

50th Rankine Lecture

Wednesday 17 March 2010

Stiffness at small strain - research and practice

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ABSTRACT

The rapid development of computing power and of numerical modelling software over the past forty years has made sophisticated analysis of geotechnical problems accessible to most practising engineers. Typically computer packages now offer a wide range of constitutive models, which the design engineer needs to choose between, and then obtain parameters for. For those structures designed to be far from failure, for example supporting urban excavations, strains in the ground are small. A sound knowledge of stiffness parameters at small strain is essential if realistic predictions of the ground movements that may affect adjacent buildings or underlying infrastructure are to be made.

This lecture reviews what is now known about the complex stiffness behaviour of soil and weak rocks in the context of elasticity, arguably the simplest of constitutive behaviour. Drawing on experience gained through field observation and numerical modelling, the case is made for the routine use of non-linear anisotropic stiffness. The determination of the parameters required is then explored, and the usefulness of advanced triaxial testing, and dynamic laboratory and field testing examined.

Chris Clayton is Professor of Infrastructure Engineering and Head of the School of Civil Engineering and the Environment at the University of Southampton. He is currently the Editor of *Géotechnique*, was the founding Editor of *Geotechnical Engineering*, part of the Proceedings of the Institution of Civil Engineers, and has been the Scientific Editor of the Quarterly Journal of Engineering Geology and Hydrogeology. He served as the Chairman of the British Geotechnical Society (now the BGA) between 1990 and 1993. He is the author of about 200 papers and books, including textbooks on 'Site Investigation' and on 'Earth pressures and earth-retaining structures', and has contributed to 5 CIRIA reports, on the procurement of ground investigations, the Standard Penetration Test, the Chalk, and CFA Piling in Chalk.

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Lecture 17:30 -19:15 hours Tea from 17:00 hours

Main Lecture Theatre, Sherfield Building, Imperial College London, Exhibition Road, SW7 2AZ

All are welcome: No registration required

(For DINNER: see Separate Ticket Application Form)

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