

Stress strain and stability analysis of landslide in north-western littoral of the Black Sea (Odessa, Ukraine)

D.V. Melkonyan

Mechnikov Odessa National University, Odessa, Ukraine (mmd@eurocom.od.ua) / Phone: (048) 784-21-40)

A method of landslides stress strain and stability estimation is presented. This method is based on the theory of elastic potential field. The field is described by a potential, which is harmonic function, satisfies the Laplace equation and presented as sum of effective normal stresses. The potential field deformation is expressed by grid deformation. The grid consists of crossing orthogonal isopotential and force lines. The conditions for refraction of these lines on the interface of two layers with different geomechanical characteristics are considered. These conditions allow to reveal layered heterogeneities in the rock masses.

The theory of the elastic potential field is based on the analogy between the electric and the elastic stationary fields. The landslide under investigation is considered to be the elastic potential field.

The stress field components expressed by potentials of the elastic field for arbitrary region are presented.

The method allows to define a local value of stresses, of safety factor inside researched landslide and predict the slip surface location.

The Dirichlet boundary value problem taking account of hydrostatic weighing and using complex variable boundary element method (CVBEM) for landslide of the north-western littoral of the Black Sea (Odessa) is considered.

The contours of vertical, horizontal, tangential stresses and the contours of stability for researched landslide are presented.