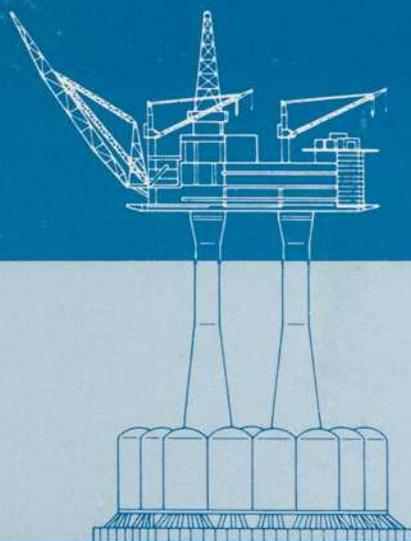


# Marine Geotechnology and Nearshore/Offshore Structures

Chaney/Fang, *editors*



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# MARINE GEOTECHNOLOGY AND NEARSHORE/ OFFSHORE STRUCTURES

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## Foreword

The Shanghai Symposium on Marine Geotechnology and Nearshore/Off-shore Structures was presented at Shanghai, The People's Republic of China on 1-4 Nov. 1983. The symposium was sponsored by ASTM Committee D-18 on Soil and Rock, Tongji University, Lehigh University, and the Chinese Academy of Science. T. M. Yu, Tongji University, and Hsai Yang Fang, Lehigh University, served as chairmen of the symposium. Editors of the resulting publication are Ronald C. Chaney, Humboldt State University, and Hsai Yang Fang, Lehigh University.

## Related ASTM Publications

Strength Testing of Marine Sediments: Laboratory and In-Situ Measurements, STP 883 (1985), 04-883000-38

Geotechnical Properties, Behavior, and Performance of Calcareous Soils, STP 777 (1982), 04-777000-38

Geotechnical Testing Journal, GTJODJ, American Society for Testing and Materials

## A Note of Appreciation to Reviewers

The quality of the papers that appear in this publication reflects not only the obvious efforts of the authors but also the unheralded, though essential, work of the reviewers. On behalf of ASTM we acknowledge with appreciation their dedication to high professional standards and their sacrifice of time and effort.

*ASTM Committee on Publications*

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# Contents

<b>Introduction</b>	ix
<b>Tabular Summary of Paper Contents</b>	1
<b>A. MARINE GEOTECHNICAL CONSIDERATIONS</b>	
<b>Geotechnical Issues in Offshore Engineering—KAARE HOEG</b>	7
<b>Sampling and In-Situ Geotechnical Investigations Offshore— ADRIAN F. RICHARDS AND HERMAN M. ZUIDBERG</b>	51
<b>Static and Dynamic Properties of Marine Sediments: A State of the Art—RONALD C. CHANEY AND HSAI YANG FANG</b>	74
<b>Rheology and Soft Clay Engineering—JIA-HUAN QIAN, SHENG-YUAN WANG, AND ZHI-PING GUO</b>	112
<b>Dynamic Pore-Water Pressure in Saturated Dense Sands— JING-XING ZHOU AND KE-JI ZHOU</b>	122
<b>B. GEO-ENVIRONMENTAL CONDITIONS ALONG THE COASTLINE OF CHINA</b>	
<b>A Study of Engineering Geological Conditions of Late Quaternary Sedimentary Layers in Coastal Areas of China—CONGXIAN LI AND XU GUOQIANG</b>	139
<b>Geo-Environmental and Climatological Conditions Related to Coastal Structural Design Along the China Coastline— HSAI YANG FANG AND RONALD C. CHANEY</b>	149
<b>Geotechnical Properties of Shanghai Soils and Engineering Applications—DA-ZHAO GAO, DAO-DUO WEI, AND ZHONG-XIONG HU</b>	161

<b>Microfabric Features, Composition, and Microstructure Classification of Marine Soils in China—GUORUI GAO</b>	178
 <b>C. BEHAVIOR OF PILE AND GRAVITY PLATFORM FOUNDATION SYSTEMS</b>	
<b>Method of Analysis of Piles Under Lateral Loading— LYMON C. REESE AND SHIN TOWER WANG</b>	199
<b>Evaluation of Bearing Capacity of Driven Piles from Stress Wave Measurements—BENGT B. BROMS AND HÅKAN BRENDENBERG</b>	212
<b>Piling in Shanghai Soils: Historical Sketch and Growth of Capacity with Time—JIN-ZHANG ZAI AND ZHONG-XIONG HU</b>	239
<b>Exploration for the Cause of Damage of a Pile-Supported Pier—RU-LONG WEI, YI DOU, AND ZHU-JIANG SHEN</b>	256
<b>The Adhesive Force of Marine Clay—GUO-DONG FENG AND ZUDE LUI</b>	267
<b>A Seismic Design of Laterally Loaded Piles for Offshore Platforms in Sands—CHEN ZHU CHANG AND ZHENG DA TONG</b>	281
<b>Deformations and Pore Pressures Beneath Gravity Structures— IVAN K. LEE, TERENCE STAUNTON, WEEKS WHITE, AND WILLIAM O. YANDELL</b>	295
<b>A Field Investigation and Analysis of a Large Pipe Pile Under Static and Dynamic Lateral Loadings—MING GAO, DAO BIN CHIN, MAY YIN MA, AND REN GON SUN</b>	306
<b>Soil Models and Soil-Gravity Platform Interaction—XIHONG ZHAO, JIANGUO DONG, JINMIN ZAI, AND JIE PEI</b>	329
<b>Pile Driving Analysis of Offshore Platforms in the Gulf of Bohai—NIAN-CI TANG, CHU-FAN LIU, AND HUI-RONG SHEN</b>	345
<b>Summary</b>	355
<b>Index</b>	363

# Introduction

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Marine sediments have received significant emphasis by the geotechnical community throughout the world in recent years as large structures are being built in deeper and deeper water. The high cost of these structures has dictated the need for accurate and precise in-situ and laboratory measurements of soil properties and the subsequent analytical modelling as a basis for improving foundation design efficiency, safety, and sediment stability analysis. Most investigations of marine sediments and design of structures in the marine environment have been performed for the ocean mineral, shipping, waste disposal, and defense industries or involve related environmental impact studies. Testing procedures and equipment to meet specific design needs have evolved, as a result, to deal with both the harsh marine environment and soft sediment conditions. Because standardized strength and soil properties testing has not yet evolved for marine sediments, ASTM Committee D-18 on Soil and Rock considers a symposium on marine sediments to be both timely and valuable. There is a particular need to (1) identify the types and varieties of in-situ and laboratory strength and property tests performed on marine sediments, (2) determine the environmental handling and preparation factors that affect strength and property measurements, (3) compare laboratory and in-situ strength and property values, and (4) examine the strength and property behavior of different marine sediment types.

A five-day symposium was co-sponsored by ASTM, Tongji University, Lehigh University, and the Chinese Academy of Science to fulfill the aforementioned needs. The chairmen of the symposium were H. Y. Fang (Lehigh University) and T. M. Yu (Tongji University). The symposium was held from 1-4 Nov. 1983 at Tongji University in Shanghai, People's Republic of China. Many of the papers presented at the symposium are published in this volume.

This volume is divided into three parts of roughly equal length: Part A contains papers that discuss the various issues in marine geotechnology involved in offshore engineering; Part B presents papers on geoenvironmental conditions along the coastline of China; and Part C presents recent work on the behavior of pile and gravity platform foundation systems. A table summarizing information within each paper follows the Introduction, and an index of topical data is presented at the end of the volume. A summary to this volume has been prepared by the editors as an additional paper. While the many papers help identify those old and some new methods of handling marine geotechnology problems, they also define the difficulty of working with soft sedi-

ments from a harsh environment. The papers in this volume provide a unifying state-of-the-art review of this topic that should remain a valuable reference for years to come. It is hoped that this work will be the basis for improvements in marine sediment standardization and provide the stimulus for future studies.

This is the fourth volume on Marine Geotechnology that has been sponsored by ASTM. The preceding volumes were

- *Underwater Soil Sampling, Testing, and Construction Control, STP 501*, 1972.
- *Geotechnical Properties, Behavior, and Performance of Calcareous Soils. STP 777*, 1982, K. Demars and R. Chaney, Eds.
- *Strength Testing of Marine Sediments: Laboratory and In-situ Measurements*, STP 883, 1985, R. Chaney and K. Demars, Eds.

The editors wish to acknowledge the support and encouragement provided by ASTM and its staff and the resources and assistance from Humboldt State University, Lehigh University, and Tongji University. The financial support for the symposium was provided by the H. H. Liu Education Foundation of New York. The contributions of the participants and technical reviewers have made this effort a success.

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