

Feasibility Study of Morphological Characterization to Comminuted Particles by A Particle Characterization Approach (4)

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A faults zone contains fine rock powders called gouge that have been ground up by past fault motions. Particle size distribution and particle shape of gouge particles may affect the frictional properties of the fault and reflect the comminution process by the past fault motions. It is well known that particle size distribution (PSD) of fault gouge show power-law distributions. Exponent of this power law is considered to reflect the style and degree of deformation. In this report, we will discuss about the relationship between the PSD and the degree of comminution of model particles by automated particle image analysis and laser diffraction as a particle characterization method.

We did several shear experiments using a rotary shear apparatus with the shear displacement ranges between 10mm to 1m. As an automated particle image analysis, Morphologi G3-SE (Malvern Instruments) was used for evaluation of particle size and shape. The observation mode was diascope mode (Transmittance mode) and a magnification was choose to sufficient to cover 1 to 10,000um. The sample was dispersed with SDU (Sample Dispersion Unit) which attached Morphologi G3-SE. Number of measured particles was over than ten thousand and a parameter filter function on software was used based on shape and pixel number of particle image.

Keywords: Fault gouge, Particle size, Particles Shape, Commutation, Fractal Distributions