

The seismic resistance simulation for cracked clayey backfill

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ABSTRACT

Applying nonlinear multidirectional forces to the earth retaining structure causes expansion and compression of existing soil crack and this phenomenon occurs in complicated form for clay. The cracked clayey backfill subjected to multi-directional seismic loads has not been reported in the literature. An analytical method was used for identifying the length of the crack. Two types of models with 7 and 15 cracks were assumed and simulated. By introducing the nonlinear extended finite element method (NXFEM), the nonlinear displacement, strain, and stress of the models were simulated. The results revealed that the number of the soil cracks modifies the vibration mechanism, nonlinear displacement, stress, and strain behavior of the model. The research methodology was validated by comparing the results of the numerical simulation with those available in the literature. The novelty of the present study is related to introducing NXFEM.

KEYWORDS: Rack, NXFEM, Seismic load, Clayey backfill, Nonlinear numerical analysis

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DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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