

ABSTRACT

During the history of the vast country of Iran, earthquakes have caused destruction of many cities and affected the cultural and economical aspects of the country.

The occurrence of two major near-field ground motions of Tabas and Bam during the recent history having effects worse than the previous ones. Resulted in an inclination of the researchers to investigate and identify the characteristics and nature of these earthquakes.

Considering the fact that nearly 3/4 of the areas of our country are located on or are close to active faults, the probability of similar earthquakes to happen again is high. For this reason, paying attention to seismic design of new structures and seismic rehabilitation of existing structures are very important.

On the part of seismic rehabilitation, use should be made of the techniques using implicit performance based design. Considering the above facts, in this research some 4, 6, 8 and 10 story steel buildings with ordinary moment resistant frames were designed according to the Iranian seismic design code (standard 2800) and then were evaluated at two hazard levels (10% and 2% probability of exceedance in 50 years).

To this end, the design acceleration spectra calculated for Tehran were used along with the nonlinear static (pushover) analysis. The same structural models were also evaluated using nonlinear dynamic analysis under Tabas and Bam earthquake records to assess the behavior of the structures subject to near-field ground motions.

The results of this research show a severe weakness in the design of ordinary moment resisting steel structures having long periods and designed according to the national codes when subjected to near-field earthquakes resulting in premature failure of the structure.

A modification to the design story drift requirement is suggested to enhance the seismic behavior of steel moment resisting buildings.