Performance of New Austrian Tunneling Method (NATM) in Weak Rock Case Study

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Abstract

The decline in the over ground utilizable space and increment in development of metro structures, cut and cover structures are winding up fairly difficult to conceptualize and build. In this examination, a nonlinear two dimensional limited component investigation was completed to show the New Austrian Tunneling Method (NATM) burrow developed in frail shake utilizing the business limited component with joint programming PHASE 2. The validity of the numerical modeling procedure performed by the author was checked by making back-analysis for an actual case study of Strengen Tunnel which is one of the biggest expressways in western Austria. A comprehensive parametric study was performed on a hypothetical circle tunnel. Two dimensional numerical simulations with the finite element with joint software PHASE 2 have been performed to ground behaviour with the results of the numerical analysis are presented and discussed for recommendations for future work. In general the tangential stress at side wall and crown obtained from finite element with joints are nearly equal or higher than the closed form solution and equivalent continuum. Also, the system behavior in jointed rock mass conditions has been investigated with numerical simulations for two parametric cases studies using finite element with joint software PHASE2 and this numerical approach in case of using primary support. The support elements simulated in this numerical analysis are shotcrete and rock bolts. Based on the results, design considerations have been provided.

Keywords: NATM tunnels, system behavior, Strengen Tunnel, Weak Rock, shotcrete, rock bolts, finite element with joint, PHASE 2.