

Laboratory testing in engineering geology – stone properties determination and its application

*Maria Heloisa Barros de Oliveira Frascá – Geologist, Dr.
Independent consultant, MHB Geological Services*

All engineering projects require several steps and one main task is to identify the most important characteristics of the rock types that will be excavated, crushed or mined for any different usage purpose, since large infrastructural works to single residential building.

Laboratory investigation in engineering geology is complementary to site investigation – that usually determines the main macroscopic features of the rock (color, grain size, fabric etc.) and the rock mass (structure, discontinuities, alteration, jointing and others) – aiming to detail the most relevant features as well as to determine/quantify rock properties to design of structures (drill hole, a mining shaft, a tunnel, a reservoir dam, a repository, or a building) to be built in or of rock.

So, most of laboratory tests follow the principles of rock mechanics aiming at to know the response of rock and rock masses to the requisitions of their future physical and/or chemical environment.

A great diversity of laboratory tests is available, each one attempting to determine a rocky property that is significant to the planned use.

In order to simplify, they are herein separated in 2 groups: (a) the characterization test group, that intent to determine the fundamental characteristics, used for any rock application, such as density, porosity, compressive strength, tensile strength, dilatation coefficient and others, including petrographic analysis that provide key information as alteration degree, presence of unstable minerals, microcracking etc. besides the petrographic classification and the real origin of the rock; (b) the application test group, which involve tests designed to some specific rock usage, among then the abrasion/abrasivity tests (Cerchar, Los Angeles, Amsler, Taber and others), flexural and shear strength determination, particle size analysis, expansion index, California test etc.

Tests may be carried in a great variety of samples, depending on the main purpose of each determination. It emphasizes the importance of sampling in order to obtain the most reliable results to the project.