Measurement of permeability of Rock by Means of X-Ray CT

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X-ray Computed Tomography (CT) is utilized to measure the permeability of rock and to visualize the migration of fluid fronts. The X-ray CT makes it possible to evaluate the attenuation of X-ray at each point within rock, by digitizing shadow pictures taken from various directions and subsequent image reconstruction, and the subtraction of CT images provides successfully the time-dependent distribution of the water ratio within rock. A percolation experiment using a disc specimen is proposed to measure the coefficient of permeability. Apparatus, operation procedure and necessary data processing are described along with the theory for interpreting the experimental results. Thus, it is stated how the coefficient of permeability is determined by means of the X-ray CT. The proposed measurement is supported by case study.

KEY WORDS: X-ray CT, Rock, Permeability, Image Processing, Visualization