THE ASSESSMENT OF STRESS-STRAIN CONDITIONS OF COASTAL SLOPE BY USE OF SEISMIC RECONNAISSANCE

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Seismic research held within the present project are carried out according to the basic principles of seismic techniques of slope stability analysis. This technique was developed by the participants of the project during the long-term research on various types of slopes, mainly on sliding slopes. The technique is based on the theoretically and experimentally correlation of seismic properties of ground on stress-strain condition of the soil mass. Very important feature of this technique is the opportunity to control preliminary changes in slopes stability some months or even years prior to the beginning of the discontinuity. Thus, the results of seismic research provide an opportunity of spatial-time forecasting of slope destruction.

The tasks and the stages of seismic research in 2002 according to the present project were the following:

- To carry out in the Temperate zone the in-situ modeling of natural conditions of seismic research to chose the technique of similar seismic research for the Arctic coastal zone.
- To execute the in-situ experiment in order to assess the features of stress-strain conditions of the coastal slope at the key site "Bolvanskiy" at the Barents sea coast at the mouth of the river Pechora.

The results of the first stage have shown that reliable information on the stress-strain conditions of slope can be received based on the rate of compressional waves and their anisotropy in the uppermost part of a geological section of 1 m thickness. Particularly, this conclusion is completely coordinated with the laws of the seismic variability characteristics of slopes which were studied in previous years. From the methodical point of view this conclusion is extremely important for conditions of the Arctic coastal slopes in permafrost zone, since it shows, that the stress-strain conditions of the coastal mass can be assessed using the distribution of seismic characteristics in the active layer (seasonally-thawed layer).

The research of the second stage were carried out taking into account this conclusion. It was conducted in September 2002 at Cape Bolvanskiy at the northern slope of about 25 m in height. The seismic operations were executed on four profiles 50-60 m in length located perpendicularly to the coastal line. The technology of operations provided information on rate distribution of compressional and shear waves both in the active layer and in the top part of perennially frozen ground.

The preliminarily processing of these results allows us to trace the weakened zone in the active layer, along which the development of discontinuity and fissures in the frozen soil mass.

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