

Book reviews

Continuous and Discontinuous Modelling of Cohesive-Frictional Materials. Eds. P. A. Vermeer, S. Diebels, W. Ehlers, H. J. Hermann, S. Luding and E. Ramm. Springer, 2001, 308 pp. ISBN 35441525 4.

The volume contains contributions to the International Symposium on *Continuous and Discontinuous Modelling of Cohesive-Frictional Materials*, organised at the University of Stuttgart jointly by the Institute of Applied Mechanics, Institute of Geotechnical Engineering, Institute of Structural Mechanics and Institute of Computer Applications in November 2000 and published in 2001.

The aim of the book is to report the current developments and problems identified in targeted research areas of cohesive-frictional materials and to provide a deeper understanding of the microscopic and macroscopic description of geomaterials. From the title of the book, both continuum modelling such as the finite element method and discontinuous modelling such as the discrete element method are included. A number of other methods have been suggested and used, such as Lagrangian particle method and statistical homogenisation.

As the symposium was held in Stuttgart, of the 19 papers, more than one third of the authors were from Germany and the rest coming from mainly from other parts of Europe including France, Switzerland, Netherlands, Greece, Austria with only about three papers coming from outside Europe. Quite a number of the famous names in Europe working in theoretical and applied mechanics on cohesive-frictional materials are included.

The emphasis of the volume is undoubtedly on the modelling of discontinuous behaviour such as strain localisation, shear band and microscopic structures of cohesive-frictional materials using the various numerical methods mentioned. Some of the papers included are:

- Computational models for failure in cohesive-frictional materials with stochastically distributed imperfections
- Short-term creep of shotcrete – thermochemoplastic material modelling and nonlinear analysis of a laboratory test and of a NATM excavation by the finite element method
- Thermo-poro-mechanics of rapid fault shearing
- A view on the variational setting of micropolar continua
- An experimental investigation of the relationships between grain size distribution and shear banding in sand
- Micromechanics of the elastic behaviour of granular materials
- Micro-mechanisms of deformation in granular materials: experiments and numerical results
- Difficulties and limitations of statistical homogenisation in granular materials
- Microstructured materials: local constitutive equation with internal length, theoretical and numerical studies
- Damage in a composite material under combined mechanical load and change in moisture content.

This book is definitely not for the faint hearted. It is highly mathematical with some papers having pages of equations included, theoretical though there are a lot of comparisons with experimental results and in some case quite difficult to follow. Nevertheless as each article is much longer than a typical conference paper, with one of 43 pages offering an in-depth treatment of the subject matter concerned. There-

fore this book would be suitable for researchers and post-graduate research students specialising in the development and/or the application of advanced numerical methods in the modelling of cohesive-frictional materials using continuum and/or discontinuous methods.

A. Chan

Mapping in engineering geology. Compiled by James S. Griffiths. *Key Issues in Earth Sciences No.1.* London: The Geological Society of London, 2002. 287 pp. ISBN 1 86239 101 7. [£27.50]

James Griffiths had the excellent idea of compiling key papers published over the last 30 years on the subject of mapping for geotechnical purposes. He, like others of our generation, took it for granted that initial site surveys for near-surface engineering works, interfacing with natural hazards that can cause ground failure and deformation, would automatically include mapping of the landscape. We were wrong, and this wonderful technique, which can be applied at any scale that is relevant, slowly or quickly, in great detail or as an overview, has been neglected. Some consultants have embraced it and benefited from its cost-effective output, but many consultants and contractors have not taken up this form of investigation, and much information of direct relevance to design and analysis of their works in these circumstances has been overlooked. This book certainly enables all who are interested in such surveys to review their attitude and commission such work, for in this book the basics needed are now gathered together in a compact form.

There are 13 papers, the earliest being the Working Party Report of the Geological Society (1972) on the preparation of maps and plans for geotechnical purposes, and the most recent being on mapping for hazards (1998). All the papers teach by example, and in them the reader will find examples from natural and artificially created slopes, and sites involving karst, subsidence, settlement, and erosion. The use of such mapping in planning, design, analysis and risk assessment is illustrated by case studies. In addition the editor has provided an excellent résumé of the evolution of such mapping in the UK, and a most useful index—something that will enable many to use the book to good effect.

Books of this sort present their editor with the task of selection, and the real editorial work is in deciding what to exclude: an Editor has to draw the line at some point. This compendium includes many examples from overseas, but has excluded most of the work on such mapping done outside the UK. The generic aspects of such mapping are transferable to any climate, but their implementation will tend to differ, and some measure of what has been excluded can be gauged from the papers describing work from Australia and Papua New Guinea. So although the generic aspects of the work can be used around the world, the practical examples of this book tend to be focused on mapping in the UK. There is also only a passing reference to the Second Working Party Report of the Geological Society on Land Surface Evaluation for Engineering Practice, also edited by James Griffiths and published in 2001. That, I thought, should have had greater prominence, because it and this book together provide both academia and industry with a most timely ready reference for good practice. I think it is an excellent work, and recommend it to the librarians of colleges and companies alike.

M. H. de Freitas