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Pile foundations are the most common form of deep foundations that are used both onshore and offshore to transfer large superstructural loads into competent soil strata. This book provides many case histories of failure of pile foundations due to earthquake loading and soil liquefaction. Based on the observed case histories, the possible mechanisms of failure of the pile foundations are postulated. The book also deals with the additional loading attracted by piles in liquefiable soils due to lateral spreading of sloping ground. Recent research at Cambridge forms the backbone of this book with the design methodologies being developed

directly based on quantified centrifuge test results and numerical analysis. The book provides designers and practicing civil engineers with a sound knowledge of pile behaviour in liquefiable soils and easy-to-use methods to design pile foundations in seismic regions. For graduate students and researchers, it brings together the latest research findings on pile foundations in a way that is relevant to geotechnical practice. Sample Chapter(s). Foreword (85 KB). Chapter 1: Performance of Pile Foundations (4,832 KB). Contents: Performance of Pile Foundations; Inertial and Kinematic Loading; Accounting for Axial Loading in Level Ground; Lateral Spreading of Sloping Ground; Axial Loading on Piles in Laterally Spread-

ing Ground; Design Examples. Readership: Researchers, academics, designers and graduate students in earthquake engineering, civil engineering and ocean/coastal engineering.

An unbiased, comprehensive review of helical pile technology and applications Helical piles have risen from being merely an interesting alternative for special cases to a frequently requested, more widely accepted deep foundation adopted into the 2009 International Building Code. The first alternative to manufacturer-produced manuals, Howard Perko's Helical Piles: A Practical Guide to Design and Installation answers the industry's need for an unbiased and universally applicable text dedicated to the design

and installation of helical piles, helical piers, screw piles, and torque anchors. Fully compliant with ICC-Evaluation Services, Inc., Acceptance Criteria for Helical Foundation Systems and Devices (AC358), this comprehensive reference guides construction professionals to manufactured helical pile systems and technology, providing objective insights into the benefits of helical pile foundations over driven or cast foundation systems, and recommending applications where appropriate. After introducing the reader to the basic features, terminology, history, and modern applications of helical pile technology, chapters discuss: Installation and basic geotechnics Bearing and pullout capacity Capacity verification through torque Axial load testing, reliability, and sizing Expansive soil and lateral load resistance Corrosion and life expectancy Foundation, earth retention, and underpinning systems Foundation economics Select proprietary systems IBC and NYC Building codes Covering such issues of concern as environmental sustainability, Helical Piles provides contractors and engineers as well as students in civil engineering with a practical,

real-world guide to the design and installation of helical piles.

Pile Foundations are an essential basis for many structures. It is vital that they be designed with the utmost reliability, because the cost of failure is potentially huge. Covering a whole range of design issues relating to pile design, this book presents economical and efficient design solutions and demonstrates them using real world examples. Co

This international handbook is essential for geotechnical engineers and engineering geologists responsible for designing and constructing piled foundations. It explains general principles and practice and details current types of pile, piling equipment and methods. It includes calculations of the resistance of piles to compressive loads, pile group

This is a concise, systematic and complete treatment of the design and construction of pile foundations. Discusses pile behavior under various loadings and types of piles and their installation, including consideration of soil parameters. It provides step-by-step design procedures for piles subject to vertical loading

and pullout, lateral, inclined and eccentric loads, or dynamic loads, and for piles in permafrost. Also describes load test procedures and their interpretation and buckling of long, slender piles with and without supported length. The closing chapter presents case histories of prediction and performance of piles and pile groups. Includes numerous solved problems.

Piled foundations are generally designed using empirical methods, in particular the traditional capacity based approach on which the majority of codes of practice are based. However in recent years the analysis of pile groups and piled rafts has undergone substantial development in the light of new research and the mechanisms for the interactions b

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This Standard provides a guideline for an engineering approach to the design and subsequent installation of pile foundations. The purpose is to furnish a rational basis for this process, taking into account published model building codes and general standards of practice. It covers such topics as: administrative requirements; pile shaft strength requirements; soil-pile interface strength require-

ments and capacity; design loads; design stresses; construction and layout guidelines for pile design; and installation guidelines for pile construction. In addition, the Standard includes information on applicable standards from ASTM, AWWA, and ACI. It concludes with an Appendix on partial factors of safety.

Introductory technical guidance for civil and geotechnical engineers and construction managers interested in design and construction of pile supported foundations. Here is what is discussed: 1. GENERAL 2. DESIGN CRITERIA 3. PILE CAPACITY 4. SETTLEMENT 5. PILE GROUP ANALYSIS.

Written to Eurocode 7 and the UK National Annex Updated to reflect the current usage of Eurocode 7, along with relevant parts of the British Standards, Pile Design and Construction Practice, Sixth Edition maintains the empirical correlations of the original—combining practical know how with scientific knowledge—and emphasizing relevant principles and applications of soil mechanics and design. Contractors, geotechnical engineers and engineering geologists responsible for designing and con-

structing piled foundations can find the most current types of pile, piling equipment, and relevant methods in this latest work. The book summarizes recent changes, including new codified design procedures addressing design parameters and partial safety factors. It also presents several examples, many based on actual problems. Broad and Comprehensive In Its Coverage Contains material applicable to modern computational practice Provides new sections on the construction of micropiles and CFA piles, pile-soil interaction, verification of pile materials, piling for integral bridge abutments, use of polymer stabilising fluids, and more Includes calculations of the resistance of piles to compressive loads, pile groups under compressive loading, piled foundations for resisting uplift and lateral loading, and the structural design of piles and pile groups Covers marine structures, durability of piled foundations, ground investigations, and pile testing Addresses miscellaneous problems such as machinery foundations, underpinning, mining subsidence areas, geothermal piles, and unexploded ordnance Pile Design and Construction Practice,

Sixth Edition serves as a comprehensive guide for practicing geotechnical engineers and engineering geologists. This text also works as a resource for piling contractors and graduate students studying geotechnical engineering. Introductory technical guidance for civil engineers, geotechnical engineers and construction managers interested in design of pile foundations for buildings and infrastructure features. Here is what is discussed: 1. GENERAL, 2. SELECTION OF PILE-SOIL MODEL, 3. SELECTION OF PILE STRUCTURE MODEL, 4. FINAL LAYOUT, 5. DESIGN OF PILE CAP, 6. SPECIAL CONSIDERATIONS.

Introductory technical guidance for civil, structural and geotechnical engineers interested in design and construction of pile foundations. Here is what is discussed: 1. GENERAL 2. SELECTION OF PILE--SOIL MODEL 3. SELECTION OF PILE STRUCTURE MODEL 4. FINAL LAYOUT 5. DESIGN OF PILE CAP 6. SPECIAL CONSIDERATIONS.

The "Red Book" presents a background to conventional foundation analysis and design. The text is not intended to replace the much more compre-

hensive 'standard' textbooks, but rather to support and augment these in a few important areas, supplying methods applicable to practical cases handled daily by practising engineers and providing the basic soil mechanics background to those methods. It concentrates on the static design for stationary foundation conditions. Although the topic is far from exhaustively treated, it does intend to present most of the basic material needed for a practising engineer involved in routine geotechnical design, as well as provide the tools for an engineering student to approach and solve common geotechnical design problems.

This book provides a comprehensive guide to the design of foundations for tall buildings. After a general review of the characteristics of tall buildings, various foundation options are discussed followed by the general principles of foundation design as applied to tall buildings. Considerable attention is paid to the methods of assessment of the geotechnical design parameters, as this is a critical component of the design process. A detailed treatment is then given to foundation design for vari-

ous conditions, including ultimate stability, serviceability, ground movements, dynamic loadings and seismic loadings. Basement wall design is also addressed. The last part of the book deals with pile load testing and foundation performance measurement, and finally, the description of a number of case histories. A feature of the book is the emphasis it places on the various stages of foundation design: preliminary, detailed and final, and the presentation of a number of relevant methods of design associated with each stage. This manual provides information, foundation exploration and testing procedures, load test methods, analysis techniques, allowable criteria, design procedures, and construction consideration for the selection, design, and installation of pile foundations. The guidance is based on the present state of the technology for pile--soil-structure-foundation interaction behavior. This manual provides design guidance intended specifically for the geotechnical and structural engineer but also provides essential information for others interested in pile foundations such as the construction engineer in understanding construction tech-

niques related to pile behavior during installation. Since the understanding of the physical causes of pile foundation behavior is actively expanding by better definition through ongoing research, prototype, model pile, and pile group testing and development of more refined analytical models, this manual is intended to provide examples and procedures of what has been proven successful. This is not the last nor final word on the state of the art for this technology. We expect, as further practical design and installation procedures are developed from the expansion of this technology, that these updates will be issued as changes to this manual.

Proceedings of the International Deep Foundations Congress 2002, held in Orlando, Florida, February 14-16, 2002. Sponsored by The Geo-Institute of ASCE. This Geotechnical Special Publication contains 110 papers documenting applied research and engineering experience in the area of deep foundations. The volume is a comprehensive resource for both researchers and practitioners covering driven, jacked, and augered piles and drilled shafts. Topics include:

geotechnical design, structural design, innovative construction, validation and verification of design and construction, soil-structure interaction, reliability-based design, field load testing for design, concepts for deep foundation systems (such as piled rafts), numerical and analytical modeling of pile foundations, design of foundations for extreme events, and numerous and varied case histories. Several papers also focus on the acquisition and use of geomaterial properties for deep foundation design and the use of deep foundations in walls.

This study focuses on the quantification of the effect of limited site investigations on the design and performance of pile foundations. Limited site investigation is one of the main causes of structural foundation failures. Over the last 30 years, most site investigations conducted for infrastructure projects have been dictated by minimum cost and time of completion, rather than meeting the need to appropriately characterize soil properties. As a result, limited site investigations remain common, resulting in a higher risk of structural foundation failure, unforeseen additional construction, and/or re-

pair costs. Also, limited site investigations can result in over-designing foundations, leading to unnecessary cost. Based on the reliability examination method for site investigations, the reliability of the foundation design was analyzed with a probabilistic approach, using the Monte Carlo technique. The levels of spatial variability of the soil were found as notable factors affecting the effectiveness of site investigations. The results will assist geotechnical engineers in planning a site investigation in a more rational manner with knowledge of the associated risks.

Contributions feature the use of in-situ tests in design; recent studies on the full-scale field behavior of pile groups and installation of driven piles; and the design and construction of drilled shaft foundations in hard soils and soft rock.

This document presents comprehensive design examples for driven pile foundations on highway structures. The worked design examples supplement the material presented in FHWA-NHI-16-009 and FHWA-NHI-16-010, the primary FHWA guidance documents on driven pile foundations. The

worked LRFD design examples address strength, service and extreme limit state considerations for a two span bridge structure in highly variable subsurface conditions. Pile foundation design examples in cohesionless, cohesive, and layered soil profiles are presented as well as pile design on hard rock. The worked examples follow the step by step design and construction process outlined in Chapter 2 of FHWA-NHI-16-009 (Geotechnical Engineering Circular No. 12 - Volume I Design and Construction of Driven Pile Foundations).

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This volume on "Advances in Analysis and Design of Deep Foundations" contains 22 technical papers which cover various aspects of analysis and design of deep foundations based on full-scale field testing, numerical modeling, and analytical solutions. The technical papers are 8-10 pages long that present the results and findings from research as well as practical-oriented studies on deep foundations that are of interest to civil/geotechnical engineering community. The topics cover a wide spectrum of applications that include evaluation of the axial and lateral capacity of piles, pile group effects, evaluation of the increase in pile ca-

capacity with time (or pile setup), influence of excavation on pile capacity, study the behavior of pile raft caisson foundations, evaluate the bearing capacity and settlement of piles from cone penetration tests, etc. This volume is part of the proceedings of the 1st GeoMEast International Congress and Exhibition on Sustainable Civil Infrastructures, Egypt 2017.

This book presents computational tools and design principles for piles used in a wide range of applications and for different loading conditions. The chapters provide a mixture of basic engineering solutions and latest research findings in a balanced manner. The chapters are written by world-renowned experts in the field. The materials are presented in a unified manner based on both simplified and rigorous numerical methods. The first four chapters present the basic elements and steps in analysis of piles under static and cyclic loading together with clear references to the appropriate design regulations in Eurocode 7 when relevant. The analysis techniques cover conventional code-based methods, solutions based on pile-soil interaction

springs, and advanced 3D finite element methods. The applications range from conventional piles to large circular steel piles used as anchors or monopiles in offshore applications. Chapters 5 to 10 are devoted to dynamic and earthquake analyses and design. These chapters cover a range of solutions from dynamic pile-soil springs to elasto-dynamic solutions of large pile groups. Both linear and nonlinear soil behaviours are considered along with response due to dynamic loads and earthquake shaking including possible liquefaction. The book is unique in its unified treatment of the solutions used for static and dynamic analysis of piles with practical examples of application. The book is considered a valuable tool for practicing engineers, graduate students and researchers. Pile Design and Construction Rules of Thumb presents Geotechnical and Civil Engineers a comprehensive coverage of Pile Foundation related theory and practice. Based on the author's experience as a PE, the book brings concise theory and extensive calculations, examples and case studies that can be easily applied by professional in their day-

to-day challenges. In its first part, the book covers the fundamentals of Pile Selection: Soil investigation, condition, pile types and how to choose them. In the second part it addresses the Design of Pile Foundations, including different types of soils, pile groups, pile settlement and pile design in rock. Next, the most extensive part covers Design Strategies and contains chapters on loading analysis, load distribution, negative skin friction, design for expansive soils, wave equation analysis, batter piles, seismic analysis and the use of softwares for design aid. The fourth part covers Construction Methods including hammers, Inspection, cost estimation, load tests, offshore piling, beams and caps. In this new and updated edition the author has incorporated new pile designs such as helical, composite, wind turbine monopiles, and spiral coil energy piles. All calculations have been updated to most current materials characteristics and designs available in the market. Also, new chapters on negative skin friction, pile driving, and pile load testing have been added. Practicing Geotechnical, and Civil Engineers will find in this

book an excellent handbook for frequent consult, benefiting from the clear and direct calculations, examples, and cases. Civil Engineering preparing for PE exams may benefit from the extensive coverage of the subject. Convenient for day-to-day consults; Numerous design examples for sandy soils, clay soils, and seismic loadings; Now including helical, composite, wind turbine monopiles, and spiral coil energy piles; Methodologies and case studies for different pile types; Serves as PE exam preparation material.

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