

Rapid Penetration Into Granular Media Visualizing

Physical Modelling in Geotechnics collects more than 1500 pages of peer-reviewed papers written by researchers from over 30 countries, and presented at the 9th International Conference on Physical Modelling in Geotechnics 2018 (City, University of London, UK 17-20 July 2018). The ICPMG series has grown such that two volumes of proceedings were required to publish all contributions. The books represent a substantial body of work in four years. Physical Modelling in Geotechnics contains 230 papers, including eight keynote and themed lectures representing the state-of-the-art in physical modelling research in aspects as diverse as fundamental modelling including sensors, imaging, modelling techniques and scaling, onshore and offshore foundations, dams and embankments, retaining walls and deep excavations, ground improvement and environmental engineering, tunnels and geohazards including significant contributions in the area of seismic engineering. ISSMGE TC104 have identified areas for special attention including education in physical modelling and the promotion of physical modelling to industry. With this in mind there is a special themed paper on education, focusing on both undergraduate and postgraduate teaching as well as practicing geotechnical engineers. Physical modelling has entered a new era with the advent of exciting work on real time interfaces between physical and numerical modelling and the growth of facilities and expertise that enable development of so called 'megafuges' of 1000gtonne capacity or more; capable of modelling the largest and most complex of geotechnical challenges. Physical Modelling in Geotechnics will be of interest to professionals, engineers and academics interested or involved in geotechnics, geotechnical engineering and related areas. The 9th International Conference on Physical Modelling in Geotechnics was organised by the Multi Scale Geotechnical Engineering Research Centre at City, University of London under the auspices of Technical Committee 104 of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). City, University of London, are pleased to host the prestigious international conference for the first time having initiated and hosted the first regional conference, Eurofuge, ten years ago in 2008. Quadrennial regional conferences in both Europe and Asia are now well established events giving doctoral researchers, in particular, the opportunity to attend an international conference in this rapidly evolving specialist area. This is volume 1 of a 2-volume set.

This single-volume thoroughly summarizes advances in the past several decades and emerging challenges in fundamental research in geotechnical engineering. These fundamental research frontiers are critically reviewed and described in details in lights of four grand challenges our society faces: climate adaptation, urban sustainability, energy and material resources, and global water resources. The specific areas critically reviewed, carefully examined, and envisioned are: sensing and measurement, soil properties and their physics roots, multiscale and multiphysics processes in soil, geochemical processes for resilient and sustainable geosystems, biological processes in geotechnics, unsaturated soil mechanics, coupled flow processes in soil, thermal processes in geotechnical engineering, and rock mechanics in the 21st century.

Water operators will find a wealth of hands-on information on the operation and maintenance of pretreatment, rapid-rate granular media filtration, slow-sand filtration, and diatomaceous-earth filtration systems in this book. This practical guide provides recommended procedures for operating, monitoring, and maintaining all types of filters used for conventional water treatment. These procedures are tested and time-proven by hundreds of water utilities and filtration experts to provide high filter efficiency, excellent water quality, long filter runs and minimum downtime. The book also gives advice on what not to do-and why-so you can avoid water quality problems, filter damage, and treatment problems in the future.

Granular Filtration of Aerosols and Hydrosols

Proceedings of the 26th International Conference on Robotics in Alpe-Adria-Danube Region, RAAD 2017

Rapid Excavation and Tunneling Conference: 2019 Proceedings

The 17th International Symposium

Physical Modelling in Geotechnics, Volume 1

Proceedings of the Second US/Japan Seminar on Micromechanics of Granular Materials, Potsdam, NY, USA, August 5-9, 1991

This paper describes a new method for quantitative analysis of dynamic penetration into granular media. The method is based on refractive index matching used to produce transparent synthetic soils. First, a procedure referred to as the embedded plane technique is introduced, to overcome limitations with laser illumination in high-speed photography. The technique consists of seeding an embedded plane with opaque particles sandwiched within the transparent soil to visualize in-plane granular kinematics. Details of sample preparation are presented, and other issues related to rapid penetration into index-matched media are discussed. High-speed image acquisition is introduced for transparent soils, and relevant target illumination techniques are described. Finally, improved digital image correlation methods are introduced and used to derive displacement fields. Shear and volumetric strains are then calculated. Analyses performed on acquired images are used to illustrate the applicability of these novel index-matching methods to the study of low-velocity penetration into granular media. The data illustrates that, for impact velocities considered in this study, the majority of lateral displacements during penetration are contained to approximately four projectile

diameters from the penetration axis. Vertical displacements extend several penetrator diameters ahead of the penetrator. Moreover, penetration is accompanied by significant vertical afterflow. Finally, a region of dense sand forms ahead of the penetrator with a conical shape, which travels with the penetrator during penetration.

Dynamic Behavior of Materials, Volume 1 of the Proceedings of the 2020 SEM Annual Conference & Exposition on Experimental and Applied Mechanics, the first volume of seven from the Conference, brings together contributions to this important area of research and engineering. The collection presents early findings and case studies on fundamental and applied aspects of Experimental Mechanics, including papers on: Synchrotron Applications/Advanced Dynamic Imaging Quantitative Visualization of Dynamic Events Novel Experimental Techniques Dynamic Behavior of Geomaterials Dynamic Failure & Fragmentation Dynamic Response of Low Impedance Materials Hybrid Experimental/Computational Studies Shock and Blast Loading Advances in Material Modeling Industrial Applications.

Share our experiences, our successes and failures, and our ideas and dreams, all with the goal of getting better at the work we love: building tunnels. Every two years, industry leaders and practitioners from around the world gather at the Rapid Excavation and Tunneling Conference (RETC), the authoritative program for the tunneling profession, to learn about the most recent advances and breakthroughs in this unique field. The information presented helps professionals keep pace with the ever-changing and growing tunneling industry. This book includes the full text of 111 papers presented at the 2019 conference covering such topics as contracting practices, design and planning, geotechnical considerations, hard-rock tunnel boring machines, new and innovative technologies, pressure-face TBM case histories, and tunneling for sustainability. The papers will inform, challenge, and stimulate each reader.

Subsurface Characterization and Monitoring Techniques: Solids and ground water, appendices A and B

Nonlinear Dynamic Effects, General Approach, Applications

IUTAM Symposium on Mechanics of Granular and Porous Materials

Proceedings of the IUTAM Symposium held in Cambridge, U.K., 15-17 July 1996

Miscellaneous Paper - Ontario Geological Survey

Sanitary Engineering Aspects of the Atomic Energy Industry

Dynamic Behavior of Materials, Volume 1: Proceedings of the 2014 Annual Conference on Experimental and Applied Mechanics, the first volume of eight from the Conference, brings together contributions to this important area of research and engineering. The collection presents early findings and case studies on fundamental and applied aspects of Experimental Mechanics, including papers on: · General Dynamic Materials Response · Novel Dynamic Testing Techniques · Dynamic Fracture and Failure · Dynamic Behavior of Geo-materials · Dynamic Behavior of Composites and Multifunctional materials · Dynamic Behavior of Low-Impedance materials · Dynamic Modeling and Simulation of Dynamic Behavior of Materials · Quantitative Visualization of Dynamic Behavior of Materials · Shock/Blast Loading of Materials · Interface and Structural Dynamics · Material Response

This book is the volume of the proceedings for the 17th Edition of ISER. The goal of ISER (International Symposium on Experimental Robotics) symposia is to provide a single-track forum on the current developments and new directions of experimental robotics. The series has traditionally attracted a wide readership of researchers and practitioners interested to the advances and innovations of robotics technology. The 54 contributions cover a wide range of topics in robotics and are organized in 9 chapters: aerial robots, design and prototyping, field robotics, human-robot interaction, machine learning, mapping and localization, multi-robots, perception, planning and control. Experimental validation of algorithms, concepts, or techniques is the common thread running through this large research collection.

The 45 papers presented in this volume all share the common goal of constructing continuum models based on the micro behaviours of granular materials. Computer simulations continue to provide observations to aid modelling, while new experimental works begin to show promise for increased understanding in this area. Theoretical studies have extended into transitions between the rapid and quasi-static regimes and the fluid and solid mixture flows.

Exciting new topics discussed in this volume include: concepts of a measure for randomness in quasi-static granular materials, which is analogous to the granular temperature in a rapid flow; scaling effects in granular media and their implications in both physical and computer simulations; instability; and boundary effects on heterogeneous behavior in simple flow configurations, which are posing new challenges for mathematical modelling. The volume will prove indispensable reading for researchers interested in the current developments in the fundamental aspects of mechanics of granular materials.

Visualizing the Fundamental Physics of Rapid Earth Penetration

Physical, Chemical, and Biological

Advances in Service and Industrial Robotics

Treatment Process Selection for Particle Removal

Water Filtration Practices

Ground Improvement Techniques

Systematic treatment of difficult ground as a separate paper in undergraduate and postgraduate courses is gaining ground in Indian universities. Earlier, these topics were taught under a variety of subjects like Advanced Geotechnical Engineering, Retaining Structures, Dams, Pavement Designs, Application of Geosynthetics, Application of Soil Mechanics, and so on. However, field requirement and advances in the technology make a strong case for a focused treatment of the subject which this book provides. A full-fledged paper in ground improvement techniques concentrates on the topics of soil stabilization, compaction, preloading, vertical drains, geosynthetics, in-situ reinforcements and modelling of soil reinforcement. The book provides an overview of the basic concepts of ground modifications to difficult soils in a logical and illustrative way. It teaches how to apply

alternative solutions to difficult foundation problems and evaluate their effectiveness before and after construction. The text is supported by a large number of examples, review and multiple choice questions, as well as practical problems. The book is intended to serve as a textbook for undergraduate and postgraduate students of Geotechnical, Transportation, Hydraulic and Environmental Engineering, and a reference work for practising civil engineers. Salient features 1. A well researched textbook on ground improvement techniques 2. Conforms to the syllabi of all Indian universities where the subject is taught 3. Written by an expert on the subject with a decade of teaching experience

Industrial Waste Treatment Process Engineering is a step-by-step implementation manual in three volumes, detailing the selection and design of industrial liquid and solid waste treatment systems. It consolidates all the process engineering principles required to evaluate a wide range of industrial facilities, starting with pollution prevention and source control and ending with end-of-pipe treatment technologies. Industrial Waste Treatment Process Engineering guides experienced engineers through the various steps of industrial liquid and solid waste treatment. The structure of the text allows a wider application to various levels of experience. By beginning each chapter with a simplified explanation of applicable theory, expanding to practical design discussions, and finishing with system Flowsheets and Case Study detail calculations, readers can "enter or leave" a section according to their specific needs. As a result, this set serves as a primer for students engaged in environmental engineering studies AND a comprehensive single-source reference for experienced engineers. Industrial Waste Treatment Process Engineering includes design principles applicable to municipal systems with significant industrial influents. The information presented in these volumes is basic to conventional treatment procedures, while allowing evaluation and implementation of specialized and emerging treatment technologies. What makes Industrial Waste Treatment Process Engineering unique is the level of process engineering detail. The facility evaluation section includes a step-by-step review of each major and support manufacturing operation, identifying probable contaminant discharges, practical prevention measures, and point source control procedures. This theoretical plant review is followed by procedures to conduct a site specific pollution control program. The unit operation chapters contain all the details needed to complete a treatment process design. Industrial Waste Treatment Process Engineering will interest environmental engineers, chemical process engineers working in environmental engineering, civil engineers with environmental specialties, as well as graduate students in environmental engineering, corporate environmental engineers, plant engineers, and industry and university technical libraries. These books supplement existing texts detailing the regulatory, legal, and permit preparation requirements imposed on manufacturing facilities. Additionally, Industrial Waste Treatment Process Engineering is designed for engineers preparing environmental appropriations for corporate funding and developing systems for plant facilities sensitive to operating costs.

This volume contains the proceedings of the 26th International Conference on Robotics in Alpe-Adria-Danube Region, RAAD 2017, held at the Polytechnic University of Turin, Italy, from June 21-23, 2017. The conference brought together academic and industrial researchers in robotics from 30 countries, the majority of them affiliated to the Alpe-Adria-Danube Region, and their worldwide partners. RAAD 2017 covered all major areas of R&D and innovation in robotics, including the latest research trends. The book provides an overview on the advances in service and industrial robotics. The topics are presented in a sequence starting from the classical robotic subjects, such as kinematics, dynamics, structures, control, and ending with the newest topics, like human-robot interaction and biomedical applications. Researchers involved in the robotic field will find this an extraordinary and up-to-date perspective on the state of the art in this area.

Visualizing Kinematics of Dynamic Penetration in Granular Media Using Transparent Soils

Vibrational Mechanics

Proceedings of the 2014 Annual Conference on Experimental and Applied Mechanics

Publications Combined - Over 100 Studies In Nanotechnology With Medical, Military And Industrial Applications 2008-2017

Proceedings of the 2020 Annual Conference on Experimental and Applied Mechanics

Proceedings of the 2017 Annual Conference on Experimental and Applied Mechanics

Rapid Penetration into Granular Media Visualizing the Fundamental Physics of Rapid Earth Penetration Elsevier

Vibrational mechanics is a new, intensively developing section of nonlinear dynamics and of the theory of nonlinear oscillations. It presents a general approach to the study of the effects of vibration on nonlinear systems. This approach is characterized by simplicity of application and by physical clearness. In recent years a number of new, essential results have been obtained both on the development of the mathematical apparatus of vibrational mechanics and on the solution of certain applied problems. This book reflects those results through the ingenious presentation of the authors -- well-known scientists from Germany, Denmark and Russia. For the convenience of readers, the main content is preceded by a brief description of the main theses of vibrational mechanics.

Over 7,300 total pages ... Just a sample of the contents: Title : Multifunctional Nanotechnology Research Descriptive Note : Technical Report, 01 Jan 2015, 31 Jan 2016 Title : Preparation of Solvent-Dispersible Graphene and its Application to Nanocomposites Descriptive Note : Technical Report Title : Improvements To Micro Contact Performance And Reliability Descriptive Note : Technical Report Title : Delivery of Nanotethered Therapies to Brain Metastases of Primary Breast Cancer Using a Cellular Trojan Horse Descriptive Note : Technical Report, 15 Sep 2013, 14 Sep 2016 Title : Nanotechnology-Based Detection of Novel microRNAs for Early Diagnosis of Prostate Cancer Descriptive Note : Technical Report, 15 Jul 2016, 14 Jul 2017 Title : A Federal Vision for Future Computing: A Nanotechnology-Inspired Grand Challenge Descriptive Note : Technical Report Title : Quantifying Nanoparticle Release from Nanotechnology: Scientific Operating Procedure Series: SOP C 3 Descriptive Note : Technical Report Title : Synthesis, Characterization And Modeling Of Functionally Graded Multifunctional Hybrid Composites For Extreme Environments Descriptive Note : Technical Report, 15 Sep 2009, 14 Mar 2015 Title : Equilibrium Structures and Absorption Spectra for SixOy Molecular Clusters using Density Functional Theory Descriptive Note : Technical Report Title : Nanotechnology for the

Solid Waste Reduction of Military Food Packaging Descriptive Note : Technical Report,01 Apr 2008,01 Jan 2015 Title : Magneto-Electric Conversion of Optical Energy to Electricity Descriptive Note : Final performance rept. 1 Apr 2012-31 Mar 2015 Title : Surface Area Analysis Using the Brunauer-Emmett-Teller (BET) Method: Standard Operating Procedure Series: SOP-C Descriptive Note : Technical Report,30 Sep 2015,30 Sep 2016 Title : Stabilizing Protein Effects on the Pressure Sensitivity of Fluorescent Gold Nanoclusters Descriptive Note : Technical Report Title : Theory-Guided Innovation of Noncarbon Two-Dimensional Nanomaterials Descriptive Note : Technical Report,14 Feb 2012,14 Feb 2016 Title : Deterring Emergent Technologies Descriptive Note : Journal Article Title : The Human Domain and the Future of Army Warfare: Present as Prelude to 2050 Descriptive Note : Technical Report Title : Drone Swarms Descriptive Note : Technical Report,06 Jul 2016,25 May 2017 Title : OFFSETTING TOMORROW'S ADVERSARY IN A CONTESTED ENVIRONMENT: DEFENDING EXPEDITIONARY ADVANCE BASES IN 2025 AND BEYOND Descriptive Note : Technical Report Title : A Self Sustaining Solar-Bio-Nano Based Wastewater Treatment System for Forward Operating Bases Descriptive Note : Technical Report,01 Feb 2012,31 Aug 2017 Title : Radiation Hard and Self Healing Substrate Agnostic Nanocrystalline ZnO Thin Film Electronics Descriptive Note : Technical Report,26 Sep 2011,25 Sep 2015 Title : Modeling and Experiments with Carbon Nanotubes for Applications in High Performance Circuits Descriptive Note : Technical Report Title : Radiation Hard and Self Healing Substrate Agnostic Nanocrystalline ZnO Thin Film Electronics (Per5 E) Descriptive Note : Technical Report,01 Oct 2011,28 Jun 2017 Title : High Thermal Conductivity Carbon Nanomaterials for Improved Thermal Management in Armament Composites Descriptive Note : Technical Report Title : Emerging Science and Technology Trends: 2017-2047 Descriptive Note : Technical Report Title : Catalysts for Lightweight Solar Fuels Generation Descriptive Note : Technical Report,01 Feb 2013,31 Jan 2017 Title : Integrated Real-Time Control and Imaging System for Microbiorobotics and Nanobiostructures Descriptive Note : Technical Report,01 Aug 2013,31 Jul 2014

Roads and Airfields

Dynamics, Strength of Materials and Durability in Multiscale Mechanics

New Zealand Journal of Agricultural Research

Proceedings of the 9th International Conference on Physical Modelling in Geotechnics (ICPMG 2018), July 17-20, 2018, London, United Kingdom

Including Slow Sand Filters and Precoat Filtration

Bentley's Textbook of Pharmaceutics - E-Book

Carefully designed to balance coverage of theoretical and practical principles, Fundamentals of Water Treatment Unit Processes delineates the principles that support practice, using the unit processes approach as the organizing concept. The author covers principles common to any kind of water treatment, for example, drinking water, municipal wastewater, industrial water treatment, industrial waste water treatment, and hazardous wastes. Since technologies change but principles remain constant, the book identifies strands of theory rather than discusses the latest technologies, giving students a clear understanding of basic principles they can take forward in their studies. Reviewing the historical development of the field and highlighting key concepts for each unit process, each chapter follows a general format that consists of process description, history, theory, practice, problems, references, and a glossary. This organizational style facilitates finding sections of immediate interest without having to page through an excessive amount of material. Pedagogical Features End-of-chapter glossaries provide a ready reference and add terms pertinent to topic but beyond the scope of the chapter Sidebars sprinkled throughout the chapters present the lore and history of a topic, enlarging students' perspective Example problems emphasize tradeoffs and scenarios rather than single answers and involve spreadsheets Reference material includes several appendices and a quick-reference spreadsheet Solutions manual includes spreadsheets for problems Supporting material is available for download Understanding how the field arrived at its present state of the art places the technology in a more logical context and gives students a strong foundation in basic principles. This book does more than build technical proficiency, it adds insight and understanding to the broader aspects of water treatment unit processes.

This unique compendium contains a vast systematized data of 14,000 experiments on high-velocity penetration into metals, concrete, reinforced concrete, and geological media which were published in the open literature (journal papers, reports, conference proceedings) during the last 70 years. Data presented in this edition are related to the initial and final stages of penetration and include: parameters which characterize mechanical and geometric properties of the striker and the shield; striking and residual velocities of projectile or depth of penetration; changes of mass and size of projectile; angles that determine the initial and residual position of the projectile; ballistic limit velocity; basic characteristics of plug and deformation of the shield.Unified form of data representation and common notations are used throughout the book. All information is presented in numerical form in SI units. The book also contains indices which allow a fast search of the authors' publications and related experiments. Theoreticians, design engineers and experimentalists will find this handbook a valuable reference material.

Dynamic Behavior of Materials, Volume 1 of the Proceedings of the 2017 SEM Annual Conference& Exposition on Experimental and Applied Mechanics, the first volume of nine from the Conference, brings together contributions to this important area of research and engineering. The collection presents early findings and case studies on fundamental and applied aspects of Experimental Mechanics, including papers on: Quantitative Visualization Fracture & Fragmentation Dynamic Behavior of Low Impedance Materials Shock & Blast Dynamic Behavior of Composites Novel Testing Techniques Hybrid Experimental & Computational Methods Dynamic Behavior of Geo-materials General Material Behavior Shock Phenomena in Granular and Porous Materials

NASA technical note

Handbook of Granular Materials Industrial Waste Treatment Processes Engineering 29th International Symposium on Ballistics

This book presents a complete and comprehensive analysis of the behaviour of granular materials including the description of experimental results, the different ways to define the global behaviour from local phenomena at the particle scale, the various modellings which can be used for a D.E.M. analysis to solve practical problems and finally the analysis of strain localisation. The concepts developed in this book are applicable to many kinds of granular materials considered in civil, mechanical or chemical engineering. This volume constitutes the Proceedings of the IUT AM Symposium on Mechanics of Granular and Porous Materials, held in Cambridge from 15th to 17th July 1996. The objectives were: 1. To review existing experimental results and practical phenomena on the flow and compaction of particulate media; 2. To review the current state of constitutive models, and their implementation for predicting the macroscopic response. 3. Identification of the shortcomings of existing models and procedures in understanding practical phenomena. The Symposium brought together the research communities of solid mechanics, materials science, geomechanics, chemical engineering and mathematics to review current knowledge of the flow and compaction of granular and porous media. The meeting emphasised the development and use of constitutive laws to model practical processes such as mixing, drainage and drying, compaction of metal and ceramic powders and soils, and instabilities associated with these processes. A common theme was to develop constitutive models from an understanding of the underlying physical mechanisms of deformation and fracture. It was particularly rewarding to find that the separate research communities came together during the meeting and came to a consensus as to the main mechanisms of deformation and failure of particulate and porous solids. Granular systems arise in a variety of geological and industrial settings, from landslides, avalanches, and erosion to agricultural grains and pharmaceutical powders. Understanding the underlying physics that governs their behavior is the key to developing effective handling and transport mechanisms as well as appropriate environmental policies. Handbook of Granular Materials presents foundational techniques used to investigate granular systems, examples of their use in contemporary research, and extensions to granular-like systems that greatly expand the realm of study. The book provides guidance on how to conduct research in granular materials and explores promising directions for new research. The first several chapters cover various methods used by contemporary researchers to investigate granular materials. Subsequent chapters delve into broader themes of investigation, focusing on results rather than methodology. The final chapters describe three extended systems of granular media: suspensions, emulsions and foams, and colloids.

Engineering Models In High-speed Penetration Mechanics And Their Applications (In 2 Volumes)

Dynamic Behavior of Materials, Volume 1

Geotechnical Fundamentals for Addressing New World Challenges

TID

Specialized Treatment Systems, Volume III

BALLISTICS 2016

Presents high-level research on various caliber guns, cannon, mortars, drones, warheads, shells, bullets, drills and other launchers and penetrants, as well as their impact effects on natural and designed materials, including large-scale targets and body armors Provides new modeling and test data on projectile design and guidance, propellants, charges and explosives for military, aerospace and civil engineering applications Over 250 presentations in two printed volumes, plus searchable CD This book makes available original ballistics technology from around the world on a wide variety of weapons and their effects, including the design and trajectory/stability control of dozens of projectiles ranging from shells to missiles. The book's authors discuss the efficacy and development of propellants, munitions, and igniters and offer new approaches for modeling and testing. Also investigated in Volume 1 are shielding and protection strategies for individual persons and other targets. Volume 2 offers research on the mechanical behavior of multiple types of explosives, as well as impact and penetration data from projectile effects on surfaces ranging from natural phenomena such as water and soils to metallic plating and material-engineered armors. Papers in these volumes were presented at a conference organized by the National Defense Industrial Association (NDIA) with the International Ballistics Society.

This important book deals with vibrational mechanics — the new, intensively developing section of nonlinear dynamics and the theory of nonlinear oscillations. It offers a general approach to the study of the effect of vibration on nonlinear mechanical systems. The book presents the mathematical apparatus of vibrational mechanics which is used to describe such nonlinear effects as the disappearance and appearance under vibration of stable positions of equilibrium and motions (i.e. attractors), the change of the rheological properties of the media, self-synchronization, self-balancing, the vibrational maintenance or deceleration (retardation) of the rotation of unbalanced rotors, resonances in the motions of celestial bodies, vibrational displacement and shift, vibrational excitation of streams and the

transportation of bodies in the fluid. The book considers the use of these effects in creating new vibrational machines, technologies, and also principally new materials ("dynamical materials"). Vibrational Mechanics contains many results published only in Russian and therefore unknown to the specialists in the West, and also a review of the new results obtained by researchers after the book was first published in Russia. Contents: Fundamentals of Theory of Vibrational Mechanics: Introduction. Subject-Matter of Vibrational Mechanics On the Mechanics of Systems with Hidden Motions Basic Statements and Mathematical Apparatus of Vibrational Mechanics Potential on the Average Dynamic Systems and Extremal Signs of Stability of Certain Motions Vibrational Mechanics of Machines, Mechanisms and Pendulum Devices: Devices of Pendulum Type Rotor Mechanisms. Machine Aggregates Self-synchronization of Mechanical Vibro-exciter Generalized Principle of Auto-balancing Vibrational Mechanics of Processes (Vibrational Displacement and Shift): The Main Models and General Regularities of Processes of Vibrational Displacement from the Position of Vibrational Mechanics Effects of Vibrational Displacement in Technique, Technology and in Nature Vibrational Shift (Drift) Vibrorheology: On Rheology and Vibrorheology Effective Rheological Characteristics Under the Action of Vibration Vibrorheological Transformation of Nonlinear Mechanical Systems with Discontinuous Characteristics into Systems with Viscous Friction Vibrational Control of Properties of Mechanical Systems, Creating New Materials ("Dynamical Materials") Vibrorheology of Granular Materials Penetration of Vibration into Certain Media Microvibrorheology: The Behavior of Suspension Under Vibration, Effective Viscosity and Effective Density of Suspension The Problem of the Control of Vibrorheological Properties of Mechanical Systems. The Idea of Creating Dynamic Materials Supplements Some Other Problems: The Motion of the Particle in a Fast Oscillating Nonuniform Field Resonance (Synchronization) in Orbital Motions of Celestial Bodies Readership: Researchers in theoretical and applied mechanics, nonlinear dynamics and nonlinear oscillation theory; engineers, researchers and inventors dealing with the application of useful vibration and the elimination of harmful vibration; mathematicians who are specialists in differential equations. Keywords: Nonlinear Dynamic; Oscillation's Theory; Methods; High-Frequency Excitation; Useful Vibration; Applications Reviews: "I think this new book has no real competitors. It should be of interest to university teachers and researchers in vibrations and mathematics, industrial vibration specialists and researchers, and university and company bookstores and libraries. It could even make up a textbook for one or more specialized courses in vibrations for graduate and postgraduate university classes." Jon Juel Thomsen Technical University of Denmark "The monograph is highly descriptive and contains a great many of very vivid schematic diagrams demonstrating the impressive diversity of effects ... it reflects the author's superiority of understanding of the subject matter and his splendid teaching skills, and it is an outstanding, probably unrivalled work." ZAMM "... this book offers a wealth of interesting mechanical problems and phenomena, many of which could form the topic of further research." G H M van der Heijden University College London, UK

This book presents recent advances in the field of computational coupling and contact mechanics with particular emphasis on numerical formulations and methodologies necessary to solve advanced engineering applications. Featuring contributions from leading experts and active researchers in these fields who provide a detailed overview of different modern numerical schemes that can be considered by main numerical methodologies to simulate interaction problems in continuum mechanics. A number of topics are addressed, including formulations based on the finite element method (FEM) and their variants (e.g. isogeometric analysis or standard and generalized high-order FEM: hp-FEM and GFEM, respectively), the boundary element method (BEM), the material point method (MPM) or the recently proposed finite block method (FBM), among many more. Written with PhD students in mind, Advances in Computational Coupling and Contact Mechanics also includes the most recent numerical techniques which could be served as reference material for researchers and practicing engineers. All chapters are self-contained and can be read independently, with numerical formulations accompanied by practical engineering applications. Contents: Frictional Mortar Formulation for Large Inelastic Deformation Problems (T Doca and F M A Pires) Standard and Generalized High-order Mortar-based Finite Elements in Computational Contact Mechanics (A P C Dias, S P B Proenca and M L Bittencourt) A Large Deformation Frictionless Contact Treatment In NURBS-based Isogeometric Analysis (J Kopačka, D Gabriel, R Kolman and J Plešek) Treatment of Non-matching Interfaces in Partitioned Fluid-Structure Interaction Problems (J A González and K C Park) An Eulerian-based Thermo-flexible Multi-body Approach for Simulating Rig Testing of Disc Brakes (N Strömberg) Nonlinear Analysis with Functionally Graded Materials by Finite Block Method (J Li, J Jin, J J Yang, T Huang and P H Wen) A Coupled Finite Element Material Point Method for Large Deformation Problems (Y Lian and X Zhang) Fracture and Contact in the Material Point Method: New Approaches and Applications (M A Homel and E B Herbold) A Cohesive-frictional Grain-boundary Technique for Microstructural Analysis of Polycrystalline Materials (I Benedetti) Piezoelectric and Magneto-electro-elastic Frictional Contact Modelling (L Rodríguez-Tembleque, F C Buroni, A Sáez and M H Ferri Aliabadi) Readership: PhD students in computational mechanics; researchers and practicing engineers. Keywords: Contact Mechanics; Friction; Cohesive-Frictional Contact; Coupling Non-Matching Interfaces; Mortar formulations; Localized Lagrange Multipliers; Isogeometric Contact Analysis; Thermomechanical Contact; Finite Element Method; Finite Block Method; Material Point Method; Multi-Body Approach; Boundary Element Method; Large Inelastic Deformation; Microstructural Analysis of Polycrystalline Materials; Impact Problems; Fragmentation and Comminution Processes; Fluid-Structure Interaction Problems; Disc Brakes Testing; Functionally Graded Materials; Piezoelectric and Magneto-Electro-Elastic Materials Review: 0

Advances In Computational Coupling And Contact Mechanics

Behaviour of Granular Materials

Rapid Penetration into Granular Media

Selected Topics in Vibrational Mechanics

Fundamentals of Water Treatment Unit Processes

Experimental Robotics

Granular forms of common materials such as metals and ceramics, sands and soils, porous energetic materials (explosives, reactive mixtures), and foams exhibit interesting behaviors due to their heterogeneity and critical length scale, typically commensurate with the grain or pore size. Under extreme conditions of impact, granular and porous materials display highly localized phenomena such as fracture, inelastic deformation, and the closure of voids, which in turn strongly influence the bulk response. Due to the complex nature of these interactions and the short time scales involved, computational methods have proven to be powerful tools to investigate these phenomena. Thus, the coupled use of experiment, theory, and simulation is critical to advancing our understanding of shock processes in initially porous and granular materials. This is a comprehensive volume on granular and porous materials for researchers working in the area of shock and impact physics. The book is divided into three sections, where the first presents the fundamentals of shock physics as it pertains to the equation of state, compaction, and strength properties of porous materials. Building on these fundamentals, the next section examines several applications where dynamic processes involving initially porous materials are prevalent, focusing on the areas of penetration, planetary impact, and reactive munitions. The final section provides a look at emerging areas in the field, where the expansion of experimental and computational capabilities are opening the door for new opportunities in the areas of advanced light sources, molecular dynamics modeling, and additively manufactured porous structures. By intermixing experiment, theory, and simulation throughout, this book serves as an excellent, up-to-date desk reference for those in the field of shock compression science of porous and granular materials.

Granular filtration is a technique used extensively in the water and sewage industries, and we would all be quickly aware if it did not work properly. Designing and building an effective granular filter is a science and an art: this book covers both aspects. The theoretical basis of design is given considerable exposure, as are the behavioural characteristics of particles and fluids. This new edition contains extra material on stochastic simulations and the Lattice Boltzmann approach for studying deposition in granular media; more on prediction methods for collection efficiency, and a chapter on the various available software programmes. Written by the world's leading expert on depth filtration Fully updated to include the latest approaches to studying granular filtration

This two-volume, 1100 pages, 38 chapters book is a significantly expanded, revised and updated version of the monograph by the authors published in 2013 (Ben-Dor, G, Dubinsky, A, Elperin, T, 'High Speed Penetration Dynamics: Engineering Models and Methods,' Singapore: World Scientific Publishing Company). The contents increased by 60%, the number of titles in bibliography doubled and reached 1600; and the scope covers a range of new topics related to hypervelocity penetration, along with high-speed impact. Presented material is structured into two parts. The first part includes description and analysis of practically all known engineering models for calculating high-speed penetration of projectiles into concrete, metals, geological shields, adobe, and gelatine. The second part focuses on the use of approximate models for solving conventional and non-standard problems of penetration mechanics including prediction and optimization of protective properties of monolithic and multi-layered shields against high-speed projectiles and space debris; shape optimization of high-speed projectiles penetrating into various media; modelling of penetration and optimal control of penetrators equipped with jet thrusters; and investigation of the efficiency and optimization of segmented projectiles. The book includes comprehensive overviews on basic classes of problems in high-speed penetration mechanics. This is a indispensable reference guide for scientists, engineers, and students specializing in the field of high-speed and hypervelocity penetration mechanics.

The Shock and Vibration Bulletin

World Scientific Handbook Of Experimental Results On High Speed Penetration Into Metals, Concrete And Soils

A Seminar Sponsored by the AEC and the Public Health Service, Held at the Robert A. Taft Engineering Center, Cincinnati, Ohio, December 6-9, 1955

NASA Technical Note

Advances in Micromechanics of Granular Materials

This adaptation of Bentley's Textbook of Pharmaceutics follows the same goals as those of the previous edition, albeit in a new look. The content of the old edition has been updated and expanded and several new chapters, viz. Complexations, Stability Testing as per ICH Guidelines, Parenteral Formulations, New Drug Delivery Systems and Pilot Plant Manufacturing, have been included, with an intention to make the book more informative for the modern pharmacists. The book has six sections: Section I deals with the physicochemical principles. Two new chapters: Complexations and ICH Guidelines for Stability Testing, have been added to make it more informative. Section II conveys the information regarding pharmaceutical unit operations and processes. Section III describes the area of pharmaceutical practice. Extensive recent updates have been included in many chapters of this section. Two new chapters: Parenteral Formulations and New Drug Delivery Systems, have been added. Section IV contains radioactivity principles and applications. Section V deals with microbiology and animal products. Section

VI contains the formulation and packaging aspects of pharmaceuticals. Pilot Plant Manufacturing concepts are added as a new chapter, which may be beneficial to readers to understand the art of designing of a plant from the pilot plant model.

Rapid Penetration into Granular Media: Visualizing the Fundamental Physics of Rapid Penetration introduces readers to the variety of methods developed to visualize, observe, and model the rapid penetration of natural and man-made projectiles into earth materials while providing seasoned practitioners with a standard reference that showcases the topic's most recent developments in research and application. There has been a flurry of recently funded research both in the U.S. and Europe on studying the behavior of projectiles in granular media. This book compiles the findings of recent research on the subject and outlines the fundamental physics of rapid earth penetration, and assembles a comprehensive collection of experimental and numerical techniques to study the problem. Presents a comprehensive interdisciplinary review of the latest research developments in the response of granular media to impact and impulsive loading Combines the experience of prominent researchers from different disciplines focusing on the challenges presented by impact loading of granular media Introduces recently developed methods for visualizing the fundamental physics of rapid penetration into granular media

This book reviews the mathematical modeling and experimental study of systems involving two or more different length scales. The effects of phenomena occurring at the lower length scales on the behavior at higher scales are of intrinsic scientific interest, but can also be very effectively used to determine the behavior at higher length scales or at the macro-level. Efforts to exploit this micro- and macro-coupling are, naturally, being pursued with regard to every aspect of mechanical phenomena. This book focuses on the changes imposed on the dynamics, strength of materials and durability of mechanical systems by related multiscale phenomena. In particular, it addresses: 1: the impacts of effective dissipation due to kinetic energy trapped at lower scales 2: wave propagation in generalized continua 3: nonlinear phenomena in metamaterials 4: the formalization of more general models to describe the exotic behavior of meta-materials 5: the design and study of microstructures aimed at increasing the toughness and durability of novel materials