

Abstract

Analysis of Rock – Lining Interaction for Circular Tunnels Using The Finite Element Simulation

The finite element technique is used to model the two phases of tunneling process namely excavation and rock-lining interaction. The excavation phase is responsible for determining the pre-lining rock mass deformations and the reduced in-situ stresses. The interaction phase models the compatibility of the rock-lining system. The deformations and stresses of the rock-lining system and the final rock mass pressure acting on the lining are determined. The finite element results are compared with the result of the Convergence-Confinement method for the case study (Whitemud-Creek Tunnel) that was guided by field measurements. A parametric study proved that for circular tunnels with diameter up to 12m excavated through very poor rock full lining with shotcrete and steel ribs is needed.