

PROCEEDINGS

Influence of Inhomogeneous Geotechnical Media on the Working Mechanical Properties of Anchors

Huan Zhu¹, Gang Bi², Yue Hu¹, Xin Jiang¹ and Long Yang^{2,*}

¹Geo-engineering Investigation Institute of Jiangsu Pr, Nanjing, 210018, China

²Nanjing Tech University, Nanjing, 211816, China

*Corresponding Author: Long Yang. Email: 1581432574@qq.com

ABSTRACT

Anchoring of geotechnical soil is an important means of stability control for major geotechnical and underground projects. Scientific research on the specific mechanical behavior of the anchor during the work is essential to ensure the quality of the project and construction safety, most of the existing theoretical studies are based on the assumption that the anchor anchoring object is a homogeneous material, while in most cases the medium composition of the rock and soil in the anchoring area is complex and variable, and there are great differences in the physical and mechanical properties, which will likely cause the theoretical results of the study and the engineering reality is inconsistent with the actual engineering application of the actual engineering exposed to large errors. This is likely to cause the theoretical results do not match with the actual engineering, and then exposed a large error in the actual engineering application. To address this problem, this paper uses a software (FLAC3d) for geotechnical analysis to investigate the factors affecting the performance of anchors in non-homogeneous geotechnical soils, and simulates and controls the non-homogeneous geotechnical working environment faced by anchors in actual projects by calling and customizing different types of intrinsic models in the process of the research, and applies axial pullout force to the anchors in a step-by-step manner, and monitors the locations of key nodes in real time. The axial pullout force is applied to the anchor rods in a stepwise incremental manner, and the strain and strain conditions at the key node locations are monitored in real time. Simulation results show that: different from the theoretical formulas derived from the basic existence of the uncertainty of the assumptions, through the numerical simulation of the soil layer mechanical parameter changes on the mechanical behavior of the anchor pulling under the action of the pulling load, FLAC3d can even meet the later in the application of larger pulling force after the anchor and the geotechnical body of the deformation of the numerical simulation of the analysis, which is analytical calculations. It is difficult to realize, the calculation study shows that the non-homogeneity and anisotropy of the soil body have a significant effect on the pullout force of the anchor cable, with the increase of the non-homogeneity constant of the soil body, the ultimate pullout force of the anchor cable is increasing, and with the increase of the anisotropy coefficient and the nonlinear strength coefficient, the pullout force is decreasing.

KEYWORDS

Inhomogeneous geotechnical; anchor pull-out test; numerical simulation; anchor working performance

Funding Statement: The authors received no specific funding for this study.

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study.



This work is licensed under a Creative Commons Attribution 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.