DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

University of Strathclyde Engineering

Fully-Funded PhD Studentship: Formation of deformation bands at low confining pressures

Supervisors: Dr Andrea Hamilton and Prof. Zoe Shipton

A fully funded PhD scholarship is available in the Department of Civil and Environmental Engineering at the University of Strathclyde, Glasgow. The project focuses on the formation of deformation bands at low confining pressures in sedimentary rocks. In the first few km of Earth's crust, deformation of low porosity rock usually produces fracturing and slip surfaces. However in high porosity rock, stress is not initially accommodated by fracturing, but instead produces zones of crushed grains known as deformation bands. Further stress on the rock results in deformation band failure and localised faults. These bands have significantly lower porosity and permeability than the parent rock and have been shown to effectively trap water and hydrocarbons. Deformation bands are increasingly being reported in locations that have only undergone shallow burial depths, where overburden pressures are unlikely to have been large enough to crack intact quartz grains. Similarly, small bursting pressures generated by salt/ice crystallisation in the pores of sedimentary rocks and concrete, can result in cracking. Project results will be directly relevant to growth faulting in hydrocarbon basins and crack development in building materials. The successful applicant will have the opportunity to carry out fieldwork on fault outcrops in the Jurassic Navajo Sandstone in Utah, USA and use cutting edge high energy X-ray facilities at DIAMOND, UK.

The succussful applicant will join an established research group in environmental geomechanics and structural engineering. This PhD would suit someone comfortable with laboratory work and field work. The Dept. of Civil and Environmental Engineering has recently moved into new state of the art laboratories with facilities for advanced geomechanics, analytical chemistry, structural and microbiology research.

Applicants for this EPSRC position must be UK or EU nationals, applicants should check their eligibility at: http://www.strath.ac.uk/pgrfunding/eligibility/ prior to applying. Applicants must hold an upper second class or first class honours degree (or equivalent) in an engineering or geological discipline. Applicants with experience of laboratory and field work are particularly invited to apply.

The studentship will cover all UK fees plus an annual tax-free stipend of £13726 (paid monthly) for 3.5 years. **Start date: 1st Oct 2014.**

If you are interested in this position, please email a CV and covering letter to andrea.hamilton@strath.ac.uk and lisa.lyons@strath.ac.uk. Please title your email "Deformation band PhD".