

The influence of the orientation of weak planes on slope deformation

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With different orientations of weak planes, the accumulated displacement or deformation of slopes at failure are different. This study aims to examine how the orientation of weak planes influences the slope deformation behavior. A small-scale physical model is used for laboratory experiments. By using the PIV program, we analyze the deformation behavior of slopes with different orientations of weak planes under loading and rainfall conditions. The materials used in the slope model are small blocks made of quartz sand, clay, gypsum, cement, and water according to the mixing ratio. The 30 °slope models are composed of stacked blocks, and the dip angles of weak planes are 30 °or 60 °. The thicknesses of the blocks are 1 cm and 2 cm to simulate different spacings of weak planes. Two methods are used to make the slope models failure. One is a loading force on to the top of the slope models, and the other is rainfall to weaken the slope materials. We take pictures per minute in the experiments for the PIV program to analyze the displacement vectors of the sliding area. The relationships between the accumulated displacement of slopes at failure and the orientations of weak planes will be examined.

Keywords: weak planes, physical model, slope deformation