

Abstract

It is evident the demolishing and rebuilding all structures to withstand earthquakes is not possible both practically and economically. This is the incentive behind the development of practical methods for seismic rehabilitation of structures in different countries. Most of the related research has been focused on building systems rather than bridges, so in this thesis it is intended to develop practical and precise analysis methods for determining the seismic capacity of existing bridges to act as a complement for the relevant codes of practice. In this research work the nonlinear static (pushover) and incremental dynamic analysis (IDA) methods are used for the above purpose. Some 3D models of bridges are considered and used with the software sap2000. In pushover method the loading is applied statically and in IDA some earthquake records are input to the structure. The records are those of Bam, Tabas and Manjil. Beside the above two analysis, the effects of the variation of shear modulus of elastic bearings of bridges with time (aging) on the seismic capacity are explored. Also, thermal stresses are calculated for a uniform variation temperature at the deck and a temperature gradient through the height of the girders. Finally, it is concluded that the bridges under study do not perform well under seismic load (this bridges are currently under operation in Tehran). Also, thermal analysis shows that a considerable effect on the capacity of the bridges practical cases.