Geophysical Research Abstracts Vol. 17, EGU2015-1128-2, 2015 EGU General Assembly 2015 © Author(s) 2015. CC Attribution 3.0 License.



An investigation of planar failure mechanisms of rock slope using distinct element method

Şaziye Özge Dinç (1), Nihat Sinan Işık (2), and Zeki Karaca (3)

(1) Çanakkale Onsekiz Mart University, Engineering Faculty, Geological Engineering Department, Çanakkale, Turkey (osgedc@gmail.com), (2) Gazi University, Technology Faculty, Civil Engineering Department, Ankara, Turkey (nihatisik@yahoo.com), (3) Çanakkale Onsekiz Mart University, Engineering Faculty, Mining Engineering Department, Çanakkale, Turkey (zeki@comu.edu.tr)

Our research project presents planar failure mechanisms of rock masses having different rock materials and discontinuity properties in slopes that are designed in different dip angles and heights. For this purpose, the distinct element methods are used for rock masses deformed under the static and dynamic loads based on their structural components such as joint, crack, bedding and foliation planes. In this work, the numerical modeling technique on PFC2D (particle flow code produced by Itasca) has been used that has advantages over other modeling methods since it effectively creates synthetic rock masses with the smooth-joint model approach. From the methodological perspective, the intact rock samples are initially created by particles with confined micro-parameters, afterwards they are subjected to uniaxial compressive and Brazilian tests. Following to this, joint properties of rock masses are determined by smooth-joint modeling. These rock masses are assigned to the slopes with different dip angles and heights and then slope stability analysis are performed. The controlling role of each property of a discontinuity (e.g. roughness, spacing etc.) and the intact properties (σc , σt etc.) on the movements and failure mechanisms are investigated correspondingly. Our preliminary results suggest how persistence of a discontinuity plays a primary role in the occurence of the planar failure mechanisms and the stability process.