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MONITORING THE HYDRAULIC CONDUCTIVITY OF CRUSHING SANDS

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Abstract

Crushing occurs when particles are subjected to sufficiently high external stresses. The crushing process leads to the production of fragments and to ensuring changes in void ratio, pore sizes, specific surface, and hydraulic conductivity. This paper presents a study of the changes in hydraulic conductivity that take place during particle crushing in sand specimens. A new one-dimensional compression cell modified for double-ring permeametry was used to measure the hydraulic conductivity of various sands during crushing and is described in detail in this paper. The device, procedures, and data analyses incorporate arching and localized crushing effects, and are presented as a development towards a new testing standard for determining hydraulic conductivity degradation curves that result from crushing of sands subjected to large stresses. Results show that the hydraulic conductivity degradation curve is dependent on sand type, in particular the particle shapes and mineral composition. The role of arching on the compression behavior and the associated post-crushing grain size distribution curves is also addressed.