

## Soil Arching Effect in Columnar Embankments: A Numerical Study

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**Abstract :** Column-supported embankments provide a practical and efficient solution for construction on soft soil due to the low cost and short construction times. In the recent years, geosynthetic have been used in combination with column systems to support embankments. The load transfer mechanism in these systems is a combination of soil arching effect, which occurs between columns and membrane effect of the geosynthetic. This paper aims at the study of soil arching effect on columnar embankments using finite element software, ABAQUS. An axisymmetric finite element model is generated and using this model, parametric studies are carried out. Thus the effects of various factors such as height of embankment fill, elastic modulus of pile and tensile stiffness of geosynthetic, on soil arching have been studied. The development of negative skin friction along the pile-soil interface have also been studied and the results obtained from this study are compared with the current design methods.

**Keywords :** ABAQUS, geosynthetic, negative skin friction, soil arching

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