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Mass movements prototypes generating by slope stability simulator in synthetic slope systems

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The slope stability simulator (SSS) allows make stability experiments in synthetic slope systems generated by slope unity emulator (SUE), by means of projection of “potential rupture surfaces”, geotechnical and physical parameters.
The SUE-SSS device (Colangelo,2007) operates with a core of 10 models and 16 input variables. It allows introduce anisotropy in materials, by modeling the behavior of its variables, and also design their evolution in space and time.
As much as the degree of device complexity is high, considering the number of algorithms and variables involved, the results of experiments should be taken with caution, because the models always correspond to simplifications in relation to the “real events”. Likewise, the results obtained from them are always approaches in relation to the “real world.”
It is very difficult to predict the behavior, in space and time, of surface formations variables related to actual slopes in your geological evolution, so that the prognosis attempts are associated with high error rates. This occurs even when many of the morphological, hydrological and geotechnical parameters used in the models was obtained from field measurements and experiments.
Since stability experiments with broad control of intervening variables are impractical in real slopes, the use of devices like these presented here allows us to explore a wide range of parametric scenarios for threshold conditions. Therefore, constitute one available alternative for mass movements processes analysis.
The difficulties of variable control in real slope systems are due to three categories of problems: The relative inaccessibility of the underground environment, little regular, or nonlinear anisotropic material associated to surface formations and, factors and intervening variables presenting a slow and multi-scale evolution.
For to operate in an integrated manner with the emulator slope units, the stability simulator allows you to analyze the conditions of stability of a synthetic slope unit considering its evolution in the geological time scale. This implies the inclusion of geomorphogenic factors such as: lowering rates-level basis, receding slopes and receding drainage headwaters in the catchment basins. Thus it is possible to make a detailed geomorphic embryological analysis of the evolution of a synthetic slope unity and at the same time, assess their stability conditions.
The operating principle of the slope stability simulator is to search for the function’s boundary conditions and define parametric scenarios for mass movements prototypes, generated on synthetic slope systems. When available, results of measurements and field experiments have been faced with the parameters obtained from the digital experiments. However, the interpretations based on that confrontation should always be taken with caution. This is because the occurrence of mass movement event modifies the original physical and geotechnical characteristics of materials.
Impossible is to present closed answers to the problems involved with the prognosis of mass movements events, and to insist about the models validation. In fact, the most important result of the digital experiments practice is just to demonstrate the real complexity of predicting events problem.