Keynote speaker Topic 3

Professor Faquan Wu

Profile

    Institute of Geology and Geophysics,   Chinese Academy of Sciences, Beijing 100029
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    Date of Birth: 30 September, 1955
    Nationality: Chinese

Titles

    2011-present: Secretary General of IAEG
    2007-2010: Vice-president of IAEG in Asia
    Director of IAEG China National Group.
    Vice president and Secretary General of Engineering Geology Commission, China Geology Society.
    Vice president and secretary-general for Chinese Society of Rock Mechanics and Engineering, 2008-2012

Position Held

    1995-present: Research professor, 1995-2011: deputy director and director of Key Laboratory of Engineering Geomechanics, Institute of Geology and Geophysics, Chinese Academy of Sciences

Research Interests

    Rock engineering geology.
    Engineering geomechanics and statistical mechanics of rock mass.
    Stochastic structure model of rock mass.
    Failure probability and strength theory of rock mass.
    Stability analysis and dynamic theory of high rock slopes.
    Deformation control of tunnels.

Education

    Ph.D., Engineering Geology, Institute of Geology and Geophysics, Chinese Academy of Sciences, 1992
    M.S., Hydrogeology and Engineering Geology, China University of Geosciences, Wuhan, 1985
    B.S., Hydrogeology and Engineering Geology, China University of Geosciences, Wuhan, 1982

Abstract

A positive reinforcement method for rock slope

    From the viewpoint of mechanism, the approaches of slope reinforcement can be classified into two categories, the passive and the positive reinforcement. Essentially, the positive reinforcement is a protection system which relies on the synergistic action of rock mass and engineering structures to fully develop the self-bearing capacity.

    Take the slope reinforcement as example, the current concept is to control the behavior of disaster using artificial structure, which can be called passive reinforcement theory. It concentrates more on the negative effect of geological disasters caused by deformation and destruction of slope, but ignored the positive function of the self-bearing capacity of slope rock. Therefore, the passive reinforcement is usually relatively conservative, and thus the cost is larger.

    The current procedure of slope reinforcement design is: predict the shape and position of the potential sliding surface through field investigation, and then calculate the sliding force along the assumed surface; decide the controlling points according to the distribution of sliding force along the surface, and then, the support or anchoring system can be designed. Obviously, such design doesn't fully consider and make use of the self-bearing capacity of slope rock. In order to minimize the risk, as many anchor bolts or piles as possible will be set to control the break of slope.

    Generally speaking, positive reinforcement of rock engineering is a subject in exploration. The paper is to initiate the terms of potentiality of slope self-stability and positive reinforcement, propose the method for locating of anchor bolts/cables and determination of force and depth of anchorage. The calculation in the method is done with the software Flac3D by Itasca Co. Ltd and developed modules.