

Book reviews

Engineering in the Lambeth Group. *D. W. Hight, R. A. Ellison and D. P. Page. London: Construction Industry Research and Information Association, Report C583, 2004. 210 pp. ISBN 0 86017 583 9. [Member price £100; non-member price £50]*

This CIRIA report is the latest in a series that covers geotechnical engineering in British strata including the Mercia Mudstone, Chalk and Glacial Till. The Lambeth Group, formerly known as the Woolwich and Reading Beds, are Tertiary age strata that underlie the London Clay in the London and Hampshire Basins. These strata present problems for conventional sampling and testing methods, and show considerable heterogeneity both horizontally and vertically. As a result they have often been regarded as 'difficult' strata from an engineering viewpoint.

However, in the past two decades a number of major projects have been constructed in or through the Lambeth Group. These include the Waterloo International Terminal, Jubilee Line Extension and Channel Tunnel Rail Link tunnels. Outside the London area, the Newbury Bypass has been engineered in these strata. As a result of these and similar projects a number of extensive and high-quality ground investigations have been performed in the Lambeth Group, leading to substantial advances in understanding of the stratigraphy and engineering properties of the strata. The report draws together much of this recent information to present a thorough and up-to-date review.

The initial section of the report deals with the geology of the Lambeth Group. The report provides a detailed and well-illustrated review of the complex stratigraphy of the group. The depositional environment and post-depositional changes are also well covered. The later sections deal with the engineering properties of the various units, engineering design and construction and ground investigations. The material in these sections is of much interest, not only to engineers working in these strata but also to anyone dealing with heavily over-consolidated heterogeneous soils with significant fabric. Of particular interest is the exposition on the role of plasticity, its effects on stress paths and the consequences for sampling and laboratory testing, which is amply illustrated with reference to large data sets from recent projects. The report concludes with extensive references and a bibliography.

In summary, this report is essential reading for geotechnical engineers and engineering geologists working in the London and Hampshire Basins. It also provides much general insight into the behaviour of heavily overconsolidated clays and silty sands. Although ground investigation techniques and semi-empirical design methods must be tailored to the unique parameters of each geological stratum and location, this report provides valuable pointers for those working in many other geologically aged engineering soils.

R. E. May

Landslides in practice: Investigation, analysis, and remedial/preventative options in soils. *D. H. Cornforth. Hoboken, NJ: John Wiley & Sons, 2005. 596 pp. ISBN 0 471 67816 3. [£85.95]*

The author is particularly well equipped for his task: a PhD under Professor Bishop at Imperial College, followed

by 10 years' work in geotechnics in the UK and the US, finally founding his own firm in 1983 in Oregon. Under his leadership this firm has remediated hundreds of landslides in the US and abroad, and provided expert witness and arbitration services.

The book is divided into three main parts: A, Investigations and Analyses; B, Remedial and Preventative Options; and C, Selected Case Histories.

The chapters in Part A are: 1 'Landslides', 2 'Landslide occurrences', 3 'Field investigations', 4 'Inclinometers and piezometers', 5 'Groundwater', 6 'Laboratory shear strength measurements on soils', 7 'Properties of sands and other cohesionless soils', 8 'Properties of clays and cohesive soils', 9 'Slope stability analyses', 10 'Stability margin', 11 'Erosion control', and 12 'Earthquake-induced landslides'.

In Chapters 1 and 2 the layout is not ideal. Thus, in Chapter 1, 'Scope' would have been better in a separate introduction, and 'Prevention and remediation of landslides' would seem to belong more naturally in Part B. 'Landslide description' and 'Landslide classification' form the heart of Chapter 1, and the latter should, when possible, be expanded to clear up common confusions between the North American and European terminology, of which this book is not free, concerning chiefly flows, flow slides, mudslides and debris flows.

The themes dealt with in Chapter 2 are often disparate, and the chapter would have been better entitled 'Landslide causes: natural and anthropogenic'. The section on 'Ancient landslide reactivation' should have covered the periglacial solifluxion of clayey soils: relict forms of this have caused many very costly earthworks failures in north-west Europe. The section on 'Delayed failure' is confusing. Classically, this refers to the failure of a clayey slope caused by the recovery of pore water pressures following unloading by a cut or erosion; the author includes also the placing of fills. Fig. 2-18 is incorrect in showing a 'curve for loss of shear strength of stiff clay with time under constant groundwater conditions'. This seems to be reverting to Henkel (1957). The loss of strength is due principally to the recovering groundwater pressures. The last three sections concentrate on rock and soil types rather than causes, and should have been treated elsewhere.

Chapter 3 is a useful review of field investigations. Although the importance of making a slide 'plan' and using stereoscopic aerial photographs is emphasised, there is no mention of geomorphology or geomorphological mapping. The remaining chapters, 4 to 12, of Part A are generally excellent. The neutral line concept is incorrectly restricted to fills, and is not integrated with any of the case records. Chapter 11 on 'Erosion control' might with advantage have been combined with Chapter 16 in Part B, and drainage of the groundwater body involved added as a further method of controlling seepage erosion.

Part B, the main focus of the book, is thoughtful, thorough and well handled. The topics covered are: 'Common issues in remediation', 'Alternatives to full remediation of a landslide', 'Earthworks', 'Erosion control measures', 'Dewatering systems', 'Seepage barriers', 'Retaining walls', 'Earth reinforcement systems', 'Liquefaction mitigation techniques', 'Slip surface strengthening', and 'Landslide hazard'. It would have been advantageous to extend this last to include the latest techniques in landslide hazard and quantitative risk assessment.

As noted, Part C of the book is devoted entirely to twelve selected case histories.

This is a specialised and authoritative book, tested in the 'front line' and thus of exceptionally good value to both practitioners and more advanced students.

J. N. Hutchinson

REFERENCE

Henkel, D. J. (1957). Investigations of two long-term failures in London Clay slopes at Wood Green and Northolt. *Proc. 4th Int. Conf. Soil Mech., London* **2**, 315–320.

Geomorphology for Engineers. P. G. Fookes, E. M. Lee and G. Milligan (eds). Dunbeath: Whittles, 2005. 851 pp. ISBN 1-870325-03-6. [£100]

In his foreword to this book, Professor Denys Brunsdén describes geomorphology as 'the study of the forms of the earth's surface: their origin; the processes involved in their development; the properties of the materials from which they are made; predictions about their future form, behaviour and status'. It is immediately clear, therefore, that this book is essential reading for anyone who professes to have an interest in geotechnics, for it provides the background as to why soils behave as they do.

Because of the limited time available and the massive amount of ground that they need to cover (forgive the pun), soil mechanics courses are inclined to concentrate on foundation analysis. As a consequence, relevant soil parameter values are often provided for exam questions on foundation design. However, as experienced geotechnical engineers are aware, inappropriate choice of soil parameter values, rather than an inappropriate choice of analysis method, tends to be the primary source of foundation design problems. The major value of this book is to allow practising geotechnical engineers to make more informed judgements of appropriate soil parameter values, by providing them with a greater knowledge of geomorphology. To quote Professor Brunsdén a second time: 'forewarned is forearmed'.

The book is divided into three parts to allow targeted browsing.

- (a) Part I 'Controls' contains chapters on climate and weathering, sedimentology, tectonics, stratigraphy, the quaternary, and engineering behaviour of soils and rocks.
- (b) Part II 'Geomorphological processes' contains chapters on landslides, active tectonic environments and seismic hazards, rivers, soil erosion, and subsidence.
- (c) Part III 'Environments and landscapes' contains chapters on glacial environments, periglacial forms and processes, temperate environments, hot drylands, savanna, hot wetlands, mountain environments, estuaries and deltas, coastal environments, continental shelves, volcanic landscapes, karst terrains, loess, chalk landscapes, and urban geomorphology.

Each chapter includes a section summarising the engineering implications (some of which sections are better than others), plus a list of references and recommendations for further reading. The quality of the illustrations and photographs is also worthy of note, for in general these are of excellent quality and extremely informative.

The presence of a chapter entitled 'Engineering behaviour of soils and rocks' within the part of the book concerned with geomorphological processes may at first seem incongruous. However, the presence of this chapter is justified by the editors on the basis that 'the physical properties of soils and rocks, in particular strength and permeability, affect many geomorphological processes, and the ground conditions encountered in many engineering projects are the result of such processes.' Thus the inextricable relationship between geomorphology and geotechnics is, once again, highlighted. In general, this chapter is a creditable attempt to fuse the two subjects, although there are inevitably some omissions and simplifications. In addition to the informative illustrations found in other chapters, this chapter also contains several useful tables—particularly Table 7.4, which provides guidance on geotechnical problems associated with different soil types.

In conclusion: in my opinion, all geotechnical engineers should have a copy of this book on their bookshelf.

N. R. Ramsey