



Uncertainties in determination of the hydraulic conductivity by physical model test

Eszter Barta (1), Géza Hajnal (2), and Vilmos Vasvári (3)

(1) Budapest University of Technology and Economics, Department of Hydraulic and Water Resources Engineering, Hungary (bartaszter89@gmail.com), (2) Budapest University of Technology and Economics, Hungary (hajnal@vit.bme.hu), (3) Budapest University of Technology and Economics, Hungary (vasvari@sww.tugraz.at)

To determine the Darcy's coefficient of permeability are several methods available. Empirical and deterministic calculation methods were developed of which applicability and accuracy depend on the available data and the type of investigated soil. Both field and laboratory investigations are common. In practice of civil engineering it is most essential task prior excavation to determine this soil physical parameter for planning of dewatering systems. Field investigations play central role also in the determination of recoverable water resources.

In practice it is not common that all data required for the field investigation - usually pumping test - and its evaluation are available, the well design and the conditions of the measurement do not meet those assumed in the theory. Due to information of poor quality and anomalous conditions the calculated coefficient of permeability and the seepage hydraulic parameters can differ from the real values.

The aims of the investigations were to conduct laboratory model tests in different soil types, also in their layered structure and by different design of the pumping well, to evaluate their results supported by numerical modelling and to come to conclusions which can be helpful in the areas mentioned above. In the course of the measurements size fraction and features of the pumping well were varied in order to achieve realistic field conditions.

A laboratory model integrated also the field experiences was created. A cylindrically symmetrical model with a ground plain of a quadrant, a radius of 1.325 m and a height of 1.0 m was used.

Moreover by means of the investigation's results recommendations can be made for the layout of field tests (number of observation wells, distance of wells), for the type of the hydraulic test (conventional pumping test, single well test, slug test) and for the best applicable evaluation method.