Book reviews

Lowlands development and management. N. Miura, M. R. Madhav and K. Koga (editors). Rotterdam: Balkema, 1994. ISBN 9 05 410603 4. £64

The inspiration for this book dealing with lowlands development and management stemmed from an international symposium held during 1992 at Saga University in Japan. The book is divided into five sections: a general description of lowlands, a review of the various types of development encountered in such areas, water management issues, including a consideration of water quality, relevant aspects of groundwater, and, finally, subsidence and monitoring. The contributors are from Japan as well as from countries having either considerable experience of dealing with or are currently facing such problems.

Each section is divided into chapters which appear to be minimally edited, conference papers; there seems to be no unifying theme about the work. Some of the chapters are fairly standard textbook material, others are in the nature of design notes, and yet others involve detailed mathematical treatment of particular elements that, in themselves, are not uniquely associated with lowlands. In this respect perhaps the rather dominant contributions from the Netherlands distort the worldwide picture in that problems such as urban drainage, agricultural, groundwater, pollution and coastal stability are all seen in an essentially lowland context.

One chapter describes the development of polders. Issues discussed include the layout to be adopted to accelerate accretion of sediments, and/or to optimize drainage, the location of pump stations, the implementation of polder development, water management, field and main drainage as well as the hydraulics of tidal and non-tidal drainage outlets.

Matters such as sea level rise are discussed; in one chapter the present rise (1–2 mm/year) is seen as the tail end of a ‘recession’-type curve beginning at the end of the last ice age (then some 25 mm/year), while in another chapter a prediction suggests a rise of 660 mm in the next century: this without comment. Another chapter deals extensively with mass transport in porous media; whilst not irrelevant it does seem out of place in a work of this nature.

The work contains much good material for the

study of the world's lowlands but would have to be rewritten to provide a coherent and balanced book on the subject.

—R. F. Stoner

Soft soil properties and testing methods. L. S. Amaryan (translated from the Russian and edited by R. B. Zeidler). Rotterdam: Balkema, 1993, 180 pp. ISBN 9 05 410134 2. £46

This book, which is in the series of selected translations of the Russian literature *Geotechnika*, gives an interesting and comprehensive account of the development of techniques for soil classification and field and laboratory testing of ‘soft soils’ in the former Soviet Union. The broad range of soils in the ‘soft soil’ category is examined and classified using moisture content, organic content and grain size data from a large number of sites covering the full range of organic contents.

The book outlines laboratory and field testing techniques including tests of a similar type to those in general use outside the Commonwealth of Independent States (CIS) as well as to a number of very interesting and original techniques developed and used only within the CIS. All the testing techniques rely heavily on the Soviet Standards (GOST).

The large database compiled by the author is analysed to establish the engineering properties of peat, sapropel and marine mud using case studies as well as the *in situ* and laboratory test data. This part of the book looks in detail at long-term settlements, from case studies and large-scale field experiments, and the use of *in situ* testing techniques for both profiling and engineering parameter evaluation.

The most difficult aspects of the book, however, are that the definitions and terminology are translated from those used in the countries of the CIS and the field and laboratory techniques developed are based on equipment and methodologies fixed in GOSTs which are not referenced or reproduced. This means that the large amount of potentially valuable data included in the text cannot easily be interpreted. This limits the use of the book to practitioners outside the CIS, but

it does provide an interesting insight into the development of soft soil engineering in the CIS.

—A. P. Butcher

The practice of soil reinforcing in Europe. T. S. Ingold (editor). London: Thomas Telford, 1995, 309 pp. ISBN 0 72 772083 X. £55

This book will be of considerable interest to all engineers involved in the use of reinforced soil. It comprises the proceedings of the symposium of the same title, organized by the Tenax Group under the auspices of the International Geosynthetics Society, and held at the Institution of Civil Engineers in May 1995. Most of the leading researchers and designers of reinforced soil structures in Europe appear amongst the authors of the 22 papers, with a total of seven countries represented: Austria, France, Germany, Italy, the Netherlands, Switzerland and the UK.

The balance of the papers would suggest that polymer reinforcement, whether in sheet, grid or strip form, is now almost universally employed in reinforced soil in Europe. Metallic reinforcement is barely mentioned, though some of the proprietary systems are wire gabions or metal grids in the formation of the facing of reinforced soil walls. Soil nailing receives rather unbalanced attention, with some discussion on design approaches in a paper by Love on the Department of Transport Advice Note HA 68/94, calculations and measurements of displacements from the Clouterre programme in a paper by Unterreiner *et al.*, and three papers on ballistic soil nailing. Two of these, by Hall and Ingold, provide brief case histories, while the third, by Myles, gives a useful overall review of the technique. Gassler describes an interesting use of very long nails to stabilize a cutting slope at 1:1.75 in Keuper Marl containing fossil slip surfaces. Because of the shallow slope, no facing was necessary and the nail ends were buried, so allowing a completely natural appearance.

Most of the other papers are concerned with the design and/or construction of reinforced soil retaining walls or steep slopes. Various comparisons of solutions obtained from design methods from different countries indicate a large measure of agreement across Europe, and for that matter with the USA. Much of the discussion at the symposium, which is more fully reported than is often the case, was concerned with matters of durability: corrosion of steel nails or steel mesh facing units; long-term deterioration of geotextiles at or near the facing surface; the effects of alkali attack from concrete on geotextiles; the durability of timber crib wall facings; and the establishment and main-

tenance of vegetation on steep slopes, particularly where it is used to provide long-term stability of the face. A useful discussion of the long-term strength and durability of geogrids is provided by Cazzuffi *et al.*

The potential for reinforced soil in very high structures, including stepped walls up to 37 m high, is demonstrated in the paper by Sembenelli and Sembenelli. Three papers discuss structures other than walls or steep slopes. Basal reinforcement of embankments on soft ground, with or without piles, or to span potential voids, is covered by Lawson. Dikran and Rimoldi describe the use of reinforced soil structures in landfill. Rankilor introduces the interesting concept of dormant reinforced soil structures, which are inactive at the time of construction but may be called into play at some future time in the event of some foreseen change of circumstances. A final paper worthy of individual mention is a comprehensive review by Jones of the development and use of polymeric reinforcement in reinforced soil, which opens the symposium and sets the tone for much of what follows. Altogether this volume includes a wealth of experience and stimulating ideas, which should be of interest and use to all civil engineers, particularly those looking for the 'softer' approach to engineering now being demanded in many circumstances.

—G. W. E. Milligan

Barrier containment technologies for environmental remediation applications. R. R. Rumer and M. E. Ryan (editors). New York: Wiley, 1995, 170 pp. ISBN 0 47 113272 1. £45

The book has been prepared by six US experts in containment technology as part of a study sponsored by E. I. DuPont de Nemours & Company. It provides a comprehensive review and evaluation of the state-of-the-art of containment technologies. Only containment technologies suitable for remediating existing contaminated sites are included. Design of new waste facilities are not addressed.

The first two chapters contain a useful summary of containment applications and containment migration. In the main part of the book the construction and performance of the three main barrier types; vertical barriers (walls), bottom barriers (floors) and surface control barriers (caps) are described.

Each of the main chapters describes the applications of the particular barriers, reviews the various types and quality control procedures. The chapter on vertical barriers describes the various types of slurry cut-off wall: soil-bentonite, cement-bento-

nite, plastic concrete and composite wall (slurry walls with membranes). The book reflects US practice. There is a large emphasis on the design and performance of soil–bentonite walls which are not used in the UK. The section on cement–bentonite walls is limited. To say that cement–bentonite walls have found limited use is misleading in relation to their use and practice in the UK where they are the most common form of vertical barrier. Useful, although short, sections on soil mixing, sheet piles and grouted barriers are included.

The chapter ‘Bottom barriers’ provides a useful introduction to the difficulties, uncertainties and cost of bottom barriers. The grouting methods available are discussed as are some more specialized methods. The limited information in this chapter reflects the rarity of their use. In contrast,

the chapter ‘Surface control barriers’ is very comprehensive and describes in considerable detail the advantages and disadvantages of the various options for different applications. It covers the use of natural materials, geomembranes and geosynthetic clay liners. The assessment section on caps covers the required slope for efficient run off of precipitation, compressibility of the underlying waste, gas control, etc.

The book is clearly written, very readable and is a good basic introduction to containment methods for contaminated ground. It is, however, written by US engineers and does not reflect UK practice with cement–bentonite cut-off walls. A most useful glossary and reference list are provided.

—P. Tedd