Abstract

Cohesionless granular matter subjected to internal flow can incur an internal erosion by suffusion characterized by a migration of its finest constituting particles. A series of suffusion tests is performed on assemblies of gap-graded glass beads using a large oedo-permeameter device. Two successive processes of erosion can be observed during the tests. First, a suffusion process is characterized by a progressive and diffuse migration of fine particles over a long time period. The second process, induced by the first one, is characterized by a strong migration over a short time period (blowout of fine particles) and produces rapidly large settlement of specimen. Time series of hydraulic conductivity, longitudinal profile of specimen density, eroded mass and axial deformation are analyzed. The initial content of fine particles and the history of hydraulic loading appear as key parameters in the suffusion development. To characterize the suffusion development, erosion rate is investigated according to the power expended by the seepage flow, and a new law of erosion by suffusion is proposed.