

A Practical Investigation on Particle Number Dependence of Particle Size and Shape Distributions of Sand Particles by Automated Particle Image Analysis.

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[Introduction]

Particle size distribution (PSD) is one of the most important soil parameters often used in soil, mineral, geological, and geomorphological laboratories. To characterize of particles , an Image Analysis (IA) based on manual microscopic techniques is one of the effective ways to determine the morphological characteristics of particles ,such as their size and shape. However, one of the major drawbacks of manual microscopic analysis is the near impossibility of measuring a statistically significant number of particles, such as measuring tens to hundreds of thousands of particles, as recommended in ISO 13322-1,2. Recent advances in computer technology have allowed for the development of a new automated particle image analysis (APIA) approach that uses digital imaging technology to allow for the acquisition of 2D particle projection images of a statistically significant number of particles. This technique has allowed for the calculation of a wide range of morphological parameters, such as the size and shape of particles, as well as allowing for the identification and quantification of the most subtle of differences within tens to hundreds of thousands of particles. This study had suggested a practical investigation of particle number dependence of particle shape distribution of soil particle by APIA.

[Method]

APIA analyses were conducted on a Morphologi G3SE as automated image analysis system (Malvern Instruments, Worcestershire, UK). Sample was subsequently dispersed with an SDU using a short duration pulse of compressed air. Measurements were collected automatically using standard operating procedures (SOPs), which clearly define the software and hardware settings used during the measurement process. The measurement sample was dispersed on a glass plate, which was used as a sample carrier to minimize environmental exposure within the enclosed sample chamber unit.

Keywords: Particle Size and Shape, Image Analysys, Partcile Number