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# Geotechnical and numerical studies of slope instability in loess deposits

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The mass movements occurred in loess accumulations often cause catastrophic damages to infrastructure and lose to the human lives. The failure in loess deposits can occur in gently terrains as happened in Tajik Republic in 1989. The earthquake with magnitude 5.5 hit the suburb of town. During this event the liquefaction effects developed consequently to lead to the catastrophic landslides. The loess failure related case is Kainama landslide (Fergana Valley, Kyrgyzstan) that killed 33 people.

Potential relation between site effects and pore pressure build up causing liquefaction is the main thrust of this research. Methodology of the seismic slope stability investigation included determination of the mechanical strength properties and numerical modelling of a slope failure. In order to simulate the slope it is essential to gather the strength parameters of soil that present the conditions of the material in the nature. The main emphasis has been put to the geotechnical studies. To better understand the slope failure in loess body the two landslide sites in Fergana Valley (Kyrgyzstan) were selected to collect the loess specimens.

Mechanism of deformation of loess material determined in terms of standard geotechnical tests. The natural water content in specimens is low, ranging from 12,8 % to 21% . The first investigation site occurred in Tertiary sediments has a low mean of the plasticity index (12% - 16 %). The climate data were analysed in order to correlate with slope failure cases. The development of landslides in investigating areas is truly connected with variation of physical and mechanical properties of loess material that is respectively related to geological and tectonic conditions of an area.

To arrange the connection between site effects and pore pressure build up we used the numerical modelling with a finite difference code (FLAC 2D and 3D). These simulations give an opportunity to better clarify site effect impact to the slope and its role to cause liquefaction effects regarding to the slope failure initiation.