

## ANALYSIS OF SHEAR MODULUS OF CONCRETE BLOCK SPECIMEN - ROCK MASS INTERFACE\*

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### ABSTRACT

In this paper, the analysis of shear modulus which appears at a concrete specimen block - rock mass interface in the process of shear loading of hydrotechnical construction concrete foundations is shown.

The analysis is based on a new method of presenting the relationship between shear displacement in a elastic area and normal and shearing stress at concrete - rock basement interface. As a result of this analysis, *an analytical form of shear modulus* is obtained as a function of normal and shear stress randomly set values. Also, from the established relationship between shear displacement and normal and shear stress at concrete - rock interface, it is possible to design a proper form of *program of testing* which unites the real properties of shear displacements on the hand, and a wide range of normal stresses under which the shearing is taking place, on the other. Finally, it is shown that the shear modulus depends of two parameters: *the ratio of shear and normal stresses* in the process of shearing ( $\tau / \sigma$ ) and *the value of normal stresses* ( $\sigma$ ), kept constants during the testing.

The results of a shear testing conducted on large concrete blocks, on locations of research profile for the future Bogovina Dam in Serbia in 1997, have been used in the process of making this paper. The testing was carried out on the total number of two blocks, the dimensions of 300/100/100 cm which were in the testing galleries on the left and right bank of the Black Timok river. It was done by applying normal and shear load in five cycles. In each cycle, the values of normal stresses were invariable during the period of application of shear stresses which were applied up to a determined value, with respect to the normal stress. In the process of testing, shear and normal displacements were measured by measuring instruments built in the concrete blocks close to the contact surface. The mean values of these displacements were used for the purpose of analysis and served as basis for obtaining the analytical forms of shear displacement and shear modulus.

The above mentioned testing was conducted by "Jaroslav Cerni" Institute for Development of Water Resources.

*Key words:* shear displacement, shear and normal stresses, field tests, programme of testing.

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\* Full document is presented on the Serbian version of this site