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Physical and Mechanical Phenomena Associated with Rock Failure in Brazilian Disc Specimens

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Abstract : Failure mechanism of rocks is one of the fundamental aspects to study rock engineering stability. Rock is a material that contains flaws, initial damage, micro-cracks, etc. Failure of rock structure is largely due to tensile stress and was influenced by various parameters. In the present study, the effect of brittleness and loading rate on the physical and mechanical phenomena produced in rock during loading sequences is considered. For this purpose, Acoustic Emission (AE) technique is used to monitor fracturing process of three rock types (onyx marble, sandstone and soft limestone) with different brittleness and sandstone samples under different loading rate. The results of experimental tests revealed that brittleness and loading rate have a significant effect on the mode and number of induced fracture in rocks. An increase in rock brittleness increases the frequency of induced cracks, and the number of tensile fracture decreases when loading rate increases.

Keywords : brittleness, loading rate, acoustic emission, tensile fracture, shear fracture
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