

Preface

In the past few decades, China and other countries in the world have experienced a new booming era, which features the construction of a considerable number of high-speed and heavy-haul railways, highways, waterways, and civil aviation networks. For railroad track and highway and airfield pavement constructions, embankment and foundation layers are often used and consist of a significant portion of the total mileage. Those layers are made of either treated (i. e., chemically or mechanically stabilized) or untreated granular materials which can be broadly termed as coarse-grained and fine-grained soils. To construct those important transportation infrastructure facilities, immense geotechnical engineering challenges have been tackled with the advancement of soil mechanics. Among those challenges, typical examples include embankment failure attributable to insufficient compaction quality, drastic moisture and temperature variations due to climatic change, excessive and differential settlement due to increased wheel loads and inferior material quality, and long-term stability and durability posed by problematic soils.

Therefore, the advancement of state-of-the-art knowledge base and state-of-the-practice technologies in soil mechanics and foundation engineering has been greatly promoted. This book intends to embrace those theoretical and technological advancements and convey them timely to research scholars, practitioners, and especially college students majoring in civil engineering and other related programs. For them, soil mechanics is a fundamental core course for more advanced ones. This book is rooted in the specifications, standards, manuals and guidelines that are currently enacted in both railroad and highway engineering professions. A comprehensive presentation of basic theories, laboratory experiments, field tests, numerical calculations, engineering practices, and case studies are elaborated in a fashion that could be easily understood and digested without much prerequisite knowledge. This book can also serve the international talents education that is booming in various universities in China. It can positively contribute to the



globalization initiatives of China's high-speed railway for instance and to the education reform and innovation practices for foreign students in China.

This book is a collaboration work by faculty members, Professors Xiao Yuanjie and Jin Liangxing at the School of Civil Engineering, Central South University, China. Meanwhile, the postdoctoral research associate Frank Siaw Ackah and the doctoral student Wang Meng, who are working with Professor Xiao Yuanjie also contribute to the draft manuscript preparation and revisions of this book. The whole book is reviewed by Xiao Yuanjie. The goal of this book is to reflect and disseminate the latest technical achievements and development trends of soil mechanics and geotechnical engineering.

During the course of preparing this book, the financial support received by Professor Xiao Yuanjie from the Natural Science Foundation of Hunan Province of China for Distinguished Young Scholars (2024JJ2073), National Natural Science Foundation of China (52178443, 51878673 & 51808577), and the National Key R&D Program of China (2019YFC1904704) is gratefully acknowledged.

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April 2024