Earthquake Response Analysis of a High Gravity Dam Considering the Radiation Damping of Infinite Foundation

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In this study, two different earthquake input models are presented, i.e. massless foundation model and viscous-spring boundary input model considering the radiation damping of infinite foundation. Based on ANSYS Parametric Design Language (APDL), the viscous-spring boundary which is consisted by the parallel-connected spring-dashpot system in each direction, and its corresponding earthquake input mechanism for implicit analysis are implemented into ANSYS. The accuracy of the viscous-spring boundary is validated by two numerical examples. The earthquake response analysis of a high gravity dam with 3D full model is then investigated. The results show that the radiation damping of infinite foundation has a great influence on the linear and nonlinear seismic responses of the high gravity dam and the maximum dynamic responses are decreased by 10%~40% when compared to the results using the massless foundation model.

Keywords: APCOM2013, Abstract, High Gravity Dam; Earthquake Response Analysis; Viscous-spring Boundary Condition; 3D Full Dam Model