

PHYSICAL PROPERTIES OF THE OPORTO GRANITE: THEIR VARIATION WITH THE WEATHERING DEGREE AND CORRELATIONS BETWEEN THOSE PROPERTIES

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A great number of samples of the Oporto granite, including fresh (W1) and weathered rock (W2, W3, W3-W4), were submitted to different tests with the purpose of choosing one or several fast and non destructive tests in order to estimate other parameters of the Oporto granite, obtained in more complex, time consuming or destructive tests as well as to calculate the correlations between the different properties. The results of porosity, dry bulk density, capillarity by water absorption, ultrasonic velocity, uniaxial compressive strength, modulus of elasticity and strain in rupture tests showed the variation of these properties versus the weathering degree of the granite, allowing the determination of the correlations between these physical properties. The results of capillarity by water absorption tests showed that the weathered granite is characterized by a homogeneous and well interconnected porous network. Free porosity is the parameter that should be used in the evaluation of other parameters, since it is very sensible to the weathering degree of the Oporto granite, increasing 13.6 times between the fresh rock and the most weathered rock. In addition, it can be correlated with a great number of parameters (correlation coefficient higher than 0.900), namely total porosity, bulk density, ultrasonic velocity, capillarity coefficient A, modulus of elasticity and compressive strength. Ultrasonic velocity and bulk density should also be used as parameters to confirm the evaluations obtained through the free porosity results, assuring the reliability of those evaluations.