

## Seismic Safety Evaluation of Weir Structures Using the Finite and Infinite Element Method

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**Abstract :** This study presents the seismic safety evaluation of weir structure subjected to strong earthquake ground motions, as a flood defense structure in civil engineering structures. The seismic safety analysis procedure was illustrated through development of Finite Element (FE) and InFinite Element (IFE) method in ABAQUS platform. The IFE model was generated by CINPS4, 4-node linear one-way infinite model as a solid continuum infinite element in foundation areas of the weir structure and then nonlinear FE model using friction model for soil-structure interactions was applied in this study. In order to understand the complex behavior of weir structures, nonlinear time history analysis was carried out. Consequently, it was interesting to note that the compressive stress gave more vulnerability to the weir structure, in comparison to the tensile stress, during an earthquake. The stress concentration of the weir structure was shown at the connection area between the weir body and stilling basin area. The stress both tension and compression was reduced in IFE model rather than FE model of weir structures.

**Keywords :** seismic, numerical analysis, FEM, weir, boundary condition

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