

Numerical Investigation on Performance of Expanded Polystyrene Geofom Block in Protecting Buried Lifeline Structures

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Abstract : Expanded polystyrene (EPS) geofom is often used in below ground applications in geotechnical engineering. A most recent configuration system implemented in roadways to protect lifelines such as buried pipes, electrical cables and culvert systems could be consisted of two EPS geofom blocks, "posts" placed on each side of the structure, an EPS block capping, "beam" put atop two posts, and soil cover on the beam. In this configuration, a rectangular void space will be built atop the lifeline. EPS blocks will stand all the imposed vertical forces due to their strength and deformability, thus the lifeline will experience no vertical stress. The present paper describes the results of a numerical study on the post and beam configuration subjected to the static loading. Three-dimensional finite element analysis using ABAQUS software is carried out to investigate the effect of different parameters such as beam thickness, soil thickness over the beam, post height to width ratio, EPS density, and free span between two posts, on the stress distribution and the deflection of the beam. The results show favorable performance of EPS geofom for protecting sensitive infrastructures.

Keywords : beam, EPS block, numerical analysis, post, stress distribution

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