings are the relationships related to the calculation of the basic shear of the structure. In this dissertation, an attempt has made somehow correct these relations. For this purpose, 4, 8 and 12 floor structures with steel bending frame system are considered. Initially, these structures designed using displacement-based design methods; then, in order to have accurate answers, by selecting 11 pairs, the appropriate acceleration mapping of the structures by Open sees software analyzed by nonlinear time history. Comparing the results, can see that there is an average difference of about 35% between the base shear values obtained from the time history method and the relocation code. Next, by examining the parameters involved in the cut and the form of the relationship related to the calculation of the cut in the regulations, a solution to improve the relationship proposed. Finally, the structures designed by the method of corrective displacement. Then the structures analyzed by nonlinear time history by 11 pairs of new accelerometers, and the results are compared to evaluate the performance of the proposed method. The results show that the proposed method has appropriately brought the base shear values closer to their exact values, so that the maximum base shear difference of the buildings reduced to about 12%.

Keywords

Displacement Based Design, Nonlinear Time History Analysis, Base Shear, Steel Moment Frame.