

# **Failure zone development in high-cut slopes under strong ground motion dynamic load in different beddings: Numerical Simulation with Discontinuous Deformation Analysis (DDA)**

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## **ABSTRACT**

High-cut slopes are a common engineering feature for protecting roads, river banks, and other important civil engineering infrastructure. The stability of these slopes is controlled by geological bedding structure, but is also severely affected by ambient conditions such as earthquake strong ground motion and rainfall precipitation by reducing the formations cohesion. In this paper we examine the failure zone development inside the slope for a number of formation bedding situations for high-cut slopes under earthquake strong ground motion dynamic loading. The geomechanical simulation engine is the Discontinuous Deformation Analysis (DDA). With all possible varieties and combinations of slope conditions such as the formation bedding orientation and heterogeneities in soil cohesion, the mechanism of the on-set of high-cut slope landslides can be very complicated. Based on given post-earthquake conditions, the mechanisms of the development of shear zones and sliding surface are investigated. Engineering counter-measures, such as the design of retaining structures will be suggested and simulated for testing its efficiency. Finally, an example by using a real high-cut slope case from the Three-Gorges Reservoir area in China is simulated and verified by the proposed approach.