

عنوان مقاله:

New Lateral Force Distribution for Seismic Design of Structures Based on Seismic Demand Ratio

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خلاصه مقاله:

The design of earthquake-resistant buildings starts with defining the maximum lateral earthquake forces or their resultant. The amount of these forces depends on various factors, including coefficient of system behavior which depends on over strength and its ductility. In this study, a method is proposed in order to design an earthquake-resistant system in which the distribution of lateral forces is adjusted based on equal distribution of the seismic demand ratio in structural elements for the optimum use of seismic capability of the structure. To this end, three types of ۴-, ۷-, and ۱۰-story structures are Applied. Firstly, the above-mentioned structures are designed based on gravity loads and consequently analyzed based on linear and nonlinear dynamic analyses, applying the accelerograms of some major earthquakes. Pursuant to that, the average loading ratio to the allowed capacity of the elements of each story in linear analysis and the average ratios of plastic rotations to the allowed capacity of elements in nonlinear analysis are applied as the modified shear ratio in the Iranian National Seismic Code. On that account, the new lateral loading distribution is measured and identified. Based on this new distribution, the above-mentioned structures are designed and their seismic behaviors are identified, applying linear and nonlinear dynamic analyses of the same accelerograms. The findings indicate an ameliorated seismic behavior of the beams and the columns. Moreover, the distribution of the seismic demand ratios attains more uniformity along the height of the structures

کلمات کلیدی:

ductility, Seismic design, Lateral force distribution, Demand to capacity ratio, Plastic rotation

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