

## Abstract:

A numerous of accomplished studies based on masonry arch bridges restrict to estimation of final capacity of these bridges against static loads in different situations and dynamic and seismic studies about this kind of structures are less done. One of the reasons of shortage of dynamic and seismic studies about this structure is the structural complexity of Masonry materials and numeric methods to modeling.

Masonry structures are modeling in two methods: Micro method in which blocks and joints to model separately, and macro method that component to model continuously. Micro method presents the details of masonry structures with high accuracy and in the modeling by finite element method usually used. In the modeling by the using of discrete element method macro method has been used. This causes the decrease of calculations. Finite element method can not to simulate large displacements and cracks in the structure of course; this method with high speed is able to analysis large structure. Discrete element method is used to simulate the failure of masonry bridges because the main goal of this study is the estimation of dynamic capacity of masonry bridges. So in this way, three stone bridges of railway network are used. Two one span and three span bridges are used in verifying of the software. These two bridges empirically examined and based on certain loading. Their final capacity is calculated. 3DEC model is used in this study, which estimates the final capacity of bridges close to empirical values. For modeling of three masonry arch bridges of railway network first, geometry and dimensions of bridges entered to AutoCAD software. and then accurate coordinates of peripheral points of bridge and every block in The

3DEC (of kinds of consulting group Itasca) and sap2000 software were entered. Modeling in The sap2000 software accomplishes the finite element method and solid elements, dynamic characteristics and modal properties of bridges are determined in the sap 2000 software. Three seismic records are used in this study. by using Fourier spectrum prevailing frequencies are calculated and compares with the frequency of first mode of bridge calculated by sap 2000 software, and shows that this seismic records to cause resonance in the bridges which are studied.

By continuing, approaches of calculating the characteristics of blocks and joints in the 3DEC model are introduced and with 3DEC model of three bridges with these characteristics. a comparison has been accomplished between these two software (sap2000, 3DEC) by live load to middle span of modeled bridges in two software. During this comparison, the optimal state of meshing and blocking in 3DEC model are determined. This study shows that two soft wares are identical in linear area but in the nonlinear state and when the failure condition starts, 3DEC and empirical results have nearer results. Because horizontal direction of bridges is damageable to earthquake so records undertake to foundation in transverse direction in the form of speed and so nonlinear dynamic behavior of bridges is studied by undertaking the various coefficients by IDA method to earthquake records. Dynamic analysis with 3DEC shows that, in these bridges arches are damageable and should be strengthen by strengthening methods. Out of strengthening methods, Archtec method is faster and less expensive. At the end of the research, gained results and more offers, are mentioned for more researches.