



# Soil Mechanics Fundamentals

By Isao Ishibashi, Hemanta Hazarika

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While many introductory texts on soil mechanics are available, most are either lacking in their explanations of soil behavior or provide far too much information without cogent organization. More significantly, few of those texts go beyond memorization of equations and numbers to provide a practical understanding of why and how soil mechanics work.

Based on the authors' more than 25 years of teaching soil mechanics to engineering students, **Soil Mechanics Fundamentals** presents a comprehensive introduction to soil mechanics, with emphasis on the engineering significance of *what soil is, how it behaves, and why it behaves that way*. Concise, yet thorough, the text is organized incrementally, with earlier sections serving as the foundation for more advanced topics. Explaining the varied behavior of soils through mathematics, physics and chemistry, the text covers:

- Engineering behavior of clays
- Unified and AASHTO soil classification systems
- Compaction techniques, water flow and effective stress
- Stress increments in soil mass and settlement problems
- Mohr's Circle application to soil mechanics and shear strength
- Lateral earth pressure and bearing capacity theories

Each chapter is accompanied by example and practicing problems that encourage readers to apply learned concepts to applications with a full understanding of soil behavior fundamentals. With this text, engineering professionals as well as students can confidently determine logical and innovative solutions to challenging situations.

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### About the Author

**Dr. Isao Ishibashi** is a professor in the Department of Civil and Environmental Engineering, Old Dominion University, Norfolk, Virginia. He was born in Japan, where he obtained his bachelor and master degrees from Nagoya University. After earning his Ph.D. from the University of Washington in Seattle, he served as a faculty member at the University of Washington and Cornell University, before moving to Old Dominion in 1986. Professor Ishibashi has been involved in research in the areas of geotechnical and earthquake engineering, specifically soil liquefaction, dynamic soil properties, static and dynamic earth pressures as well as seismic water pressure, granular mechanics, slope stability, and used tire application to embankment, etc. He is the author or co-author of over 100 published technical papers that have appeared in journals and proceedings in these areas. He is a member of the ASCE, ISSMFE, ASTM, EERI, and JGS.

**Dr. Hemanta Hazarika** is professor in the Department of Civil and Structural Engineering, Kyushu University, Fukuoka, Japan. Born in India, he obtained his bachelor of technology degree in Civil Engineering from the Indian Institute of Technology (IIT), Madras, India and his Ph. D. in Geotechnical Engineering from Nagoya University in Japan. Before moving to his present position, he worked as a practicing engineer for a few years and spent several years teaching and conducting research in academia, as well as with public sector research institutes in Japan. Professor Hazarika's research activities include soil-structure interaction, seismic stability of soil-structure, ground improvement geosystem, applications involving recycled waste and lightweight geomaterials, stability of cut slopes, and landslides and protection against them. He has published more than 100 technical papers in international journals and for international conferences and symposia proceedings, several of which have appeared as contributed chapters in books. He is also credited with serving as the editor of two books in his research fields. He is a member of ASCE, ISSMGE, IACMAG, IGS, JSCE, and JGS.

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