

Pile Cap Analysis Design And Detailing In Accordance

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 (AC308), 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.

A detailed guide providing a comprehensive overview of pile cap design, detailing and analysis methodologies

This book is unique on the subject because it is not so much a collection of individual work, but basically comprising national reports from most European countries on the present-day design methods, as prescribed in more or less strict national codes or recommendations and so daily used in practice by consulting engineers and contractors. As far as already implemented, the application of these methods within the framework of Eurocode 7 is described as well. In order to improve the understanding of the design methods, the national papers also consider aspects such as the local piling practice, limitations of the design methods, some practical examples and particular national experiences. The proceedings also include the contributions of two invited speakers as well as those of the three session discussion leaders, focusing on some particular aspects with regards to pile design. The book is of particular interest for those who are involved with pile design in practice, consulting engineers, piling contractors, control organisms as well as those dealing with geotechnical normalisation and research work.

This new edition of a highly practical text gives a detailed presentation of the design of common reinforced concrete structures to limit state theory in accordance with BS 8110.

This book 'Design of Concrete Structures' in S.I. Units is based on working stress method as per code IS: 456-2000. All the chapters of the book have been revised and re-arranged in eight parts (32 thirty two chapters) separate aspects of design of one structural member have been described in different subsequent chapters. In addition to above (i) the service life of concrete structures, (ii) Non-destructive tests/ Evaluation of strength (NDT/NDE) of materials and (iii) futuristic construction materials and Technique (FCMT) likely to be used for the concrete are new topics. Text for these topics (rarely, available in current books by other authors) have been first time given to familiarize the readers.

This book is intended to serve as a textbook for engineering courses on earthquake resistant design. The book covers important attributes for seismic design such as material properties, damping, ductility, stiffness and strength. The subject coverage commences with simple concepts and proceeds right up to nonlinear analysis and push-over method for checking building adequacy. The book also provides an insight into the design of base isolators highlighting their merits and demerits. Apart from the theoretical approach to design of multi-storey buildings, the book highlights the care required in practical design and construction of various building components. It covers modal analysis in depth including the important missing mass method of analysis and tension shift in shear walls and beams. These have important bearing on reinforcement detailing. Detailed design and construction features are covered for earthquake resistant design of reinforced concrete as well as confined and reinforced masonry structures. The book also provides the methodology for assessment of seismic forces on basement walls and pile foundations. It provides a practical approach to design and detailing of soft storeys, short columns, vulnerable staircases and many other components. The book bridges the gap between design and construction. Plenty of worked illustrative examples are provided to aid learning. This book will be of value to upper undergraduate and graduate students taking courses on seismic design of structures.

This handbook provides a complete and detailed overview of piling systems and their application. The design and construction of piled foundations is based on Eurocode 7 and DIN 1054 edition 2010 as well as the European construction codes DIN EN 1536 (Bored piles), DIN EN 12699 (Displacement piles) and DIN EN 14199 (Micropiles). These recommendations also deal with - categorisation of piling systems, - actions on piles from structural loading, negative skin friction and side pressure, - pile resistances from static and dynamic pile test loading as well as extensive tables with the pile load-bearing capacity of nearly all piling systems based on values from practical experience, - pile groups, - performance of static and dynamic test loading and integrity tests, - load-bearing behaviour and verifications for piles under cyclical, dynamic and impact actions - quality assurance for construction. An appendix with numerous calculation examples completes the work. As part of the approval procedure for offshore wind energy structures, the Federal Office for Shipping and Hydrography (BSH) demands verifications according to the new Chapter 13 ("Load-bearing behaviour and verifications for piles under cyclical, dynamical and impact actions") of the EA Pfähle (the recommendations of the Piling working group - 2nd edition), which deals with external pile resistance for the foundations of offshore wind energy structures and the types of verifications to be provided under cyclical actions. The publication of the EA-Pfähle recommendations by the Piling working group of the German Society for Geotechnics (DGGT), which works with the same members as the piling standards committee NA 00-05-07, is intended to provide assistance for engineers active in the design, calculation and construction of piled foundations. The recommendations can thus be considered as rules of the technology and as a supplement to the available codes and standards.

Pile caps are structural elements used to transmit loads from structural columns into pile groups. A pile cap is generally constructed of reinforced concrete and contains only minimal flexural reinforcing steel. Using modern design methods, the anchorage of the flexural steel may limit the design capacity of existing pile caps. To develop new data on performance of existing pile

caps with poorly detailed flexural reinforcing steel, four pile cap specimens were constructed and tested. The specimens were full-size representations of in-situ pile caps used in a mid-rise hospital building. Materials used to construct the specimens were selected to represent those of the in-situ pile caps. Tests were conducted until failure or the maximum capacity of the hydraulic loading system was achieved. Design methods were used to compare the predicted design strength with the measured experimental strength of the specimens. Based on the observed experimental response, specimens exhibited either two-way punching shear or one-way shear failure modes. Widespread yielding and little relative slip of the embedded reinforcing steel were observed. The modern design methods were sometimes conservative and sometimes unconservative in predicting the strength of the specimens.

An exploration of the world of concrete as it applies to the construction of buildings, Reinforced Concrete Design of Tall Buildings provides a practical perspective on all aspects of reinforced concrete used in the design of structures, with particular focus on tall and ultra-tall buildings. Written by Dr. Bungale S. Taranath, this work explains the fundamental principles and state-of-the-art technologies required to build vertical structures as sound as they are eloquent. Dozens of cases studies of tall buildings throughout the world, many designed by Dr. Taranath, provide in-depth insight on why and how specific structural system choices are made. The book bridges the gap between two approaches: one based on intuitive skills and experience and the other based on computer skills and analytical techniques. Examining the results when experiential intuition marries unfathomable precision, this book discusses: The latest building codes, including ASCE/SEI 7-05, IBC-06/09, ACI 318-05/08, and ASCE/SEI 41-06 Recent developments in studies of seismic vulnerability and retrofit design Earthquake hazard mitigation technology, including seismic base isolation, passive energy dissipation, and damping systems Lateral bracing concepts and gravity-resisting systems Performance based design trends Dynamic response spectrum and equivalent lateral load procedures Using realistic examples throughout, Dr. Taranath shows how to create sound, cost-efficient high rise structures. His lucid and thorough explanations provide the tools required to derive systems that gracefully resist the battering forces of nature while addressing the specific needs of building owners, developers, and architects. The book is packed with broad-ranging material from fundamental principles to the state-of-the-art technologies and includes techniques thoroughly developed to be highly adaptable. Offering complete guidance, instructive examples, and color illustrations, the author develops several approaches for designing tall buildings. He demonstrates the benefits of blending imaginative problem solving and rational analysis for creating better structural systems.

This work is intended to provide the practicing engineer with a detailed overview of pile cap design, detailing, and analysis methodologies that in accordance with the 2014 AASHTO LRFD Bridge Design Specifications (AASHTO)

This volume presents some advances in the analysis and design of deep foundations. It contains 21 technical papers covering various aspects of analysis and design of deep foundations based on full-scale field testing, numerical modeling and analytical solutions. They present 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 capacity with time (or pile setup), influence of excavation on pile capacity, study the behavior of pile raft caisson foundations, evaluation of the bearing capacity and settlement of piles from cone penetration tests, etc. The volume is based on the best contributions to the 2nd GeoMEast International Congress and Exhibition on Sustainable Civil Infrastructures, Egypt 2018 – The official international congress of the Soil-Structure Interaction Group in Egypt (SSIGE).

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 an

The purpose of this book is to provide a straightforward introduction to the principles and methods of design for concrete structures. It is directed primarily at students and young designers who require understanding of the basic theory and a concise guide to design procedures. The theory and practice described in the book are of a fundamental nature and will be of use internationally. Limit state concepts are used, and the calculations are in SI units throughout. The principal aim of the fifth edition has been to update the text to incorporate changes and amendments introduced in the 1997 version of BS8110 and to include new material such as pile cap design. A complete new chapter on composite construction has been introduced.

Important equations that have been derived within the text are highlighted by an asterix adjacent to the equation number.

Over 140 experts, 14 countries, and 89 chapters are represented in the second edition of the Bridge Engineering Handbook. This extensive collection highlights bridge engineering specimens from around the world, contains detailed information on bridge engineering, and thoroughly explains the concepts and practical applications surrounding the subject. Published in five books: Fundamentals, Superstructure Design, Substructure Design, Seismic Design, and Construction and Maintenance, this new edition provides numerous worked-out examples that give readers step-by-step design procedures, includes contributions by leading experts from around the world in their respective areas of bridge engineering, contains 26 completely new chapters, and updates most other chapters. It offers design concepts, specifications, and practice, as well as the various types of bridges. The text includes over 2,500 tables, charts, illustrations and photos. The book covers new, innovative and traditional methods and practices; explores rehabilitation, retrofit, and maintenance; and examines seismic design and building materials. The third book, Substructure Design, contains 11 chapters addressing the various substructure components. What's New in the Second Edition: • Includes new chapter: Landslide Risk Assessment and Mitigation • Rewrites the Shallow Foundation chapter • Rewrites the Geotechnical Consideration chapter and retitles it as: Ground Investigation • Updates the Abutments and Retaining Structures chapter and divides it into two chapters: Abutments and Earth Retaining Structures This text is an ideal reference for practicing bridge engineers and consultants (design, construction, maintenance), and can also be used as a reference for students in bridge engineering courses.

The Geotechnical Engineering Handbook brings together essential information related to the evaluation of engineering properties of soils, design of foundations such as spread footings, mat foundations, piles, and drilled shafts, and fundamental principles of analyzing the stability of slopes and embankments, retaining walls, and other earth-retaining structures. The Handbook also covers soil dynamics and foundation vibration to analyze the behavior of foundations subjected to cyclic vertical, sliding and rocking excitations and topics addressed in some detail include: environmental geotechnology and foundations for railroad beds.

The latest edition of this well-known book makes available to structural design engineers a wealth of practical advice on effective design of concrete structures. It covers the complete range of concrete elements and includes numerous data sheets, charts and examples to help the designer. It is fully updated in line with the relevant British Standards and Codes of Practice.

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.

Although foundation engineering is recognised as a mature discipline with geotechnics, the diversity of applications and studies evident in this book demonstrates that the field is still developing and will continue to provide challenges for engineers for many years.

Structural Modeling and Experimental Techniques presents a current treatment of structural modeling for applications in design, research, education, and product development. Providing numerous case studies throughout, the book emphasizes modeling the behavior of reinforced and prestressed concrete and masonry structures. Structural Modeling and Experimental Techniques: Concentrates on the modeling of the true inelastic behavior of structures Provides case histories detailing applications of the modeling techniques to real structures Discusses the historical background of model analysis and similitude principles governing the design, testing, and interpretation of models Evaluates the limitations and benefits of elastic models Analyzes materials for reinforced concrete masonry and steel models Assesses the critical nature of scale effects of model testing Describes selected laboratory techniques and loading methods Contains material on errors as well as the accuracy and reliability of physical modeling Examines dynamic similitude and modeling techniques for studying dynamic loading of structures Covers actual applications of structural modeling This book serves students in model analysis and experimental methods, professionals manufacturing and testing structural models, as well as professionals testing large or full-scale structures - since the instrumentation techniques and overall approaches for testing large structures are very similar to those used in small-scale modeling work.

This thesis is concerned with study of behavior of pile to pile-cap connection with respect to lateral loads. In this connection prestressed precast concrete piles and reinforced concrete pile caps were given particular attention. General parameters for the design of pile-pile cap connection are discussed with reference to ACI Code and New Zealand Code. Seismic design philosophies for prestressed concrete pile and reinforced concrete pile cap connections are given in the summary form. A review of the previous works concerning pile-pile cap connections is given along with comments. The properties of main materials, ie, concrete and steel are discussed, elaborating their physical models. Analytical methods for analysis are discussed with a short review of the analytical as well as mathematical models for concrete and steel. Reinforced concrete models are discussed for the finite element method of analysis. Seismic design methodology for bridge piers is discussed in order to develop understandings of the possible origins and effects of the lateral loads on the pile-pile cap connections. Design of reinforced concrete pile cap is discussed along with assumptions, design steps and explanatory examples according to ACI Code as well as New Zealand Code. Six pile-pile cap connections are modelled incorporating the improved material properties as well as detailing of reinforcement. The analysis of these models is carried out by the finite element method, using 'ABAQUS' program, and the results are compared with the experimental results. The proposed models have shown satisfactory results in most of the areas. There are valuable indications of requirements for further research in some areas. Finally, a number of recommendations are offered on the basis of the observations made and conclusions drawn during this study. Recommendations are also made for areas demanding further research for better understanding of the behavior of pile-pile cap connections. Comments are offered about "ABAQUS" for the aspects which demand further elaboration for better understanding and convenient application of the program.

A basal reinforced piled embankment consists of a reinforced embankment on a pile foundation. The reinforcement consists of one or more horizontal layers of geosynthetic reinforcement installed at the base of the embankment. A basal reinforced piled embankment can be used for the construction of a road or a railway when a traditional construction method would require too much construction time, affect vulnerable objects nearby or give too much residual settlement, making frequent maintenance necessary. This publication is a guideline (CUR226) for the design of basal reinforced piled embankments. The guideline covers the following subjects: a survey of the requirements and the basic principles for the structure as a whole; some instructions for the pile foundation and the pile caps; design rules for the embankment with the basal geosynthetic reinforcement; extensive calculation examples; finite element calculations; construction details and management and maintenance of the piled embankment. The guideline includes many practical tips. The design guideline is based on state-of-the-art Dutch research, which was conducted in cooperation with many researchers from different countries.

A preliminary investigation was conducted on the behavior of steel pipe pile to concrete pile cap connections for bridge structures subjected to extreme seismic and ice forces. This investigation consisted of reviewing available information on the analysis, design, and performance of steel pipe pile to concrete pile cap connections, setting up a finite element model for analyzing the behavior of these connections, and investigating a method for experimentally testing these connections. Only limited information on the behavior of steel pipe pile to concrete pile cap was found during the literature search. Therefore, a finite element model was developed to study connection behavior. The model, developed in ANSYS, consisted of a typical bridge bent (comprised of steel pipe piles topped with a concrete pile cap) and superstructure. The concrete and steel were represented with 3D brick and link elements. All materials were modeled as linear and elastic. Inelastic material behavior was studied in some detail, and issues that need to be addressed in future analyses in modeling such behaviors were identified. The finite element model was used to study the behavior of the pipe pile to concrete pile cap connection in different situations. The model was loaded with a horizontally directed inertial body force of 1 g to study the behavior of the connection under lateral seismic loads. Ice loads were applied as pressures acting directly

on the pile cap (high water case) and on the lead pile in a bent. These pressures varied from 0 to 200 psi (0 to 1379 kPa). In general, large stresses and strains were predicted in the pile to pile cap connection under seismic loads. The predicted strains exceeded the elastic limit of the materials, suggesting that large deformations and significant damage may occur in the pile and cap under seismic loads. The stresses and strains predicted in the ice load analyses were significantly lower than those predicted in the seismic analyses, and only minor damage would be expected in the pile and cap under ice loads. Parametric calculations were performed to estimate the effect of deck support conditions, pile height, pile embedment, and pile reinforcement on connection response. Performance of the finite element model was validated by comparing its results with the results of simple hand calculations and with the results of a test on a physical model of a pile and pile cap. The hand calculations were performed using a simple 2D frame model of a typical bent. The physical test was performed on a 1/2 size model of an interior section of a typical bent. Further calculations need to be done that realistically consider the inelastic response of the pile and cap materials under seismic loads. The objectives of such calculations would be (a) to precisely determine the vulnerability (strength and ductility) of these connections under seismic loads, (b) to develop retrofit strategies for existing connections, and (c) to develop design approaches for new connections, as necessary.

This book bridges the gap between academic and professional field pertaining to design of industrial reinforced cement concrete and steel structures. It covers pertinent topics on contracts, specifications, soil survey and design criteria to clarify objectives of the design work. Further, it gives out guiding procedures on how to proceed with the construction in phases at site, negotiating changes in equipment and design development. Safety, quality and economic requirements of design are explained with reference to global codes. Latest methods of analysis, design and use of advanced construction materials have been illustrated along with a brief on analysis software and drafting tool.

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 extensively revised and updated fourth edition provides engineers with the principles and tools needed to turn their familiarity with earlier ACI Codes into more profitable, time-saving routine designs. Created to be used with the ACI Code and Commentary, this outstanding guide follows the new Code format with information covered in more specific sections and subsections in order to enhance clarity. In addition, it shortens the time needed for computer-aided design and analysis, converts code formulas from the review form to direct design, and presents simple formulas, tabulations, and charts for conservative longhand direct design. Two convenient indices - a subject index and a 1995 Code section index - are provided, enabling engineers to quickly locate all Code references to a particular topic, as well as concise interpretation of a given Code section. The Guide also saves engineers time and effort on the job with its detailed coverage of: torsional stiffness, braced and unbraced slender columns with and without sidesway, wide-module joist systems, reinforcement details for economy in design, detailing, fabricating, field erection, and inspection, latest ASTM material specifications, anchorage, development, and splice requirements, high-strength concrete, comparisons between wall and column economy, structural plain concrete. More than ever, the sure-handed Structural Design Guide to the ACI Building Code is an indispensable practical reference for structural, civil, and architectural engineers and students who want to safely meet modern building requirements while taking full advantage of every economy permitted by the 1995 ACI Code.

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Effective measurement of the composition and properties of petroleum is essential for its exploration, production, and refining; however, new technologies and methodologies are not adequately documented in much of the current literature. Analytical Methods in Petroleum Upstream Applications explores advances in the analytical methods and instrumentation that allow more accurate determination of the components, classes of compounds, properties, and features of petroleum and its fractions. Recognized experts explore a host of topics, including: A petroleum molecular composition continuity model as a context for other analytical measurements A modern modular sampling system for use in the lab or the process area to collect and control samples for subsequent analysis The importance of oil-in-water measurements and monitoring The chemical and physical properties of heavy oils, their fractions, and products from their upgrading Analytical measurements using gas chromatography and nuclear magnetic resonance (NMR) applications Asphaltene and heavy ends analysis Chemometrics and modeling approaches for understanding petroleum composition and properties to improve upstream, midstream, and downstream operations Due to the renaissance of gas and oil production in North America, interest has grown in analytical methods for a wide range of applications. The understanding provided in this text is designed to help chemists, geologists, and chemical and petroleum engineers make more accurate estimates of the crude value to specific refinery configurations, providing insight into optimum development and extraction schemes.

Analysis, Design and Construction of Foundations outlines methods for analysis and design of the construction of shallow and deep foundations with particular reference to case studies in Hong Kong and China, as well as a discussion of the methods used in other countries. It introduces the main approaches used by geotechnical and structural engineers, and the precautions required for planning, design and construction of foundation structures. Some computational methods and computer programmes are reviewed to provide tools for performing a more realistic analysis of foundation systems. The authors examine in depth the methods used for constructing shallow foundations, deep foundations, excavation and lateral support systems, slope stability analysis and construction, and ground monitoring for proper site management. Some new and innovative foundation construction methods are also introduced. It is illustrated with case studies of failures and defects from actual construction projects. Some advanced and modern theories are also covered in this book. This book is more targeted towards the understanding of the basic behavior and the actual construction of many geotechnical works, and this book is not dedicated to any design code or specification, though Euro codes and Hong Kong code are also used in this book for illustration. It is ideal for consulting geotechnical engineers, undergraduate and postgraduate students.

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

With chapters culled from the acclaimed Bridge Engineering Handbook, Bridge Engineering: Substructure Design focuses on the various components comprising and affecting bridge substructures. These include bearings, piers and columns, towers, abutments and retaining structures, footings and foundations, and bridge hydraulics. For each component, the contributing

