EFFECT OF ISOTROPIC AND NON-ISOTROPIC STRESSES ON STRUCTURAL STABILITY OF TUNNEL

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by

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ABSTRACT

Tunnels are underground passages used for different purposes like to carry traffic, water, power cables, sewage, gas etc. During the excavation of tunnel, it passes through various types of rocks and soils. It is important to identify the stability of the tunnel of a given size. There are many factors affected on stability of tunnel, in which the existence of groundwater is the most important factor. The stress distribution around the tunnel will be changed greatly when tunnelling under high groundwater table. The pore pressure will be redistributed and groundwater will inflow into tunnels through some fractures and faults in soil or rock respectively. Groundwater inflow inevitably induces additional stress on the tunnel surface, tunnel face, and support structure. In this study, the pore water pressure exerted at the boundary surface which generated hydrostatic stress consider in a confining state. The ground surface assumed as a non-homogeneous and non-isotropic. The basic requirement for the design of stable tunnel is calculated the deformation and distribution of stresses around tunnel. The aim of this study is to analyse the structural stability of tunnel and deformation, boundary stress condition surrounding the tunnel. The results of analytical model using analytical method Modified Hoek-Brown failure criterion for anisotropic rock and numerical model simulated in Solidworks 19 software. Stresses and displacements distributions using the proposed analytical solutions are compared to the numerical solution of Solidworks 19 for anisotropic rock tunnel.