

CIVIL ENGINEERING SEMINAR

Wednesday 2nd April 2014 4pm
A401 – School of Engineering



Recent observations on the particle scale mechanics of granular materials

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ABSTRACT

This lecture will give an overview of some recent contributions to better understand the mechanics of granular materials by studying the material at the particle scale. The presentation encompasses both experimental and numerical research. The first half of the lecture will discuss the use of micro-computed tomography to characterize the internal structure of granular materials. A study that considered the relationship between the particle-scale fabric and the overall behaviour of a natural, locked sand will be considered. These results show the power of micro-computed tomography to make non-destructive measurements both of the material fabric and the particle morphologies.

The second half of the lecture will present some recent work in which the discrete element method has been used to look at the critical state framework of soil behaviour as it can be applied to sand. Some perplexing behaviour that is observed at a high coefficient of interparticle friction is discussed. Then, the influence of a fully three-dimensional stress state on soil behaviour is considered. Finally DEM is shown able to replicate the way in which the state parameter influences soil behaviour. This DEM presentation will include some comments on the use of high performance computing (hpc).

ABOUT THE SPEAKER

Dr O'Sullivan has been a reader in the Geotechnics Section of the Department of Civil and Environmental Engineering at Imperial College since September 2012. She joined the Dept. in 2004 as a lecturer, following a two-year period at University College Dublin. Her main research interest is in particulate soil mechanics. Her research uses discrete element modelling (DEM) as well as experimental techniques including micro-computed tomography (μ CT). Catherine has been applying these techniques to look at fundamental sand behaviour, behaviour of reservoir sandstones, internal erosion and interpretation of laboratory tests.

This seminar is open to all and refreshments are provided. For more information, contact Dr Stefano Utili by email at s.utili@warwick.ac.uk

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