



EXPERIMENTAL STUDY OF THE INFLUENCE OF THE DEGREE OF SATURATION ON PHYSICAL AND MECHANICAL PROPERTIES IN TOURNEMIRE ARGILITE (FRANCE)

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In addition to direct mechanical perturbations, an excavation influences the hydric state of rock with regard to hydration and desiccation. The object of this study is to investigate the influence between the degree of saturation and the physical/mechanical properties for an argilite rock. Anisotropy effects are studied with samples drilled in three different directions. To understand the effects of hydric perturbations on these shales, the Laboratory of Solids Mechanics (LMS) conducted an experimental study program to determine the effect of water saturation on the physical and mechanical properties. The correlation laws between the hydric state of the material and the mechanical properties are indispensable input data to a hydro-mechanical model.

The aim of this work is to provide physical and mechanical data that are dependent on water saturation. To obtain different water saturations (from quasi dry atmosphere to quasi-saturated ones), shale samples are put in equilibrium with controlled relative-humidity atmospheres, or hydric cures. During this hydric cure, the evolution of physical parameters (weight, length, local strains) are recorded. This gives a time evaluation of the equilibrium or transfer kinetic.

Then, for different cures, the mechanical characterisation (a compressive test with and without confinement) is performed. These compressive tests are carried out in order to attempt to establish a relationship between different mechanical parameters (elastic and failure data) and the sample saturation.