

ANALYZING TENSILE STRENGTH AND DEFORMABILITY AS A FUNCTION OF ANISOTROPY

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Anisotropy is a very common condition in rock mass; it can be due to different factors and directly affects the failure mechanisms affecting the rock mass. For example, metamorphic rocks that are foliated, sedimentary rocks that are stratified or volcanic formations with alternating layers. Despite the existence of several studies related to anisotropy those specifically addressing the tensile strength of anisotropic rocks are quite limited.

The present study is focused on the determination of the deformability, compressive and tensile strength of anisotropic rocks. Being remarkable that the mechanical behavior of the anisotropic rock mass is dependent on the inclination of the foliation planes. Considering a parallel plane of weakness, suppose that the two extremes of tensile strength are 0°(horizontal) and 90° (vertical).

A series of laboratory tests has been done in anisotropic sandstone (lithic arkose), from Burgos, Spain, including uniaxial compressive strength tests, direct tensile strength tests, and diametric compression (Brazilian tests). The tests were carried out with strain gauges that allowed estimating the elastic modulus. To determine the anisotropic direction, ultrasonic pulse wave velocity tests were also performed.

The variation of strength and deformability as a function of anisotropy is analyzed, as well as the variation of elastic behavior in tensile and compressive.