PhD Studentship: Characterising engineering performance of embankments

Application deadline: 31st July 2017

Start date: 2 October 2017 preferred, alternative dates will be considered for the right candidate.

Duration: 3 years

Applications are invited for a PhD position in geomechanics at the School of Engineering of the University of Warwick. The research focuses on long-term influence of hydraulic hysteresis, and temperature and suction variations on response of soils with high clay content, and characterising stability and performance of slopes and embankments which are predominantly made of these geomaterials.

The Project:

Common practice in geotechnical design mostly assumes soil deposits to be fully saturated or completely dry. However, geo-structures such as transportation embankments and flood defence levees often constitute of soils in an unsaturated state where the overall geo-structure behaviour and stability are highly affected by the hydro-mechanical processes occurring in the soil. For example, with time the additional strength gain due to matric suction, that is a consequence of unsaturated soil condition, can potentially replace the shear strength that has evaded due to loss of initial soil structure (natural or man-made), and as a consequence the stability can be unwittingly reliant on matric suction. In these circumstances embankment/slope failure can occur frequently when there is a complete loss of soil suction due to an ingress of water (e.g. during or after periods of prolonged and heavy rainfalls). In this research a series of micro-level/element-level tests will be carried out on soil samples subjected to thermal and water content variations with the aim to better understand the progressive evolution of their hydro-mechanical properties. Furthermore, the experimental results will be used to analyse the long-term response of embankments under unsaturated conditions in order to investigate the impact of soil properties alteration on the geo-structure performance.

The PhD student will become a member of the Ground Engineering research group which has well-equipped research laboratory and computational facilities and carries out practical research in geotechnical engineering. The project benefits from a considerable head start as it is in continuation of a recently completed research project during which a number of specialised testing devices have been developed in-house that are of direct application for this research. The student is expected to work within a civil/geotechnical engineering laboratory environment and will be required to assist in design, setup, execution and interpretation of the experiments, and further computational implementation of the findings. There will be opportunities to present the research outputs locally and at international conferences.

Eligibility:

Due to funding restrictions this award is available for well-qualified UK or EU students (oversees students can apply, but need to meet the difference in costs). Other motivated students are encouraged to apply but will need to secure their own funding.

- The applicants must have a minimum of 2:1 honours degree level (or equivalent) in civil engineering, or related subjects of mechanical/chemical engineering with relevant experimental experience. An MSc degree with distinction or equivalent, in geotechnics, geoenvironment or hydrogeology is highly desirable.
- The applicants should be able to demonstrate a strong interest in laboratory hydro-mechanical testing of soils; they should have good written and oral presentation skills as well as strong analytical and problem solving skills. Working experience with LabView, sensor electronics and data acquisition systems is desirable.

Funding: The studentship covers tuition fees at the UK/EU rate (£4,191* at the 2017/18 rate) and standard stipend (£14,700* at the 2017/18 rate) per annum for three years.
*Home/EU PGR tuition fees for 2017/18 onwards are subject to RCUK funding rate changes and are therefore not yet confirmed. Fees are expected to increase and the inflation rate applied by RCUK is generally expected to be in line with RPI.

**How to apply:**

For informal enquiries, please send a CV, a covering letter stating how your interests and experience relate to the project, your academic transcripts and the names and email addresses of two academic referees to Dr Mohammad Rezania, email: m.rezania@warwick.ac.uk.

To apply for this post you must complete the online application form and quote scholarship reference MR17.

As soon as you have a University ID number you will be invited to upload your degree certificate, transcripts, CV and a personal statement that explains your specific research interests and why you should be considered for this award.

**Application Form Course Details:**

Department: School of Engineering

Course Type: Research

Course: Engineering (PhD)

**Application form:** [http://www.go.warwick.ac.uk/pgapply](http://www.go.warwick.ac.uk/pgapply).