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

by

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INTRODUCTION

Our theme is, in fact, the recognition that rocks and rock masses are not continuous homogeneous, isotropic bodies. Their physical and mechanical** behavior is influenced by interactions between (a) the intrinsic characteristics of the material (Table 1) and (b) the physical and chemical environmental conditions of the deformation (Table 2).*** The intrinsic aspects (crystal structure, composition, and fabric) are manifest on all scales from that of the constituent crystals or grains, through that of the intact or coherent rock sample, to that of the rock mass and terrain. A review of these characteristics and their mechanical effects is attempted here in order to delineate the nature and scope of the parameters that need to be described in applied rock mechanics.

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**All mechanical properties are of course physical, but they constitute a special category relating to the motions of material particles. Some mechanical properties important in rock mechanics are Young's modulus, Poisson's ratio, linear and bulk compressibility, viscosity, and ultimate, yield, shear, tensile, and unconfining compressive strength. There are other physical properties of nonmechanical nature that are of sufficient interest to warrant special attention. These include thermal conductivity and expansion, density, porosity, permeability, electrical conductivity, and acoustic velocity and attenuation.

***The chemical environment doubtless affects the mechanical behavior of rocks, but very little is known about this subject, and it will not be discussed further here.