عنوان مقاله:

ESTIMATION OF MULTIPLE STRIP ANALYSIS CURVE USING IDEALIZED TRILINEAR MODAL PUSHOVER ANALYSIS CURVE

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خلاصه مقاله:

Multiple stripe analysis is among the most accurate nonlinear dynamic methods for estimating the behavior of buildings against probable seismic demands. In spite of the accuracy of MSA analysis, time-consuming and significant computational are negative aspects of the method. In this paper, the equivalent method base on modal pushover analysis is examined. The presented method, in addition to the simplicity, provides the acceptable accuracy for estimating the MSA fractile curves. This method uses the nonlinear single degree of freedom (SDOF) systems for estimating responses of multistory building. To evaluate the accuracy and applicability of the method a 9-story steel moment-resisting 2D building was modeled in OpenSees simulation software. The model was analyzed using 200 scale earthquake records with different intensities. The records are selected according to the conditional mean spectrum as a target spectrum. Epsilon parameter, magnitude, and source-to-site distance are three important parameters for selecting the records. First, the building model is analyzed under the selected suits of records. After that to estimate the response of building SDOF equivalent models are used. The force deformation relationships of these systems are constructed based on the modal pushover curves of the main building. The pushover curves are simplified by trilinear idealization, and the MPA fractile curves are estimated by using nonlinear time history responses of constructed single degree of freedom systems (SDOF) under the 200 selected records. These analyses for the SDOFs system perform for various modes of structure and the responses estimated by using the complete quadratic combination (CQC) method. By comparing curves which are calculated by both methods, the precision of the proposed method in 16, 50 and 84% fractile values in both linear and nonlinear parts of the curves are satisfactory.

کلمات کلیدی:

Multiple strip analysis, Modal pushover analysis, Epsilon parameter, Conditional mean spectrum

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