عنوان مقاله:

Assessment of Equivalent Static Earthquake Analysis Procedure for Structures with Mass Irregularity in Height

محل انتشار:

ششمین کنگره ملی مهندسی عمران (سال: 1390)

تعداد صفحات اصل مقاله: 10

نویسندگان:

Saleh Malekpour - *Structural Engineering Department, School of Civil Engineering, University of Tabriz, Tabriz, Iran*

Farhad Dashti - *University College of Science and Technology, Oroumieh, Iran*

Amir Kiani - *PhD Student of Earthquake Engineering, International Institute of Earthquake Engineering and Seismology, Tehran, Iran*

خلاصه مقاله:

Sudden changes in structural dimensions and mass irregularities are inevitable in urban buildings. Most building codes have different analysis and design previsions for such buildings. In this article, such provisions based on the Iranian seismic code of practice (Standard No. 2800), which is to a great extent similar to UBC-97 model code, are verified in order to assess the provisions for different types of structures. Thus, four two-dimensional residential type steel structures with 4, 8, 12 and 16 stories and with different forms of mass irregularities in height are designed using the standard equivalent static procedure per the Iranian Seismic Code of practice. The designed structures, then, were subjected to different nonlinear static (pushover) and dynamic analyses. Two levels of irregularities, i.e. 150 and 300 percents, located at the heights equal to 50% and 75% of the overall height of the structures, have been considered. The results show that the static procedure adapted in the code results in much higher internal forces, story shears and overturning moments in various parts of the structures compared to the dynamic results. Also, this study shows that lateral inter-story drifts obtained using the equivalent static procedure and dynamic analyses are quite comparable for short buildings. For taller buildings, in contrast, dynamic analyses showed less inter-story drifts. It is also observed that mass irregularities in height could be responsible for more contribution of higher modes in seismic response of such structures.

کلمات کلیدی:

Mass irregularity, equivalent static analysis, nonlinear analysis, Iranian seismic code