

ENGLISH SUMMARY

Rakenteiden Mekaniikka 2 (1969) pp. 4 to 16

DEFORMATION FUNCTIONS IN GEOTECHNIQUE

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Rakenteiden Mekaniikka 2 (1969) pp. 4 to 16

Above some of the simplest deformation functions adaptable to soil mechanics have been dealt with. The hyperbolic function (1) is often suitable among other things for the handling of the loading test results of the subsoil and piles. The same function can often be used to approximate also the compression test results of cohesive soils. Among the most important advantages of this function, in addition to simplicity must also be counted the fact that the parameters a and b have a rational physical meaning and furthermore the fact that the test results in a suitably selected coordinate system will settle on a straight line, by means of which the parameters can easily be calculated.

The method of estimating consolidation settlement (fig. 11) which is generally used in dealing with the oedometer test results especially of fine-grained soils and which is based on the so called compression index (fig. 6b) is not nearly always adaptable to the Finnish soils. The worst fault in this method must be taken to be the fact that the calculation formula (11) of settlement differs from the calculation formulae of deformations which are generally used in the mechanics of structures and science of the strength of materials. The tangent modulus method developed by Ohde (1939) and Janbu (1963) seems on the other hand to be adaptable to almost all the soils prevalent in Finland. The greatest fault in this method seems to be the fact that the parameters of the deformation function do not have a sensible physical meaning. It is apparent that a deformation function whose parameters have a distinct physical meaning, can be developed for the handling of the oedometer test results. The parameters of formula (17) fulfill the above condition. It seems, however, obvious that formula (17) is not adaptable to all soils.

The deformation functions adaptable to the handling of results from different loading tests and strength tests on soil samples should be developed so that the parameters of these functions can be used as a classifying basis of soils. When applying the civil engineering soil classification system at present in use in Finland the soils cannot be divided into natural and sensible soil groups on the basis of geotechnical properties. A new classification system ought to be developed so that the circumstances of geological origin as well as the physical and chemical properties of soils and in addition the properties determined by simple classification tests (gradation, plasticity, water content etc.) be taken into consideration. The parameters of the deformation factors suitable for the approximation of different loading test results apparently constitute a natural and the most important starting point when developing the above mentioned new soil classification system.

BENDING OF A BEAM ON A TWO-DIMENSIONAL ELASTIC FOUNDATION

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Rakenteiden Mekaniikka 2 (1969) pp. 17 to 27

The article describes a theoretical investigation of bending of a beam on an elastic foundation, when the foundation is a wall like plane plate. The state of stress in the plate is solved by means of the Airy stress function. The stress function and the load are given in the form of Fourier integral. The solution is obtained by making use of common boundary conditions of the beam and the plate. Also the case in the absence of mutual sliding of the beam and the foundation is studied. In the solution the beam has been treated according to the elementary theory of bending.

As a numerical example a beam of infinite length under single load is considered. The distribution of different stress components or resultants is shown in figures 6—10.

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