

عنوان مقاله:

SEISMIC ANALYSIS OF SLOPES STABILIZED BY STONE COLUMNS

محل انتشار:

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خلاصه مقاله:

Slope instability is a great problem and of significance to geotechnical engineers. To increase the stability of slopes especially in earthquake-prone areas, various methods including retaining walls, piles, and geosynthetics may be used. An alternative solution is the use of stone columns. The utilization of stone columns dates back to 1950 for cohesive soil improvement. Potential applications of them include stabilizing the foundation soils to support embankments, supporting retaining structures on slightly marginal soft to stiff clays, improving loose silty sand against liquefaction, and slope stabilization. In this paper, an analytical approach is used to assess the stability of slopes reinforced with stone columns subjected to earthquake loading. The approach which is based on the so called pseudo-static method enables the user to compute the seismic safety factor of slopes. The present solution has been verified using the finite element method (FEM) as coded into GEO-OFFICE software. A simple equation has been derived enabling the user to calculate the seismic factor of safety of slopes reinforced with stone columns. The results have shown that the seismic factor of safety of slope-reinforced with stone columns increases. Parametric studies have been performed to determine the best location of stone columns in the slope to achieve the maximum dynamic factor of safety. It has been found that this location is at the top or slightly down the top of the slope. Further studies have carried out to determine the influence of stone column diameter, friction angle of stone column material, distance between stone columns.

کلمات کلیدی:

Slope stability, factor of safety, stone column, friction angle, analytical solution

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