

عنوان مقاله:

Bearing Capacity of Tapered and Step-tapered Piles Subjected to Axial Compressive Loading

محل انتشار:

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خلاصه مقاله:

In this paper the bearing capacity of cylindrical, tapered and stepped piles under vertical static loads has been investigated using finite difference method based on the commercially available code, FLAC 3D (Fast Lagrangian Analysis of Continua). The pile is assumed to have linearly elastic. The main objective of the paper is to investigate whether a tapered pile can be idealized as some prismatic segments connected rigidly at nodes. The soil failure is assumed to obey Mohr-Coulomb criterion. The soil-pile interaction has been modeled using interface elements. Such elements allow the pile to slip from the soil when necessary. A cylindrical pile of the same volume and length has also been analyzed. This facilitates to compare load-carrying capacity of prismatic, uniformly tapered, and step-tapered piles of the same volume and length. To ensure the accuracy of the constructed numerical model of piles, the results obtained from numerical analysis have been compared with those obtained from experimental and theoretical approaches. This comparison indicates a very good agreement. It will be shown that a uniformly tapered pile can be confidently idealized as a number of prismatic segments which are connected to each other. This is an interesting finding and enables users to apply simple one dimensional numerical analysis for determination of pile capacity.

کلمات کلیدی:

Finite difference method, pile foundations, tapered pile, bearing capacity, Mohr-coulomb criterion

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