Assessing river embankment stability under transient seepage conditions

The evaluation of riverbank stability is a fundamental problem in flood risk management, representing a critical task for engineering practice. Soil heterogeneity together with initial and boundary conditions are among the crucial issues that should be considered to obtain an accurate solution of the problem. Generally, attention and efforts are mostly devoted to the soil characterization, the hydrometric level forecasts and the estimation of the rainfall intensity, while in situ measurements usually receive less attention. Nevertheless, suction and soil water content have a strong influence on the reliability of seepage and stability analyses. A preliminary study aiming at the design of a monitoring system for the measurement of soil moisture and suction in the unsaturated silty soils of a river embankment has been carried out, with the purpose of linking the collected data to the boundary conditions and hence obtaining a more accurate estimate of the riverbank probability of failure. Furthermore, a general outline of the research project, its methodology and application are presented in the paper.