

DESCRIPTION OF ROCKS AND ROCK MASSES
WITH A VIEW TOWARD THEIR PHYSICAL AND MECHANICAL BEHAVIOR -
A GENERAL REPORT*

by

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ABSTRACT

A review of the intrinsic characteristics of crystals, rocks, and rock masses and their physical and mechanical effects leads to an awareness of the parameters that should be considered in any given application of rock mechanics. Evidence is presented to illustrate that composition, structure, and orientation prescribe the behavior of the single crystals. For rocks, it is shown that lithology, statistical crystallographic orientation, grain size, mineralogical alteration, porosity, water saturation, microfracture development, and primary and secondary anisotropies are important. Within the rock mass the surfaces of mechanical discontinuity are decisive, provided that their shear and tensile strengths are less than those of the adjacent rock. Accordingly, the orientation, size, and frequency, degree of mineral filling, shear and tensile strength, water saturation, and contribution to rock mass permeability of the discontinuities, particularly the macrofractures (joints, fissures, cracks), need to be recognized and quantified. Illustrative examples for each point are taken largely from the contributions to Theme 2, First International Congress on Rock Mechanics.

The techniques for measurement and description utilized by the contributors to this Theme are reviewed. They include use of X-ray diffraction, petrographic modal analysis and quality indices, acoustic velocity measurements, a variety of experimental deformation tests, field investigations, drilling tests, and laser-optical processing of photographs.

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