Post Doc Proposal

Post Doc Title: Risk-based Selection of Constitutive Models for Geotechnical Analysis

Post Doc description:

Soil, as a typical natural material, has very complex behaviour which is very difficult to be accurately modelled. In geotechnical engineering, about half of the accidents are caused by insufficient designs. The soil's constitutive model is the fundamental issue for modelling and analyzing soil-related engineering systems.

Many constitutive models have been proposed in the literature. Yet, very limited researches have been conducted to examine the applicability of these models. The problem of how to select the appropriate constitutive model for geotechnical analysis and modelling is seldom addressed. As misuse of the constitutive model may mislead engineering decisions, lack of research on constitutive model selection has been one of the sources for introducing risk analysis into geotechnical analysis design.

The objective of the fundamental research program **ANR RISMOGEO** (Risk-based Selection of Constitutive Models for Geotechnical Analysis) is to develop innovative theories, tools, as well as model application examples for the selection of constitutive models. Scientific partners include the Research Institute in Civil and Mechanical Engineering (LUNAM Université, Ecole Centrale de Nantes, GeM, UMR CNRS) (France) and the Department of Geotechnical Engineering at Tongji University (China).

The risk assessment can benefit greatly when the "site-specific data", such as laboratory data and field observed performance data are available. Within the **ANR RISMOGEO** a method will be developed for updating the risk model using the site-specific data. The risk updating method, based on Bayer's theorem, should be able to incorporate information from multiple sources, update both model parameters and model errors. Practical algorithms will be developed to solve the updating problem. To facilitate practical application, software interfaced with existing geotechnical numerical programs will be programmed. Finally, to illustrate the benefits of the proposed research, model application examples will be worked out by applying the theories and the software developed within the **ANR RISMOGEO** research program to ongoing geotechnical projects.

A post-doctoral research associate is needed on this last part, to conduct research about applying the developed theory to real examples. His/Her major responsibility is to work out good illustrative examples for risk control through careful selection of constitutive models. The potential candidate should be excellent at numerical simulation. Ideally, the candidate should also have strong background in inverse analysis of geotechnical systems.

The candidate should have a taste for numerical programming and teamwork. Knowledge of English is essential.

The candidate should provide a detailed CV to Post Doc Supervisors:

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Beginning: February 2014 (negotiable); Duration: 1 year

Bibliography:

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