

ANALYSIS OF BUCKLING LOAD FOR MICROPILES EMBEDDED IN A WEAK SOIL UNDER VERTICAL AXIAL LOADS

ALNOS ALY E. HEGAZY

Associate Professor, Department of Civil Engineering, Benha Faculty of Engineering, Benha University, Qalyubia, Egypt

ABSTRACT

A theoretical approach for buckling of micropiles fully embedded in a weak soil is presented in this study using nonlinear equations. A method has been developed to predict relationships between the critical buckling load and the lateral deflection for a single micropile subjected to vertical axial load. Nonlinearity of soil was considered using subgrade reaction. Therefore, the buckling of the micropile was formulated by using the small-angle bending theory. The governing nonlinear equations for the buckling of micropiles depend on the exact expressions of the curvatures and the finite-difference method which were used to formulate the mathematical model. The controlling factors such as subgrade reaction coefficients, boundary conditions and pile dimensions were considered in the analysis, applications and calculations. Comparisons between the results of the present analysis and those obtained from the p-y analysis show a good agreement. Also, comparisons show the accuracy of the present analysis. Additionally, the results indicated that the present analysis is rational and easy for application and using.

KEYWORDS: Buckling, Finite-Differences, Lateral Deflection, Micropiles, Numerical Analysis, Numerical Application, Weak Soil