Book review

Offshore geotechnical engineering. *Mark Randolph and Susan Gourvenec. Abingdon: Spon, 2011. 550 pp. ISBN 978-0-415-47744-4. £80.00*

In the past, offshore geotechnical knowledge has generally lagged behind onshore geotechnics. However, the past two decades have seen extensive research in offshore geotechnics with findings that should vastly benefit the offshore industry. The results of this research have yet fully to reach practising engineers. This book, with extensive reference to research publications, has made a good step in bridging the knowledge gap between practising geotechnical engineers and state-of-the-art geotechnical research findings (both numerical and experimental). The book is full of illustrations from latest research findings while still providing the fundamental and traditional background to geotechnics. It is clear from the contents of the initial few chapters that the target reader is an experienced geotechnical engineer or academic researcher.

The book has ten chapters in 528 pages. The introduction provides an overview of the offshore developments from the early 1950s and highlights some key aspects of geotechnical engineering that play a vital role in offshore engineering. Chapter 2, 'The offshore environment', enables the reader to obtain a general background to offshore seabed conditions, wave and current characteristics. Chapter 3, 'Offshore site investigation', details the survey equipment and methodology applied in typical offshore geotechnical surveys. Details of geotechnical testing equipment are well presented along with some relevant test data. The reader is also introduced to centrifuge modelling and its usefulness in investigating practical offshore problems.

Chapter 4, 'Soil response', provides a concise but in-depth overview of soil behaviour such as compression, consolidation and shear. The 'critical state' framework is used to explain soil behaviour. Cyclic behaviour of soil is also well outlined in this chapter, although the reviewer felt that the

contents may be beyond the normal reader's understanding, but likely to be appreciated by a reader with a soil dynamics background. All aspects of pile foundations such as types of piles, pile capacity, axial and lateral response and cyclic loading, are covered in Chapter 5, 'Piled foundations'. The capacities of piles in clay and sand are presented separately, and in some detail. The reader is provided with sufficient details and published data to achieve a thorough understanding of the various aspects of pile foundation behaviour.

The various types of shallow foundations and their bearing capacity under vertical–horizontal and moment loading conditions are well covered in Chapter 6. This chapter is a vital source of information for all foundation engineers as foundation behaviour under various conditions is well captured. The geotechnics of anchoring systems and mobile jack-up platforms are presented in Chapters 7 and 8. Analytical solutions for anchor capacities are described in detail, along with research results. It is good to see that the book describes the fundamental differences between drained and undrained capacity calculations.

Chapter 9, 'Pipeline and riser geotechnics', addresses pipe–soil interaction issues and provides state-of-the-art research findings. The lateral response of pipelines on the seabed is well illustrated with test data.

Identification and risk assessment of geohazards are fundamental to all offshore projects. Chapter 10 covers this aspect well by discussing the regional geohazards and risk assessment methodology. Submarine slope failures and mass flows are also addressed in this chapter.

In summary, this book is an essential reference for all offshore geotechnical engineers and academic researchers in the field. Experienced pipelines engineers will also benefit from this book's content. Readers with prior soil mechanics knowledge will fully appreciate the contents, but in the reviewer's opinion readers without prior soil mechanics knowledge may find it a little difficult to follow.

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