Theory and Applications of Transport in Porous Media

Volume 30

More information about this series at http://www.springer.com/series/6612

Arnold Verruijt

An Introduction to Soil Mechanics

Springer

Arnold Verruijt
Emeritus Professor of Soil Mechanics
Delft University of Technology
Delft
The Netherlands

Additional material to this book can be downloaded from http://extras.springer.com.

ISSN 0924-6118 ISSN 2213-6940 (electronic)
Theory and Applications of Transport in Porous Media
ISBN 978-3-319-61184-6 ISBN 978-3-319-61185-3 (eBook)
DOI 10.1007/978-3-319-61185-3

Library of Congress Control Number: 2017943831

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This book is the text for the introductory course on Soil Mechanics at Delft University of Technology's Department of Civil Engineering, as I gave from 1980 until my retirement in 2002. It includes an introduction to the major principles and methods of soil mechanics, such as the analysis of stresses, deformations and stability. It also describes the most important methods of determining soil parameters, both in the laboratory and in situ, and in the appendices presents the basic principles of applied mechanics that are frequently used. The text has been developed on the basis of lectures at Delft by Profs. Nanninga, Langejan and De Josselin de Jong. The subdivision into chapters is such that one chapter can be treated in a single lecture, with sufficient time for demonstrations of soil behavior and some illustrative applications, including failures of soil structures.

Since 2001 a preliminary version of this book has been available on the internet, and some of its numerous users from all around the globe have offered their comments and suggestions for corrections and improvements. Many of these have been implemented in this version, which also includes references to other books and papers. Upon the suggestion of Prof. Emmanuel Detournay of the University of Minnesota, the problems at the end of chapters have been supplemented with worked examples as a further aid to students. Additional sets of problems (with answers) have been added to several chapters, and a number of demonstrations of soil testing and of soil properties can be downloaded from http://geo.verruijt.net and from http://extras.springer.com.

Delft, The Netherlands — Arnold Verruijt
April 2017

Contents

About the Author

Prof. Arnold Verruijt is Emeritus Professor of Soil Mechanics at Delft University of Technology, the Netherlands. He received his M.Sc. and Ph.D. degrees in 1964 and 1969 from this university. He stayed with the university until he retired in 2002, interrupted by Visitor Professorships at Ontario (Canada), Haifa (Israel) and Sydney (Australia). He has published many papers and several books on groundwater flow and soil mechanics, usually with an emphasis on theoretical solutions of engineering problems. His main research interests are the development of analytical and numerical solution methods, such as the complex variable method and the finite element method.

Professor Verruijt is a member of the Royal Netherlands Academy of Science (KNAW) and an honorable member of the Royal Institute of Engineers (KIVI). In 1997 he was appointed Officer in the Order of Orange-Nassau by Queen Beatrix. At Delft University of Technology he was known as an excellent teacher, for which he received the (first) Master Prize of the Delft University Foundation. In 2014 he received the Biot Medal of the American Society of Civil Engineers (ASCE) for his pioneering contributions to the theory of poroelasticity.

He also acted as consultant on engineering projects, such as tunnels, river embankments and storm surge barriers, mainly in the Netherlands but also abroad.