

عنوان مقاله:

Optimal placement of smart sensors in the underground storage tanks regarding to the cavitations effect by Monte Carlo analysis

محل انتشار:

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نویسندگان:

M. Moradi - *Graduated Master Science of Hydraulic Structures, Department of Islamic Azad University, Maragheh Branch, Maragheh, Iran*

H. Vosoughifar - *Assistant Professor of Civil Engineering Department of Islamic Azad University , Tehran South Branch, Tehran, Iran*

Y. Hassanzadeh - *Professor of Civil Engineering Department of Tabriz University, Tabriz, Iran*

خلاصه مقاله:

Natural disasters especially earthquake could easily damage the water supply systems including underground water tanks. The earthquake could result water sloshing and cavitation inside the water tank. Consequently human tragedy in different aspects of socially, economically and ecologically would happen. Therefore, immediate and effective measures for repairing and utilizing the water tanks after the earthquake should be taken into the account. The aim of this research is optimal placement of smart sensors in the underground water tanks regarding to the cavitation effect by Monte Carlo approach. In this article, the effect earthquake on water tanks regarding to the cavitation effect and seismic response of the tank will be considered. For considering seismic shock effect on the tanks and their reaction, the ANSYS software was used for modeling and simulating by using of finite element method. Thereafter, the places which are prone to the cavitation (Places with negative pressure) will be detected by Monte Carlo analysis. The statistics of the seismic cavitation were examined, and the placement of this phenomenon is compared with the results from the Monte Carlo simulations. The MATLAB software was used for this decision making for optimal placement of smart sensors via Monte-Carlo analysis. Moreover, in order to reduce the analysis time, the comparison method is taken into the account. Finally, different types of water tanks were loaded subjected to far and near field earthquake. The finite element result with be analyzed via Monte Carlo approach and the best places for smart sensors installation will be proposed.

کلمات کلیدی:

Cavitation phenomena, sloshing, vibration response, Monte Carlo

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