Abstract

Adel M Belal

Numerical Analysis Of Vertical Side Wall Rock Tunnels Without Lining Subjected To Internal Blasting Loading Using Autodyn

The paper presents a comprehensive approach to simulate an explosion occurring inside tunnels buried in rock media. A preliminary study was performed for a field test problem with available field measurements to examine the performance of material models that used to characterize the non-linear behavior of the rock under failure conditions during explosion loads. Then, based on the preliminary study, complete analysis by using the commercial software AUTODYN has been accomplished to investigate the effect of internal blasting on the behavior of these tunnels in rock media. The approach considers all the stages of the process: detonation of the internal charge the shock wave propagation in the internal gas and its following interaction with rock dynamic interaction, including wave propagation in the surrounding medium. The soil is modeled by RHT model that takes into account both bulk and shear elastic plastic behavior, including the effect of rock pressure on the yield strength for the stress tensor deviator. The gas-dynamics problem is solved based on a fixed Eulerian mesh.