Stress Analysis through the Construction of Tunnel and Comparative Study of the Tunnel Parameters by Finite Element Method

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ABSTRACT

The present research aims to study the stresses analysis during the construction stages of the tunnel. For this purpose, the finite element method (FEM) was adopted as an effective approach to analyze the test results using (SIGMA/W) program. The research includes the study of the behavior of soil due to excavation of tunnel by calculating the displacements and stresses in the three positions of tunnel (crown, wall, and invert) during the various stages of construction. The finite element analyses were carried out using (Elastic- plastic) and (linear elastic) models for the soil and the concrete liner respectively. Finally, the excavation process was done by excavating the tunnel in stages. In this study, different parameters are considered such as the effect of tunnel's depth and tunnel's diameter, soil properties, lining stiffness, surcharge value and surcharge position. The effect of these parameters on the stresses and displacements is considered.

Keywords: *Finite element method, stresses, displacements, surcharge.*