Book Reviews

Engineering Geology of Waste Disposal. S. P. Bentley (ed.) Geological Society, London, Engineering Geology Special Publication 11, 1996. US$148/£89 hardback; 399pp. ISBN 1-897799-46-2.

Members of the Geological Society may purchase this volume for US$73/£44 from: Geological Society Publishing House, Unit 7 Brassmill Enterprise Centre, Brassmill Lane, Bath BA1 3JN, UK (Tel: 01225 445046. Fax: 01225 442836).

This volume is the latest in the series of Engineering Geology Special Publications and includes the papers submitted to the 29th Annual Conference of the Engineering Group of the Geological Society. The book contains most of the papers presented along with a number which were not presented as well as the keynote papers not included in the conference preprint volume. No discussion of the papers is included.

The 49 papers are divided into five sections. They are mostly short (less than 8 pages) and just under half the papers are case histories. The subject matters and authors include contributions from South Africa, the Far East, Europe and Canada as well as the UK.

The first section commences with an overview of the investigation, hazard assessment and remediation of existing landfills and is followed by papers on subjects including the geophysical leak detection test for HDPE liners, leachate plumes and the properties of waste. The final paper in the section discusses the first year’s results of the long-term monitoring of the settlement across a landfill, indicating that the current practice may be underestimating the settlement of wastes.

Section 2 considers the design of new landfills and includes two excellent and complimentary papers on the use of old quarries for landfill. Other papers discuss the use of geogrids to aid stability when extending landfills and groundwater tracing. The section concludes with two overview papers on geomembranes and clay liners.

Section 3 deals predominantly with the disposal of nuclear waste with a number of papers showing different aspects of the design of repositories at Sellafield.

Section 4 covers the containment properties of natural clays and includes discussions on clay and cementitious barriers, the variability of soil properties in clays from the same geological formation and a case study indicating the perils of not understanding the basic geology of a proposed landfill site. One paper discusses the changes in fabric caused by settlement and is particularly relevant to clay capping given the initial conclusions of the long-term monitoring of Section 1!

The final section, entitled ‘Standards in Landfill Engineering’, comprises papers on a wide variety of topics including a general discussion on regulatory philosophies, a good overview of risk assessment and a paper summarizing the role of the NRA. An interesting technical note is included which provides the results of two surveys indicating that out of 4000 landfills surveyed 5% had experienced some form of failure, the most common being landfill gas emissions followed by the contamination of surface waters and groundwater.

The book is well referenced at the end of each paper, and as usual for this series the presentation is excellent. It has much to commend it with a number of excellent overview papers as well as varied case histories and would be of considerable value to both professionals and those new to the subject. It is a valuable addition to this excellent series.

J. Hucker

Geology and Hazardous Waste Management. Syed E. Hansen (ed.). Prentice-Hall. New Jersey, 1996. Hardback; xii+387pp. ISBN 0-02-351682-8.

As geology and earth science courses in Universities become more environmental, applied or useful, depending upon the nomenclature you wish to use, so the demand for texts to supplement such courses will of necessity increase. And here is one that should be able to hold its own against many others in the field for some years to come. Aimed at final year undergraduate students and beyond, it is clearly intended to be a text for any course containing a significant amount of applied geology or hazardous waste management in its syllabus. But more than that I think it will prove to be a useful source of reference material for professionals in the field, even if the vast majority of the information is from the US Environmental Protection Agency and therefore heavily biased towards the state of the art and regulatory framework that exists in North America.

The fact that geology underpins so much of what we do and where we live, either directly from a hazard perspective or indirectly in providing resources for us to exploit, is now well recognized. This book goes a stage further to underline the fact that having made a mess of the planet we are going to have to use geological criteria in (a) the clean-up and (b) the more enlightened ‘prevention is better than cure’ era we are now entering. Thus the first few chapters introduce some basic geological concepts, definitions and then aspects of environmental law as practised in both the USA and elsewhere. These are followed by discussions on the physical, geotechnical and geochemical properties of earth materials and
hydrogeology so that the biggest chapter of all on contaminant transport in the subsurface has a firm foundation. However, the hallmark of the book is the practical slant always being delivered and never more so in the subsequent chapters on hazardous waste site selection and assessment and personnel protection. The last two chapters concern the treatment technologies that may be employed and the methods of disposal for hazardous wastes. Maybe a small criticism would be the relatively few references provided at the end of each chapter.

If that was all there was to the volume then maybe it would be nothing special. Surprisingly, though, a quarter of the text is taken up by Appendices. These I thought were very useful and informative: a full listing of hazardous wastes, acronyms and the fundamentals of toxicology one might expect. A set of addresses for the EPA in each state in the USA, American Universities offering courses in the relevant subject matter, a listing of environmental journals and sources of geological information provide more novel material.

Overall then this is an excellent book which, if not worth purchasing as an individual, should be in every relevant library, consultancy or local authority engineering department. It is well produced, has abundant clear illustrations and is a mine of useful information.

S. Wakefield

Site Investigation. C. R. I. Clayton, M. C. Matthews & N. E. Simons (eds). Blackwell Science, Oxford, 1995. £69.50 hardback; 584pp. ISBN 0-632-02908-0.

Over a decade has passed since this treatise first appeared, but yet little changes have occurred within the Industry. In particular, the true value of proper site investigation is still not appreciated by some client advisors. However, this new edition gives emphasis to the correct way of instigating and controlling a worthwhile ground investigation. The two alternative methods of procurement are explained and emphasis is given to the need for all investigation work to be directed by a trained geotechnical specialist. There are many references throughout the book on the short-sightedness of cheap ground investigation work.

A whole chapter is devoted to Desk Study and Walk-over Inspection. This much-neglected aspect is given well-deserved prominence and is illustrated with colour maps and records. The extent of a desk study depends on the requirements of the project, but as the authors point out, even a basic desk study produces valuable information.

The section on sampling disturbance is most welcome and points out the various factors which can give rise to the scatter of test results. A reminder is given on the need to keep to original design methods based on traditional test procedures and correlation factors, and not to merely change the rules because of a new technique.

There is an extended discussion of boring and drilling techniques. Surprisingly this new book omits reference to the use of round rods rather than square rods when carrying out SPT tests. More importantly, there is no mention of the dynamic ‘window-sampling’ boring technique which is becoming increasingly more useful in basic soil investigation where access is restricted, and is particularly useful in assessing soil conditions close to existing houses.

A large amount of text is devoted to geophysical techniques of exploration and recent advances in methods. It would seem that this tool could provide answers to many problems, but some engineers have not been impressed by the conclusions.

Basic, yet vital, factors in deciding depths of boreholes, frequency of sampling and testing, are given in simple and direct statements. If only these points were practised!

In summary, this book is not a textbook—there are plenty of those already! This book is a clearly written and practical guide to site investigation which every young geotechnical engineer and most structural engineers should read if they want to truly understand the purpose of ground investigation work.

S. E. Quarrell