PROF. Caterina Di Maio

SCIENTIFIC CURRICULUM VITAE:

Full Professor in Soil Mechanics. At the beginning of her research activity, she studied the effects of water and drainage on slope stability and retaining systems. Subsequently, she conducted experimental research on the behaviour of clayey soils. Purpose of these studies was the evaluation of the influence of both the mineralogical composition of soils and the composition of the pore fluid on swelling pressure, compressibility and swelling, shear strength and hydraulic conductivity. With reference to the pore fluid, the initial focus of the study was the effect that the ionic force of aqueous solutions has on the geotechnical parameters of clays. The effects were studied for clays exposed to fluids both equal and different from the pore fluid. Recently, in an attempt to unify the interpretation of the interaction between soil and fluid, Caterina Di Maio has been conducting experimentations in which various types of clays are reconstituted with many different fluids: distilled water, aqueous solutions at different concentrations, HCl solutions at various pH and organic solvents with different dielectric properties. The influence of the pore fluid composition on compressibility is determined by oedometer and isotropic consolidation tests on clays reconstituted at their liquid limit. To correctly compare the various results, the same reconstitution procedure is being employed on all soil-pore fluid configurations examined. The influence of the pore fluid composition on shear strength has been determined with reference to the residual strength which is known to be independent from the initial conditions and the stress history of the soil. The experimental results show that the chemical response of clays is strongly dependent on the mechanical conditions of the material. Likewise, the mechanical properties of the clays vary significantly if the chemical properties vary.

The variations in shear strength, compressibility and hydraulic conductivity induced by changes in the pore fluid are significant. The residual friction angle and the intrinsic compressibility index can vary of an order of magnitude, hydraulic conductivity can change up to 4 orders of magnitude. Furthermore, the study shows that results relative to so different fluids (organic solvents, ionic aqueous solutions and acid solutions) can be compared in a unique coherent framework if one relates them to the dielectric constant of the pore fluid.

She is also studying and monitoring some large earthflows close to the city of Potenza, Southern Italy. By means of experimentation, both in laboratory and in situ, and by theoretical 3D models, she is trying to understand the dynamics of the landslide, the influence of rain on pore pressures and on displacements. Furthermore, she is studying the influence of pore solution composition and of its variations on the deformation and sliding of the landslide body.

PROFESSOR'S OFFICE HOUR: on Tuesday: 9-13 a.m.

E-MAIL:caterina.dimaio@unibas.it

WEBSITE:http://www2.unibas.it/dimaio/home.html

TELEPHONE:3204238545