

Geological Characteristics Investigation of F9 and Stability Prediction of Surrounding Rockmass in D Yao Shan Tunnel

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Abstract

The geological characteristics of F9 — Fault 9 — in Da Yao Shan Tunnel region are studied systematically. The effect of F9 on the excavation of the tunnel also researched. Based on the analyses, the author foretells some conditions which appear in different parts of the fault zone.

After geological investigation, researching of information of remote sensing and drilling as well as regional geology, and analyses of microscopic feature of rock samples from F9 zone, F9 is considered of one part of a regional fault — Jiu Feng Fault. Jiu Feng Fault curves in the portion of F9. On the ground, F9 shows shuttle-like shape. In cross section, F9 is found to be consisted of 7 small reverse faults which are almost parallel to each other with large dip angle.

Based on the geological analyses, the zone of F9 is divided into 7 different smaller zones with different mechanical properties. According to the different mechanical properties, Basement Friction Simulating Test, Finite Element Method Calculation, Elastic-plastic analyses and block balance analyses are carried out. On the basement of testing, calculation and analyses, the author suggests qualitative and quantitative predictions of surrounding rockmass stability of different parts in F9 zone when excavated. Part of the predictions has been proved correct by the initial excavation. Other predictions are to be checked by further excavation.

The methods used are considered useful and practicable.