Stress Analysis Of Buried Pipeline Using Finite Element Method

Process Piping
Pipe Stress Engineering

This book, for the first time, introduces comprehensively all main topics of lifeline earthquake engineering, including the structure analysis, network evaluation, and network design. The distinctive features involved in this book are the construction of theories and methods for stochastic analysis of structures based on the physical idea, probability analytical algorithms for network evaluation by employing Boolean Algebra, functional evaluation of water distribution networks using hydraulic analysis, and network design methods by employing genetic, simulated annealing, and hybrid algorithms.

Pipeline Engineering ebook Collection

Dynamics of Soil and Modelling of Geotechnical Problems

Mechanical Stress Analysis

This one-of-a-kind resource touches on everything engineers need to know to work with and design buried piping systems. Discusses all aspects of pipe design, from basic design principles to matters relating to soil. New to this edition: coverage of materials, such as profile-wall polyurethane; new standards from ASTM, AWWA, ASHTTO, and TRB; a new safety section; and more design examples.

Pipeline Rules of Thumb Handbook

Mechanical Behavior of High-Strength Low-Alloy Steels

This volume contains contributions by eminent researchers in the field of geotechnical engineering. The chapters of this book are based on the keynote and theme lectures delivered at the Indian Geotechnical Conference 2018, and discuss the recent issues and
challenges, while providing perspective on the possible solutions and future directions. A strong emphasis is placed on proving connections between academic research and field practice, with many examples and case studies. Topics covered in this volume include contemporary infrastructural challenges, underground space utilization, sustainable construction, dealing with problematic soils and situations and geo-environmental issues including landfills. This book will be of interest to researchers, practitioners and students alike.

Unsaturated Soil Mechanics - from Theory to Practice

This book presents state-of-the-art methodologies for the design and analysis of buried steel pipelines subjected to severe ground-induced action, including tectonic (quasi-static) effects, slope movements (landslides), liquefaction-induced actions or excavation-induced settlements. The text is an amended version of the final deliverables of the GIPIPE project, sponsored by the European Commission (Research Fund for Coal and Steel programme, 2011-2014). Geohazards and Pipelines presents an integrated investigation of this subject, using advanced and innovative experimental techniques, high-performance numerical simulations and novel analytical methodologies, which account for the particularities of buried steel pipelines with an emphasis on soil-pipeline interaction. Geohazards and Pipelines will be of use to professionals working in the field of pipeline engineering, including design consultants and industrial practitioners involved in projects related to pipeline infrastructure. Structural engineers, mechanical engineers, geotechnical engineers, geologists and seismologists may also find this book of interest, as may graduate students and researchers in these areas.

Numerical Methods in Geotechnical Engineering IX, Volume 2

Numerical Methods in Geotechnical Engineering IX contains 204 technical and scientific papers presented at the 9th European Conference on Numerical Methods in Geotechnical Engineering (NUMGE2018, Porto, Portugal, 25-27 June 2018). The papers cover a wide range of topics in the field of computational geotechnics, providing an overview of recent developments on scientific achievements, innovations and engineering applications related to or employing numerical methods. They deal with subjects from emerging research to engineering practice, and are grouped under the following themes: Constitutive modelling and numerical implementation Finite element, discrete element and other numerical methods. Coupling of diverse methods Reliability and probability analysis Large deformation – large strain analysis Artificial intelligence and neural networks Ground flow, thermal and coupled analysis Earthquake engineering, soil dynamics and soil-structure interactions Rock mechanics Application of numerical methods in the context of the Eurocodes Shallow and deep foundations Slopes and cuts Supported excavations and retaining walls Embankments and dams Tunnels and caverns (and pipelines) Ground improvement and reinforcement Offshore geotechnical engineering Propagation of vibrations Following the objectives of previous eight thematic conferences, (1986 Stuttgart, Germany; 1990 Santander, Spain; 1994 Manchester, United Kingdom; 1998 Udine, Italy; 2002 Paris, France; 2006 Graz, Austria; 2010 Trondheim, Norway; 2014 Delft, The Netherlands), Numerical Methods in Geotechnical Engineering IX updates the state-of-the-art regarding the application of numerical methods in geotechnics, both in a scientific perspective and in what concerns its application for solving practical boundary value problems. The book will be much of interest to engineers, academics and professionals involved or interested in Geotechnical Engineering. This is volume 2 of the NUMGE 2018 set.

Understanding and Reducing Landslide Disaster Risk


Pipelines 2013

This book presents selected papers from the International Symposium on Geotechnics for Transportation Infrastructure (ISGTI 2018). The research papers cover geotechnical interventions for the diverse fields of policy formulation, design, implementation, operation and management of the different modes of travel, namely road, air, rail and waterways. This book will be of interest to academic and industry researchers working in transportation geotechnics, as also to practicing engineers, policy makers, and civil
Agencies.

Structural Mechanics of Buried Pipes

This collection contains 200 papers presented at the ASCE International Conference on Pipeline Engineering and Construction, held in Baltimore, Maryland, July 13–16, 2003.

Stress Corrosion Cracking of Pipelines

Explains why pipeline stress corrosion cracking happens and how it can be prevented. Pipelines sit at the heart of the global economy. When they are in good working order, they deliver fuel to meet the ever-growing demand for energy around the world. When they fail due to stress corrosion cracking, they can wreak environmental havoc. This book skillfully explains the fundamental science and engineering of pipeline stress corrosion cracking based on the latest research findings and actual case histories. The author explains how and why pipelines fall prey to stress corrosion cracking and then offers tested and proven strategies for preventing, detecting, and monitoring it in order to prevent pipeline failure. Stress Corrosion Cracking of Pipelines begins with a brief introduction and then explores general principals of stress corrosion cracking, including two detailed case studies of pipeline failure. Next, the author covers: Near-neutral pH stress corrosion cracking of pipelines High pH stress corrosion cracking of pipelines Stress corrosion cracking of pipelines in acidic soil environments Stress corrosion cracking at pipeline welds Stress corrosion cracking of high-strength pipeline steels The final chapter is dedicated to effective management and mitigation of pipeline stress corrosion cracking. Throughout the book, the author develops a number of theoretical models and concepts based on advanced microscopic electrochemical measurements to help readers better understand the occurrence of stress corrosion cracking. By examining all aspects of pipeline stress corrosion cracking—the causes, mechanisms, and management strategies—this book enables engineers to construct better pipelines and then maintain and monitor them to ensure safe, reliable energy supplies for the world.

BURIED PIPE DESIGN 3/E

This report provides recommendations to revise the AASHTO LRFD Bridge Design Specifications relating to the distribution of live load to buried structures. The report details the development of simplified design equations (SDEs) for structural response based on three-dimensional (3D) analysis of 830 buried culverts. In addition, the report provides guidelines for conducting 2D and 3D modeling for design situations with conditions not covered by the SDEs. The material in this report will be of immediate interest to roadway and bridge designers.

Lifeline Engineering Systems


Recommended Design Specifications for Live Load Distribution to Buried Structures

The 5th International Conference on Civil Engineering and Urban Planning (CEUP2016) was held in Xi’an, China on August 23 – 26, 2016. CEUP2016 gathered outstanding scientists and researchers worldwide to exchange and discuss new findings in civil engineering and urban planning associated with transportation and environmental topics. The conference program committee is also greatly honored to have four renowned experts for taking time off to present their keynotes to the conference. The conference had received a total of 410 submissions, which after peer review by the Technical Program Committee, only 108 were...
selected to be included in this conference proceedings, which covers Architecture and Urban Planning; Civil Engineering and Transportation Engineering.

Advances in Civil Engineering and Building Materials IV

Civil Engineering And Urban Planning – Proceedings Of The 5th International Conference On Civil Engineering And Urban Planning (Ceup2016)

Provides background information, historical perspective, and expert commentary on the ASME B31.3 Code requirements for process piping design and construction. It provides the most complete coverage of the Code that is available today and is packed with additional information useful to those responsible for the design and mechanical integrity of process piping.

Maintaining Financial Stability in Times of Risk and Uncertainty

Buried pipes are a highly efficient method of transport. In fact, only open channels are less costly to construct. However, the structural mechanics of buried pipes can be complicated, and imprecisions in the properties of the soil envelope are usually too great to justify lengthy, complicated analyses. Designers and engineers need principles and m

Geohazards and Pipelines

GIPIPE combines geotechnical engineering concepts with mechanical and pipeline engineering practice, towards developing design guidelines/recommendations for safeguarding the structural integrity of buried welded steel pipelines under severe ground-induced actions. Permanent ground-induced actions are considered (fault motion, landslides, liquefaction-induced lateral spreading). The guidelines improve and extend current design practice, considering steel pipeline particularities and emphasizing on soil-pipe interaction. The following intermediate targets have been achieved: Critical evaluation of current design practice and pipeline incidents, towards identifying specific needs for developing pipeline novel design methodologies against geohazards (WP1); development of rigorous three-dimensional models for analysing buried pipelines under permanent ground actions (faults, landslides, liquefaction) with emphasis on soil material modelling (WP2); preparation of experimental set-up, acquisition of pipe specimens, material testing (WP3); performance of large-scale and small-scale experiments, with the purpose of examining soil-pipe interaction (WP4); extensive parametric analyses of buried pipelines under ground-induced actions (fault action, landslides, lateral spreading, settlements) (WP5); proposal of calibrated methodologies for simple and efficient stress analysis of buried pipelines for design purposes (WP6); presentation of guidelines for buried pipeline design against permanent ground-induced actions, summarizing existing knowledge and incorporating all results (WP6); dissemination of the results through a dedicated workshop (WP6). The GIPIPE results and deliverables are both novel and unique, resulting in development and validation of rigorous and simplified models, capable at describing large permanent deformations of buried pipelines, better understanding of soil-pipe interaction under severe ground-induced actions, significant improvement of pipeline design state-of-the-art in geohazard areas.

Buried Flexible Steel Pipe

Deep Rock Mechanics: From Research to Engineering

NUMGE 2018 is the ninth in a series of conferences on Numerical Methods in Geotechnical Engineering organized by the ERTC7 under the auspices of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). The first conference was held in 1986 in Stuttgart, Germany and the series continued every four years (1990 Santander, Spain; 1994 Manchester, United Kingdom; 1998 Udine, Italy; 2002 Paris, France; 2006 Graz, Austria; 2010 Trondheim, Norway; 2014 Delft, The Netherlands). The conference provides a forum for exchange of ideas and discussion on topics related to numerical modelling in geotechnical engineering. Both senior and young researchers, as well as scientists and engineers from Europe and overseas, are invited to attend this conference to share and exchange their knowledge and experiences.
Read Book Stress Analysis Of Buried Pipeline Using Finite Element Method

14th International Probabilistic Workshop

This book is a part of ICL new book series “ICL Contribution to Landslide Disaster Risk Reduction” founded in 2019. Peer-reviewed papers submitted to the Fifth World Landslide Forum were published in six volumes of this book series. This book contains the following parts: • Impact of Large Ground Deformations near Seismic Faults on Critically Important Civil Infrastructures• Recent Progress in the Landslide Initiating Science• Earth Observation and Machine Learning in Landslide Science• General Landslide Studies Professor Željko Arbanas is the Vice President of International Consortium on Landslides. He is a Professor of Faculty of Civil Engineering, University of Rijeka, Croatia. He is the Assistant Editor-in-Chief of International Journal Landslides. Professor Peter Bobrowsky is the President of International Consortium on Landslides. He is a Senior Scientist of Geological Survey of Canada, Ottawa, Canada. Professor Kazuo Konagai is Professor Emeritus at the University of Tokyo and Principal Researcher at the ICL Headquarters. He serves as the Secretary-General of the Fifth World Landslide Forum. Professor Kyoji Sassa is the Founding President and the Secretary-General of the International Consortium on Landslides (ICL). He has been the Editor-in-Chief of International Journal Landslides since its foundation in 2004. Professor Kaoru Takara is the Executive Director of International Consortium on Landslides. He is a Professor and Dean of Graduate School of Advanced Integrated Studies (GSAIS) in Human Survivability (Shishu-Kan), Kyoto University.

Safety of Buried Steel Pipelines Under Ground-induced Deformations (GIPIPE)

This is the third book in a series on Computational Methods in Earthquake Engineering. The purpose of this volume is to bring together the scientific communities of Computational Mechanics and Structural Dynamics, offering a wide coverage of timely issues on contemporary Earthquake Engineering. This volume will facilitate the exchange of ideas in topics of mutual interest and can serve as a platform for establishing links between research groups with complementary activities. The computational aspects are emphasized in order to address difficult engineering problems of great social and economic importance.

Computational Methods in Earthquake Engineering

This book is a printed edition of the Special Issue “Mechanical Behavior of High-Strength Low-Alloy Steels” that was published in Metals

Mechanical Stress Analysis of Buried Pipeline

Energy Research Abstracts

Unearth the Secrets of Designing and Building High-Quality Buried Piping Systems This brand-new edition of Buried Pipe Design helps you analyze the performance of a wide range of pipes, so you can determine the proper pipe and installation system for the job. Covering almost every type of rigid and flexible pipe, this unique reference identifies and describes factors involved in working with sewer and drain lines, water and gas mains, subway tunnels, culverts, oil and coal slurry lines, and telephone and electrical conduits. It provides clear examples for designing new municipal drinking and wastewater systems or rehabilitating existing ones that will last for many years on end. Comprehensive in scope and meticulously detailed in content, this is the pipe design book you’ll want for a reference. This NEW edition includes: Important data on the newest pipe styles, including profile-wall polyethylene Updated references to ASTM, AWWA, and ASHTTO, standards Numerous examples of specific types of pipe system designs Safety precautions included in installation specifications Greater elaboration on trenchless technology methods New information on the cyclic life of PVC pressure pipe Buried Pipe Design covers the ins and outs of: External Loads Gravity Flow Pipe Design Pressure Pipe Design Rigid Pipe Products Flexible Steel Pipe Flexible Ductile Iron Pipe Flexible Plastic Pipe Pipe Installation Trenchless Technology

Earthquake Geotechnical Engineering for Protection and Development of Environment and Constructions

Marine pipelines for the transportation of oil and gas have become a safe and reliable part of the expanding infrastructure put in place for the development of the valuable resources
Read Book Stress Analysis of Buried Pipeline Using Finite Element Method below the world's seas and oceans. The design of these pipelines is a relatively new technology and continues to evolve as the design of more cost-effective pipelines becomes a priority and applications move into deeper waters and more hostile environments. This updated edition of a best-selling title provides the reader with a scope and depth of detail related to the design of offshore pipelines and risers not seen before in a textbook format. With over 25 years of experience, Professor Yong Bai has been able to assimilate the essence of the applied mechanics aspects of offshore pipeline system design in a form of value to students and designers alike. It represents an excellent source of up-to-date practices and knowledge to help equip those who wish to be part of the exciting future of this industry.

Numerical Methods in Geotechnical Engineering IX

MOP 119 offers sound information on the structural design and analysis of buried steel pipe consistent with the latest pipe/soil design concepts of the industry.

Mechanical Stress Analysis of Buried Pipeline

Buried Pipe Design, 2nd Edition

Risks and uncertainties?market, financial, operational, social, humanitarian, environmental, and institutional?are the inherent realities of the modern world. Stock market crashes, demonetization of currency, and climate change constitute just a few examples that can adversely impact financial institutions across the globe. To mitigate these risks and avoid a financial crisis, a better understanding of how the economy responds to uncertainties is needed. Maintaining Financial Stability in Times of Risk and Uncertainty is an essential reference source that discusses strategies to mitigate risk and achieve financial resilience under uncertainty. Featuring research on topics such as financial fraud, insurance ombudsmen, and Knightian uncertainty, this book is developed for researchers, academicians, policymakers, students, and scholars.

Geotechnics for Transportation Infrastructure

Taking a big-picture approach, Piping and Pipeline Engineering: Design, Construction, Maintenance, Integrity, and Repair elucidates the fundamental steps to any successful piping and pipeline engineering project, whether it is routine maintenance or a new multi-million dollar project. The author explores the qualitative details, calculations, and technology-related aspects of the pipeline industry.

Soil Mechanics for Pipeline Stress Analysis

Underground pipelines transporting liquid petroleum products and natural gas are critical components of civil infrastructure, making corrosion prevention an essential part of asset-protection strategy. Underground Pipeline Corrosion provides a basic understanding of the problems associated with corrosion detection and mitigation, and of the state of the art in corrosion prevention. The topics covered in part one include: basic principles for corrosion in underground pipelines, AC-induced corrosion of underground pipelines, significance of corrosion in onshore oil and gas pipelines, numerical simulations for cathodic protection of pipelines, and use of corrosion inhibitors in managing corrosion in underground pipelines. The methods described in part two for detecting corrosion in underground pipelines include: magnetic flux leakage, close interval potential surveys (CIS/CIPS), Pearson surveys, in-line inspection, and use of both electrochemical and optical probes. While the emphasis is on pipelines transporting fossil fuels, the concepts apply as well to metallic pipes for delivery of water and other liquids. Underground Pipeline Corrosion is a comprehensive resource for corrosion, materials, chemical, petroleum, and civil engineers constructing or managing both onshore and offshore pipeline assets; professionals in steel and coating companies; and academic researchers and professors with an interest in corrosion and pipeline engineering. Reviews the causes and considers the detection and prevention of corrosion to underground pipes. Addresses a lack of current, readily available information on the subject. Case studies demonstrate how corrosion is managed in the underground pipeline industry.

Underground Pipeline Corrosion
An up-to-date and practical reference book on piping engineering and stress analysis, this book emphasizes three main concepts: using engineering common sense to foresee a potential piping stress problem, performing the stress analysis to confirm the problem, and lastly, optimizing the design to solve the problem. Systematically, the book proceeds from basic piping flexibility analyses, springer hanger selections, and expansion joint applications, to vibration stress evaluations and general dynamic analyses. Emphasis is placed on the interface with connecting equipment such as vessels, tanks, heaters, turbines, pumps and compressors. Chapters dealing with discontinuity stresses, special thermal problems and cross-country pipelines are also included. The book is ideal for piping engineers, piping designers, plant engineers, and mechanical engineers working in the power, petroleum refining, chemical, food processing, and pharmaceutical industries. It will also serve as a reference for engineers working in building and transportation services. It can be used as an advance text for graduate students in these fields.

Frontiers in Geotechnical Engineering

The Shock and Vibration Digest

Earthquake Geotechnical Engineering for Protection and Development of Environment and Constructions contains invited, keynote and theme lectures and regular papers presented at the 7th International Conference on Earthquake Geotechnical Engineering (Rome, Italy, 17-20 June 2019. The contributions deal with recent developments and advancements as well as case histories, field monitoring, experimental characterization, physical and analytical modelling, and applications related to the variety of environmental phenomena induced by earthquakes in soils and their effects on engineered systems interacting with them. The book is divided in the sections below: Invited papers Keynote papers Theme lectures Special Session on Large Scale Testing Special Session on Liquefact Projects Special Session on Lessons learned from recent earthquakes Special Session on the Central Italy earthquake Regular papers Earthquake Geotechnical Engineering for Protection and Development of Environment and Constructions provides a significant up-to-date collection of recent experiences and developments, and aims at engineers, geologists and seismologists, consultants, public and private contractors, local national and international authorities, and to all those involved in research and practice related to Earthquake Geotechnical Engineering.

Subsea Pipelines and Risers

This book presents the proceedings of the 14th International Probabilistic Workshop that was held in Ghent, Belgium in December 2016. Probabilistic methods are currently of crucial importance for research and developments in the field of engineering, which face challenges presented by new materials and technologies and rapidly changing societal needs and values. Contemporary needs related to, for example, performance-based design, service-life design, life-cycle analysis, product optimization, assessment of existing structures and structural robustness give rise to new developments as well as accurate and practically applicable probabilistic and statistical engineering methods to support these developments. These proceedings are a valuable resource for anyone interested in contemporary developments in the field of probabilistic engineering applications.

New Pipeline Technologies, Security, and Safety

In the past decades advances have been made in the research and practice on unsaturated soil mechanics. In 2000 the first Asia-Pacific Conferences on Unsaturated Soils was organized in Singapore. Since then, four conferences have been held under the continued support of the Technical Committee on Unsaturated Soils (TC106) of the International Socie

Guidelines for the Seismic Design of Oil and Gas Pipeline Systems

This classic reference has built a reputation as the "go to" book to solve even the most vexing pipeline problems. Now in its seventh edition, Pipeline Rules of Thumb Handbook continues to set the standard by which all others are judged. The 7th edition features over 30% new and updated sections, reflecting the exponential changes in the codes, construction and equipment since the sixth edition. The seventh edition includes: recommended drill sizes for self-tapping screws, new ASTM standard reinforcing bars, calculations for calculating grounding resistance, national Electrical Code tables, Corilis meters, pump seals, progressive cavity pumps and accumulators for lubricating systems. * Shortcuts for
At present, deep earth resources remain poorly understood and entirely under-utilised. There is a growing appreciation of the important role deep earth will play in future sustainability, particularly in opportunities for new and sustainable large-scale energy alternatives, and extraction of resources through mining and greenhouse mitigation. Deep Rock Mechanics: From Research to Engineering is a collection of papers on the effective development of deep earth resources, which were presented at the International Conference on Geo-mechanics, Geo-Energy and Geo-Resources 2018 (Chengdu, P.R. China, 22–24 September 2018). The contributions aim at breaking beyond existing patterns of discovery, to advance research on geomechanical and geophysical processes in deep earth resources and energy development, enhancing deep earth energy and mineral extraction and mitigating harmful atmospheric emissions. Deep Rock Mechanics: From Research to Engineering covers a wide range of topics: 1. Deep rock mechanics and mining theory 2. Water resources development and protection 3. Unconventional oil and gas extractions 4. CO2 sequestrations technologies and nuclear waste disposal 5. Geothermal energy 6. Mining engineering 7. Petroleum engineering 8. Geo-environmental engineering 9. Civil geotechnical engineering Deep Rock Mechanics: From Research to Engineering promotes safer and greener ways for energy and resource production at great depth, and will serve as a must-have reference for academics and professionals involved or interested in geo-mechanics, geo-energy, and geo-resources.