Geophysical Research Abstracts
Vol. 17, EGU2015-3140, 2015
EGU General Assembly 2015

Ring shear characteristics of waste rock materials in response to drainage and shear velocity

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The ring shear characteristics of Imgi waste materials collected from an abandoned mine deposit, Busan Metropolitan city, were investigated to examine the slope stability and mobility of failed masses. A series of ring shear tests were carried out to investigate the shear stress characteristics of waste materials under different drainage, consolidation and shearing speed conditions. The tests are performed at the same normal stress (16 kPa), but different drainage (drained and undrained conditions) and shearing speed (0.01, 0.1, 1, 10, 100 mm/sec) conditions. From the test results, we found that a ring shear stress is dependent on the drainage and the shearing speed conditions at the same normal stress. The materials tested typically exhibited a strain softening behavior. However, at the same shearing speed (especially for V < 10 mm/sec), the shear stress under drained condition is slightly smaller than the shear stress under undrained condition. In particular, it increases with increasing shearing speed. Grain crushing is also dependent on the drainage condition. Under drained conditions, the grain crushing has been observed in the shearing zone from the shearing surface to the bottom (i.e. $\leq$ 3.5 cm), but under undrained condition it has been observed only at the shearing surface (i.e. $\leq$ 1 cm).