

Present activity of Shenzhen Fault Zone and Its Bearing on the Safety of Planned Diversion Tunnel in Shenzhen, China

Tan Chengxuan Sun Ye Wang Ruijiang

Institute of Geomechanics, Chinese Academy of Geological Sciences (CAGS), No.11 Minzu Xueyuan Nanlu, Haidian District, Beijing 100081, P.R..China

In this paper, after a study of present activity of Shenzhen fault zone, a numerical simulation of present three-dimensional tectonic stress field is made to calculate the angle enclosed between the maximum horizontal principal compressive stress and the tunnel axis. The tectonic stress states of four sectors at a depth of 200~250m of the tunnel path and the present displacement rate of the Shenzhen fault zone where the tunnel is planned to pass are also estimated by the modeling. The results are as following:

1. Among the angles enclosed between the maximum horizontal principal compressive stress directions with the axes of different sectors of the tunnel, a half of them are less than 30° , and a quarter greater than 60° .
2. The maximum horizontal shear stress is less than 1MPa and the 3-D maximum shear stress less than 2.5Mpa at the four deep buried sectors of the tunnel. The angles enclosed between the S_{Hmax} and the axes of the 4 sectors are 87° , 40° , 22° and 11° respectively.
3. The displacement rate of the Shenzhen fault zone is less than 1mm/a with a total displacement of no more than 40mm in 50 years.

Such data are considered necessary for the safety of the diversion tunnel construction and were accepted by user for the tunnel line siting and operating.