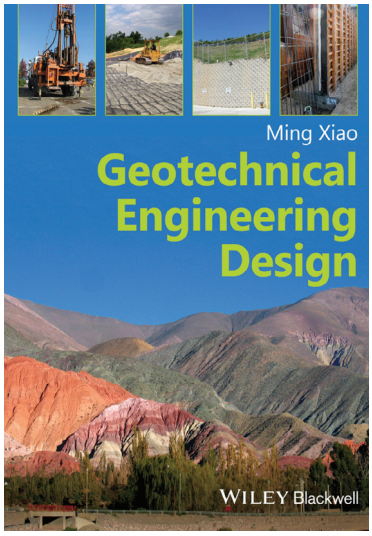
Review

This is a succinct and valuable textbook that, together with the accompanying online resources, will serve students well into their first years in industry, says Jennie Gates.

Geotechnical Engineering Design



Author: Ming Xiao
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This is a first-edition textbook primarily intended for students taking a geotechnical course at university. The book covers the fundamental principles and methodology behind geotechnical design and problem solving, although readers are expected to have already grasped some basics.

The content of the book references both European and US codes of practice throughout. Both allowable stress design (as used in the US codes) and limit state design (as used in Eurocodes) are explained in the text. Although there is a slight content bias, with many of the illustrations being US examples, generally two sets of solutions are supplied for the example problems, assisting the reader in understanding the differences and commonalities between the two. Metric units are used except on rare occasions.

Chapter 1 covers an introduction to engineering geology, including a brief section on the interpretation of topographical and geological maps. Chapter 2 covers geotechnical subsurface exploration. Here the slight US bias is evident, as although references are given for both the NAVFAC 1986 (the *Soil Mechanics Design Manual* by the Naval Facilities Engineering Command) and Eurocodes for determining appropriate borehole spacings, only the NAVFAC requirements are reproduced within the text.

Callout tables on the relative merits of cone penetration testing versus the standard penetration test are helpful and similar tables are used throughout the text. Chapter 2 also includes a section on geophysical techniques, including ground penetration radar, electromagnetics, electrical resistivity imaging, microgravity and seismic reflection and seismic refraction. The chapter concludes with a useful checklist of sections for an investigation report, worthwhile for a task which is typically given to a new graduate.

Chapters 3, 4 and 5 cover the principles behind shallow foundation design, deep foundation design and slope stability analysis and stabilisation measures. The text does not go into great depth, instead concentrating on the fundamental concepts. Straightforward explanations of the calculations' origins are given. Step-by-step instructions and rules of thumb are provided on how to carry out the analyses in practice, for both the allowable stress and limit state design approaches. An effort is made to pick out problems which may catch out a young engineer and, where several methods are explained, worked examples are provided for each and compared.

Chapter 6 covers filtration, drainage, dewatering and erosion control, while Chapter 7 explains soil-retaining structures and design of conventional retaining walls, sheet pile walls and soil nailing. Numerous images complement the wall descriptions. The final two chapters cover design using geosynthetics and geotechnical earthquake design.

Something perhaps unique to this textbook is the provision of online resources which accompany the text. A companion website has model solutions to the ample homework questions posed at the end of each chapter. Downloads of colour versions of images, figures and tables are available along with a suite of editable Excel spreadsheets for the worked examples. A useful 22 pages of homework solutions accompany the chapter on deep foundation design and a substantial 42 pages the shallow foundations chapter.

In summary, this textbook is succinct, factual and a valuable companion for tutors and students. Although there are some typographical errors, each topic is well described and well referenced back to both US codes and Eurocodes. The step-by-step approaches outlining typical calculations using both limit state and allowable stress design are helpful and the online resources provide far more assistance than could be compiled into a typical textbook. As such, this book is likely to be retained and well thumbed by a student well into their first few years in industry.

Jennie Gates

Jennie is a Senior Geotechnical Engineer at Arup, London. She is a chartered member of the ICE and a UK Registered Ground Engineering Professional. With Arup, she has designed numerous geotechnical structures and worked on several multidisciplinary infrastructure projects, including the London 2012 Olympics, Crossrail and London's new super sewer, Thames Tideway.