

Fragility Analysis of Weir Structure Subjected to Flooding Water Damage

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Abstract : In this study, seepage analysis was performed by the level difference between upstream and downstream of weir structure for safety evaluation of weir structure against flooding. Monte Carlo Simulation method was employed by considering the probability distribution of the adjacent ground parameter, i.e., permeability coefficient of weir structure. Moreover, by using a commercially available finite element program (ABAQUS), modeling of the weir structure is carried out. Based on this model, the characteristic of water seepage during flooding was determined at each water level with consideration of the uncertainty of their corresponding permeability coefficient. Subsequently, fragility function could be constructed based on this response from numerical analysis; this fragility function results could be used to determine the weakness of weir structure subjected to flooding disaster. They can also be used as a reference data that can comprehensively predict the probability of failure and the degree of damage of a weir structure.

Keywords : weir structure, seepage, flood disaster fragility, probabilistic risk assessment, Monte-Carlo simulation, permeability coefficient

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