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Geological and Geomechanical Investigations of Cataclastic Rock Samples: Evidences for a Better Rock Mass Characterization and Geotechnical Description.

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Technical difficulties associated with excavation works in tectonized geological settings are frequent. They comprise instantaneous and/or deferential convergence, sudden collapse of the walls and/or roof of the gallery, outpouring of fault-filling materials and water inflows. These phenomena have a negative impact on the construction sites as well as on its safety.

The proper characterization of cataclastic rock cores involves combining the geological information from structure and mineralogy together with the geomechanical information from triaxial tests. Exploring both aspects of the rock characterization procedure, an operational methodology has been developed for its potential in geotechnical studies.

The fact that the manifestations of cataclasis are very widespread and dependent on rock composition is obvious. Cataclastic rocks can build up virtually in any kind of petrological settings. Thus it is envisaged that a catalogue of specific damage microstructures related to a given petrology can be linked to different stage of cataclasis. This provides the opportunity to interpret rock samples from reconnaissance drilling operations in a much powerful way.

Weak cataclastic rocks -for which no precise geotechnical classification exists yet- can be properly characterized by integrating geological evidences into the interpretation of triaxial tests. With this regard, the medical X-ray computed tomography (XRCT) constitutes a bridge technique permitting an improved correlation between specific properties of cataclastic rocks based on indirect evidences. A critical analysis of 3D segmented models corresponding to sample structures before and after mechanical tests is therefore thought capable to improve the resulting test interpretation as well as the prognostic regarding short- and long-term behavior of a tectonized rock unit affecting an engineering structure underground.