Slope stability analysis of embankments over stone column with FDM, LEM and FEM methods

In this study a two-dimensional (2D) with various methods including finite difference method (FDM), limit equilibrium methods (LEM) and finite element method (FEM) was adopted to evaluate the factor of safety (FS) against deep-seated failure of embankments over stone column-improved soft clay based on individual column.

The factors influencing the FS against deep-seated failure of embankments over stone column-improved soft clay were investigated including the spacing, thickness, height and friction angle of stone columns, cohesion of soft clay, friction angle, and height of embankment fill and existence of ground water. Overall, the results show that the factor of safety in the FDM method is higher than the LEM and FEM, respectively. The results show that the safety factor calculated in the limit equilibrium method is not reliable in the presence of water. Finally the results of these analyses are summarized into a series of design charts, which can be used in engineering practice.

Keywords: safety factor, deep-seated, finite difference method, limit equilibrium methods, finite element.

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