

Seismic Risk Assessment for Earth Slopes and Dams

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Seismic risk assessments for earth slopes and dams are based on evaluating the permanent displacements induced by earthquake shaking and more recently probabilistic approaches have been proposed to incorporate uncertainties into the analysis. This presentation will describe newly developed predictive models for earthquake-induced slope displacements based on finite element simulations. The models are developed using both classical regression techniques and artificial neural networks (ANN), and models for both the median displacement and its variability are provided. A missing part of most seismic risk assessments for slopes and dams is the translation of a displacement level into a damage state. This presentation will also outline a seismic fragility framework for earth dams and slopes that is modeled after the approaches used for other types of infrastructure, such as bridges. The framework uses an engineering demand model to predict the permanent displacement as a function of ground motion intensity, and a seismic capacity model to predict the probability of a damage state given the permanent settlement.