Numerical modeling of TANGAB dam under dynamic modeling

مهدی انصاری[1*]، مرتضی شریفی [2]

۱- مهدی انصاری، کارشناس ارشد عمران،گرایش ژئوتکنیک، فارس، ایران.mehdiansari571@gmail.com

۲- مرتضی شریفی، عضو هیات علمی دپارتمان مهندسی عمران و معماری، دانشکده فنی و مهندسی شهید باهنر،د انشگاه فنی و حرفه ای، فارس، ایران،M_sharifi@iauest.ac.ir

Abstract:

The study of the stability of the earth dams in the field of earthquake is one of the most complex issues because of the variation of the effects of the earthquake characteristics (in terms of intensity, acceleration, frequency, effective performance time), fill material various properties (soil resistance factors and porosity pressure) and change of properties mentioned in the effect of seismic loads caused by the earthquake. Given the effect of earthquake force and sudden changes in cavernous pressure, the points of the dam that are in contact with water are strongly affected by the loss of effective stress in horizontal and vertical directions. Dam crest also has a negative displacement over time that is facing downwards. Therefore, a more precise modeling of the input stimulus is necessary to obtain more accurate results.

Keywords: Dynamic Analysis, Tangab earth dam, Plaxis, Mohr Coulomb.

Introduction:

Considering the high seismic potential in most parts of Iran, the importance of studying the behavior of earth dams during earthquake loading seems important. Methods of studying the stability of the body of earth dam have grown more and more in the last 40 years and at the same time they have identified the need for accurate and detailed information for such analyzes. Measurements of displacements, total stresses, pore water pressures, and arching ratio can be used to carry out a number of tasks, such as characterizing the dam's overall behavior [12], checking the behavior of specific zones, obtaining information about the in situ mechanical properties of embankment soils [8] and finally, supporting the difficult task of evaluating dam safety and efficiency [3].

Behavior of earth dams during construction and operation is a crucial issue in terms of settlement and hydraulic fracturing, which may cause serious hazards to dams and their associated facilities. Because of some uncertainties in material properties, results of a numerical analysis may be somehow different from those provided by instruments [6]. Hence, back analysis of dams is necessary at the end of construction. By designing a monitoring system and installing the corresponding instruments in the body of a dam during construction, settlements, stresses, and pore water pressures can be measured [9]. Analysis of the data recorded by the instruments not only helps to understand the complicated stresses and settlements in the body of the dam, but also can be a suitable basis for determining the geotechnical parameters through the back analysis. These data can be compared with the numerical results to assess the accuracy of numerical analysis. According to the earth dam codes, the results of a numerical analysis are acceptable provided that there is a tolerable difference between these results and those provided by the instruments. If the difference is significant, it will then be necessary to perform a kind of back analysis to modify the material properties and assumptions [1]. In summary, in order to achieve a mathematical analysis, it is necessary to determine the coefficient of seismicity of the acceleration spectrum, the performance time of the main movements, the acceleration of the submission of the acceleration charts along the dam height and in some cases other quantities or based on the correct estimate, their values supposed [2]. However, some of the above quantities