

Post-doctoral position

Contact:

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Location: LTDS at Ecole Centrale de Lyon

Duration: 12 months from 1st September 2015

Filter criteria for granular soils based on the Constriction Size Distribution

Context:

Recent researches showed that the distribution of throats (Constriction Size Distribution or CSD) between pores play a key role to understand the filtration properties of a granular soil. Some analytical models to reach in quick way the CSD exist in the literature. They take into account the particle size distribution (PSD) and the density of the material but are derived from geometrical analyses considering the grains as spheres. It may hold true for sands but this hypothesis is no longer adapted for fluvial gravels which are flat and elongated. Moreover, these models were only validated for materials having continuous gradings, which is not always the case on site.

The aim of this Postdoc is to built a new analytical model for the CSD considering the grading, the density but also the shape of the particles and to derive a filter criterion adapted for different kinds of granular soil. This work is based on an existing work performed for sands.

Work:

- Numerical modeling: creation of samples made of polyhedral particles for different kinds of gradings and particles shapes (Discrete Element Method, DEM)
- Derivation of the CSD considering the PSD, the density and the shape of particles
- Construction of a new analytical model for the CSD from existing one for sands
- DEM filtration analyses of the numerical samples
- Design of adapted filter criteria

Collaborations: TU Weimar (Germany) and a French company which manages hydraulic and retaining structures

The candidate must have completed a PhD, with a strong background in Solid Mechanics. Good programming skills are expected, particularly in relation with DEM.

Procedure: Applications involving CV, research skills and interests, diploma, can be sent by email to: eric.vincens@ec-lyon.fr.

Salary: standard in a French institution 2000€/month

Supervision: E. Vincens, Associate Professor at Ecole Centrale de Lyon

Applications will close as soon as a suitable candidate is found.

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