



Effect of Reinforced Soil Interaction with Other Components on Static and Dynamic Performance of MSE Wall

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Abstract

Mechanically stabilized earth (MSE) walls are reputed for demonstrating improved static and seismic performance over conventional retaining walls. The stabilization of the earth is generally done by placing reinforcing elements such as metal strips, geosynthetic layers or micro-piles in different layers of the backfill soil. There is no scarcity of literature on numerical analysis of MSE walls for both static and dynamic loading. However, the present state of the research lacks a comprehensive analysis of the combined effect of the various contributing factors on the performance of the wall. The reinforced fill interacts with other components, namely the wall, retained fill, reinforcement and foundation. Under operational conditions all these interactions occur simultaneously and therefore also have a combined effect. For dynamic analysis additional factors have to be accounted for such as seismic wave passage effect on the wall and backfill, acceleration and displacement amplification through the backfill. The present study aims to develop a finite element model that can effectively analyze the effect of these factors on the wall performance under static and dynamic loading. The performance of the wall is assessed by the lateral displacement and strain levels in the reinforcement layers at the end of construction and during a seismic event.

Keywords: Finite-element analysis, Mechanically stabilized earth (MSE) walls, Seismic motions, Geogrid reinforcement, Soil-geogrid interface