Book review

Design of column-reinforced foundations

Mounir Bouassida, J. Ross Publishing, Plantation, FL, USA, 2016, ISBN 978-1-60427-072-3, £79.95, 240 pp.

The aim of this book is stated to be the presentation of a unified method of foundation design applicable to stone columns, deep mixing and sand compaction piles. Foundations are assumed to be structures such as oil tanks and buildings. The book has relevance for embankment design, but does not cover slope stability assessments.

An introduction to column-reinforced foundations is presented in Chapter 1. The chapter describes installation of columns at a high level and presents the fundamental assumptions used in subsequent analytical modelling of the improved ground.

Chapter 2 focuses on the ultimate capacity of column-reinforced foundations. The chapter reviews a number of methods to predict the bearing capacity of column-reinforced foundations.

Chapter 3 focuses on settlement predictions of column-reinforced foundations using linear elasticity. The chapter reviews a number of methods to predict settlement of column-reinforced foundations and then compares various methods of prediction with the measured performance of an oil tank facility and an embankment.

Chapters 2 and 3 are written in the style of a review paper and provide a useful snapshot of many methods for assessment of bearing capacity and

settlement. Maximum value will be gained by readers familiar with the reviewed design methods. Those unfamiliar with the details of each method will have to source the technical papers referenced in the book to get full value from the discussion in these sections.

Chapter 4 presents a process of numerical optimisation that aims to achieve the most efficient design considering both bearing capacity and settlement. The optimisation process is described and several case histories are assessed using the optimisation method programmed into commercial software developed by the author.

Chapter 5 addresses the strength gain in the soft clay between columns caused by volumetric strains during installation. Field and laboratory data are presented and demonstrate that strength gain can occur. Numerical simulations of stone column expansion are also presented, showing strength increase to varying degrees depending on the assumptions made.

Chapter 6 presents numerical analyses for three case histories to demonstrate how the different approaches discussed in previous chapters can be used in practice.

This book summarises the academic and practising experience of the author and provides some advice regarding the design of foundations using stone columns in particular, and soil mix columns to a lesser extent. Practitioners will value the case histories summarising the relative performance of analytical methods and the outcomes of performance against prediction.

Richard Kelly