



Characterizing Rock Joint Geometrical Properties for Slope Stability through UAV Photogrammetry and 3D Point Cloud Analysis

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The characterization of rock joint plays an important role in estimating the rock slope stability. The discontinuities often dominate the geomechanical and hydrological behavior on a rock slope. It's the basis for dealing with the rock mass. Building a 3D slope model with the fracture network is needed.

In 1989, there was a significant wedge failure occurs on the cliff at Nanya village in the northern coast of Taiwan. It was difficult work to get enough information to capture the failure mechanism of the rock mass, especially on a steep cliff. The photogrammetric techniques are carried out in this study to build a 3D point cloud model and identify the dominant joints sets on a rock slope. Basing on the scanline survey method, the spacing and the persistence of the joints can be acquired on a 3D point cloud model. A 3D slope model with fracture network can be constructed.

The pre-fractured slope model provides engineering-geological data like orientation, spacing, and persistence for estimating the volume of the wedge and potential of wedge failure. The kinematic and mechanical behavior on the rock slope can then be evaluated. It is believed that the study can enhance the way for stability analysis of complex fractured rock slopes.