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Advanced Rail Geotechnology - Ballasted Track Advanced Rail Geotechnology – Ballasted Track **Mechanics of Ballasted Rail Tracks Ballast Railroad Design: SMART-UOW Approach** Construction in Geotechnical Engineering **Geotechnics for Transportation Infrastructure** *Rail Infrastructure Resilience* Geotechnical Innovation for Transport Infrastructures **Analytical Methods in Petroleum Upstream Applications Advances on Testing and Experimentation in Civil Engineering** *Proceedings of GeoShanghai 2018 International Conference: Transportation Geotechnics and Pavement Engineering Geocells* Railway Geotechnics *Ground Improvement Case Histories* ICSBE 2020 **Advances in Transportation Geotechnics IV** ICSECM 2019 *Transportation Soil Engineering in Cold Regions, Volume 1 Sustainable Solutions for Railways and Transportation Engineering* **Bearing Capacity of Roads, Railways and Airfields Geotechnical Characterization and Modelling** Inverse Dynamics Problems *12th International Conference on Structural Engineering and Construction Management* Track Geotechnology and Substructure Management **Advances in Geotechnical Engineering & Geoenvironmental Engineering Environment-Friendly Construction Materials Earthworks** Sustainable Issues in Transportation Engineering **Proceedings of the 7th Indian Young Geotechnical Engineers Conference Proceedings of GeoShanghai 2018 International Conference: Advances in Soil Dynamics and Foundation Engineering Geotechnical Engineering** *5th International Conference on Geotechnical and Highway Engineering* **Proceedings of the Indian Geotechnical Conference 2019** *Computational Granular Mechanics and Its Engineering Applications* **Numerical Methods in Geotechnical Engineering IX** Geomechanics and Geotechnics of Particulate Media *Numerical Methods in Geotechnical Engineering IX, Volume 2* **Recent Developments in Railway Track and Transportation Engineering** Design and Construction of Pavements and Rail Tracks *Sustainable Railway Engineering and Operations*

This volume comprises select papers presented during the Indian Geotechnical Conference 2018, discussing issues and challenges relating to the characterization of geomaterials, modelling approaches, and geotechnical engineering education. With a combination of field studies, laboratory experiments and modelling approaches, the chapters in this volume address some of the most widely investigated geotechnical engineering topics. This volume will be of interest to researchers and practitioners alike. This book highlights current research and developments in the area of Structural Engineering and Construction Management, which are important disciplines in Civil Engineering. It covers the following topics and categories of Structural Engineering. The main chapters/sections of the proceedings are Structural and Solid Mechanics, Construction Materials, Systems and Management, Loading Effects, Construction Safety, Architecture & Architectural Engineering, Coastal Engineering, Foundation engineering, Materials, Sustainability. The content of this book provides necessary knowledge for construction management practices, new tools and technologies on local and global levels in civil engineering which can mitigate the negative effects of built environment. In this book, the authors discuss testing of ballast, including the strength, deformation and degradation aspects of fresh and recycled ballast under monotonic and cyclic loading. The effectiveness of geosynthetics in stabilising recycled ballast has also been examined. A new stress-strain constitutive model for ballast

incorporating particle breakage is presented. Finally, a new range of particle gradations, balancing the strength and permeability requirements, has been proposed for future rail tracks. This book is intended as a reference text for final year civil engineering students and postgraduates, and for practicing railway engineers with the task of modernizing existing designs. This book comprises the select peer-reviewed papers presented at the 7th Indian Young Geotechnical Engineers Conference (7IYGEC 2019) held at the National Institute of Technology, Silchar. It covers recent research developments in geotechnical engineering particularly in the fields of shallow and deep foundations, rock mechanics, ground improvement techniques, geotechnical earthquake engineering, and characterization of soil. The book also discusses several computational techniques to model behavior of soil which can be useful for future research. A special emphasis is given on geo-environmental engineering for making the world cleaner and safer to live. Given the contents, the book will be beneficial for students, researchers, and professionals working in geotechnical engineering and allied areas. Economic growth, security and sustainability across Europe are at risk due to ageing railway infrastructure systems. At present, the majority of such systems are aging and some have even reached their initial design lives. These issues align with a major challenge in civil engineering: how to restore and improve urban infrastructure and built environments. Policy, environmental and physical barriers must be addressed and overcome. The complex and interconnected nature of the problem means that there is a need for academia, industry, communities and governments to work collaboratively. The challenges posed by extreme events from natural and man-made disasters are urgent. Rail Infrastructure Resilience: A Best-Practices Handbook presents developed improvement methods for rail infrastructure systems, toward resilience to extreme conditions. It shows how best to use new information in the engineering design, maintenance, construction and renewal of rail infrastructure resilience, through knowledge exchange and capability development. The book presents the outcome of a major European research project, known as the RISEN project. RISEN aimed to enhance knowledge creation and transfer using both international and intersectoral secondment mechanisms among European Advanced Rail Research Universities and SMEs, and Non-EU, leading rail universities, providing methodological approaches and practical tools for restoring and improving railway infrastructure systems for extreme events. Edited and written by members of this project, this book will be essential reading for researchers and practitioners hoping to find practical solutions to the challenges of rail infrastructure resilience. Offers a best-practices handbook for rail infrastructure resilience from the leaders in the field Paints a holistic picture of the rail transport system, showing that infrastructure maintenance intervention can be enhanced through advanced monitoring systems and resilience design Presents rail infrastructure resilience and advanced condition monitoring, allowing a better understanding of the critical maintenance, renewal and retrofit needs of railways Considers how academia, industry, communities and governments can work collaboratively in order to tackle aggregated problems in rail infrastructure resilience Presents the findings from the RISEN project, the leading European project on enhancing knowledge creation and transfer of expertise on rail infrastructure resilience This book highlights the latest knowledge and innovations in the field of civil engineering and construction industry striving for a sustainable built environment. It includes recent innovative findings from the proceedings of the 11th ICSBE 2020 under the themes of sustainable tall buildings, sustainable bridge construction and maintenance, waste in construction industry, sustainable manufacturing and recycling, disaster risk reduction for sustainable built environment, green innovations and entrepreneurship, sustainable water management in developing countries, water pollution and CKDu, sustainable urban environment and social well-being, and many greener and sustainable resource and energy-efficient innovative research findings. 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. This book is the fourth volume of the proceedings of the 4th GeoShanghai International Conference that was held on May 27 - 30, 2018. This volume, entitled “Transportation Geotechnics and Pavement Engineering”, represents the recent advances and technologies in transportation geotechnics and pavement engineering. This book covers a wide range of topics, from transportation geotechnics, to geomechanics at various length scales, to pavement materials and structures. The book offers a unique mix of numerical modeling studies, experimental studies, and case studies from industry. It may be of interest to researchers and practitioners in the fields of transportation engineering and pavement engineering. Each of the papers included in this book received at least two positive peer reviews. The editors would like to express their sincerest appreciation to all of the anonymous reviewers all over the world, for their diligent work. Railways are frequently promoted as one of the most sustainable modes of transport. However, their impact will in practice be significantly affected by the ways in which they are designed, constructed, and used. This book provides a comprehensive overview of the issues involved in planning, engineering and operating sustainable railway systems. Design and Construction of Pavements and Rail Tracks - Geotechnical Aspects and Processed Materials is a compilation of selected contributions produced between 2002 and 2005 by the International Committee TC3 - Geotechnics of Pavements of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), a committee dedicated to gat This book is the sixth volume of the proceedings of the 4th GeoShanghai International Conference that was held on May 27 - 30, 2018. This volume, entitled “Advances in Soil Dynamics and Foundation Engineering”, covers the recent advances and technologies in soil dynamics and foundation engineering. These papers are grouped into four categories: (1) soil dynamics and earthquake engineering, (2) deep excavations and retaining structures, (3) shafts and deep foundations, and (4) offshore geotechnics. It presents the state-of-the-art theories, experiments, methodologies and findings in the related areas. The book may benefit researchers and scientists from the academic fields of soil dynamics and earthquake engineering, geotechnical engineering, geoenvironmental engineering, transportation engineering, geology, mining and energy, as well as practical engineers from the industry. Each of the papers included in this book received at least two positive peer reviews. The editors would like to express their sincerest appreciation to all of the anonymous reviewers all over the world, for their diligent work. This book of the GeoMEast 2019 proceedings includes a collection of research and practical papers from an international research and technology activities on recent developments in pavement design, modeling and performance, and effects on infrastructure, green energy, technology, and integration. Sustainability is increasingly a key priority in engineering practices. With the aging transportation infrastructure and renewed emphasis on infrastructure renovation by transportation agencies, innovations are urgently needed to develop materials, designs, and practices to ensure the sustainability of transportation infrastructure. This eBook is a collection of articles from a Frontiers Research Topic. Frontiers Research Topics are very popular trademarks of the Frontiers Journals Series: they are collections of at least ten articles, all centered on a particular subject. With their unique mix of varied contributions from Original Research to Review Articles, Frontiers Research Topics unify the most influential researchers, the

latest key findings and historical advances in a hot research area! Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers Editorial Office: frontiersin.org/about/contact. Written by an international group of contributors, Ground Improvement Case Histories: Compaction, Grouting and Geosynthetics provides over 700 pages of international case-histories. Each case-history provides an overview of the specific technology followed by applications, with some cases offering a comprehensive back-analysis through numerical modelling. Specific case-histories include: The Use of Alternative and Improved Construction Materials and Geosynthetics in Pavements, Case Histories of Embankments on Soft Soils and Stabilisation with Geosynthetics, Ground Improvement with Geotextile Reinforcements, Use of Geosynthetics to aid Construction over Soft Soils and Soil Improvement and Foundation Systems with Encased Columns and Reinforced Bearing Layers. Comprehensive analysis methods using numerical modelling methods Features over 700 pages of contributor generated case-histories from all over the world Offers field data and clear observations based on the practical aspects of the construction procedures and treatment effectiveness 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 volume brings together scientific experts in different areas that contribute to the railway track and transportation engineering challenges, evaluate the state-of-the-art, identify the shortcomings and opportunities for research and promote the interaction with the industry. In particular, scientific topics that are addressed in this volume include railway ballasted track degradation/settlement problems and stabilization/reinforcement technologies, switches and crossings and related derailments causes, train-induced vibrations and mitigation measures, operations, management and performance of ground transportation, and traffic congestion and safety procedures. 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). This book systematically introduces readers to computational granular mechanics and its relative engineering applications. Part I describes the fundamentals, such as the generation of irregular particle shapes, contact models, macro-micro theory, DEM-FEM coupling, and solid-fluid coupling of granular materials. It also discusses the theory behind various numerical methods developed in recent years. Further, it provides the GPU-based parallel algorithm to guide the programming of DEM and examines commercial and open-source codes and software for the analysis of granular materials. Part II focuses on engineering applications, including the latest advances in sea-ice engineering, railway ballast dynamics, and lunar

landers. It also presents a rational method of parameter calibration and thorough analyses of DEM simulations, which illustrate the capabilities of DEM. The computational mechanics method for granular materials can be applied widely in various engineering fields, such as rock and soil mechanics, ocean engineering and chemical process engineering. Microscopic re-examination of geomaterials consisting of aggregates can shed light on macroscopic behaviour, including compressibility, anisotropy, yielding, creep, cyclic liquefaction and shear rupture. As a result of this process of examination, new methods of material characterization emerge, leading to a greater degree of accuracy in the specification of new constitutive models with physically-meaningful parameters. The impetus behind this development is an increasing awareness on sustainability, leading to the more efficient use of recycled materials for geotechnical applications. The characteristics of recycled materials, such as compressibility and self-hardening, may differ significantly from those of natural materials, and it is crucial that evaluation is made from a specifically particulate perspective. Bearing Capacity of Roads, Railways and Airfields includes the contributions to the 10th International Conference on the Bearing Capacity of Roads, Railways and Airfields (BCRRA 2017, 28-30 June 2017, Athens, Greece). The papers cover aspects related to materials, laboratory testing, design, construction, maintenance and management systems of transport infrastructure, and focus on roads, railways and airfields. Additional aspects that concern new materials and characterization, alternative rehabilitation techniques, technological advances as well as pavement and railway track substructure sustainability are included. The contributions discuss new concepts and innovative solutions, and are concentrated but not limited on the following topics: · Unbound aggregate materials and soil properties · Bound materials characteritics, mechanical properties and testing · Effect of traffic loading · In-situ measurements techniques and monitoring · Structural evaluation · Pavement serviceability condition · Rehabilitation and maintenance issues · Geophysical assessment · Stabilization and reinforcement · Performance modeling · Environmental challenges · Life cycle assessment and sustainability Bearing Capacity of Roads, Railways and Airfields is essential reading for academics and professionals involved or interested in transport infrastructure systems, in particular roads, railways and airfields. Case studies are used to show how theory is applied in practice. In the design and construction process, various models are used – geotechnical, laboratory, analytical, delivery, and economic models as the project is developed from planning to construction. This book explores the use and limitations of these earthwork models to be understood and appropriately applied. This book evolved from an earthworks course to practicing engineers over a 10-year period. Theory alone is not enough. Experience alone without relating back to theory can sometimes be misleading if transferred without understanding the fundamentals. The book benefited from the experiences of those many practicing engineers and the author’s experience in multi-disciplinary consulting companies as well as specialist geotechnical companies and government departments. The basics of soil, rock and compaction mechanics as applied to field conditions are covered. Material typically not covered in other textbooks, include the applications and limitations of associated "standard" laboratory and field testing. Specific chapters are dedicated to excavation, subgrade and expansive clay assessment and treatment. Useful design practices as well as the development and application of specifications is covered. A specification, test or design in one climatic condition or geology may not apply in another. Ballast plays a vital role in transmitting and distributing train wheel loads to the underlying sub-ballast and subgrade. Bearing capacity of track, train speed, riding quality and passenger comfort all depend on the stability of ballast through mechanical interlocking of particles. Ballast attrition and breakage occur progressively under heavy cyc This volume brings together scientific experts in different areas that contribute to the Railway Track & Transportation Engineering challenges, evaluate the State-of-the-Art, identify the shortcomings and opportunities for research and promote the interaction with the industry. In particular, scientific topics that are addressed in this volume include railway ballasted track degradation/settlement problems and stabilization/reinforcement technologies, switches and crossings and related derailments causes, train-induced vibrations and mitigation measures, operations, management and performance of ground transportation, and traffic congestion and safety procedures. This volume

is part of the proceedings of the 1st GeoMEast International Congress and Exhibition on Sustainable Civil Infrastructures, Egypt 2017. The inverse dynamics problem was developed in order to provide researchers with the state of the art in inverse problems for dynamic and vibrational systems. Contrasted with a forward problem, which solves for the system output in a straightforward manner, an inverse problem searches for the system input through a procedure contaminated with errors and uncertainties. An inverse problem, with a focus on structural dynamics, determines the changes made to the system and estimates the inputs, including forces and moments, to the system, utilizing measurements of structural vibration responses only. With its complex mathematical structure and need for more reliable input estimations, the inverse problem is still a fundamental subject of research among mathematicians and engineering scientists. This book contains 11 articles that touch upon various aspects of inverse dynamic problems. This volume is a comprehensive study which provides practical advice and guidance on the important role played by ground engineering in the construction of railway track, the use of which will result in optimum quality with the minimum maintenance effort and the most economical use of resources. 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. This book includes a collection of researches that contains research data, discussions and conclusions focusing on several related geotechnical aspects of infrastructure. Topics include issues related to civil infrastructure such as temperature-induced lateral earth pressure on bridge abutment, subsidence of high speed rail and expressway, application of recycled rubber mats, railway ballast evaluation, hurricane protection floodwall, tunnel portal stability, deep excavation case study and properties of contaminated soils. Various types of research were used in the various studies, including field measurements, numerical analyses and laboratory measurements. This findings and results should lead to more resilient infrastructure design, maintenance and management, which will provide benefits to both civil engineering practitioners, researchers and students This book is designed to serve as a comprehensive resource on cellular confinement systems or geocells, covering technologies and their applications in geotechnical engineering. The book discusses all aspects of geocells and related technologies, and covers the subjects from conceptual basics to recent advances. The chapters of this book are written by renowned international experts and its contents include detailed case studies from both academic and industry experts. This book is a one-stop reference work for academicians, students, and practicing engineers in the global geotechnical community. The book presents the recent advances on testing and experimentation in civil engineering, especially in the branches of

geotechnics, transportation, hydraulics, and natural resources. It includes advances in physical modelling, monitoring techniques, data acquisition and analysis, and provides an invaluable contribution for the installation of new civil engineering experimental facilities. The first part of the book covers the latest advances in testing and experimentation in key domains of geotechnics: soil mechanics and geotechnical engineering, rock mechanics and rock engineering, and engineering geology. Some of the topics covered include new developments in topographic survey acquisition for applied mapping and in situ geotechnical investigations; laboratory and in situ tests to estimate the relevant parameters needed to model the behaviour of rock masses and land structures; monitoring and inspection techniques designed for offshore wind foundations. The second part of the book highlights the relevance of testing and monitoring in transportation. Full-scale accelerated pavement testing, and instrumentation becomes even more important nowadays when, for sustainability purposes, non-traditional materials are used in road and airfield pavements. Innovation in testing and monitoring pavements and railway tracks is also developed in this part of the book. Intelligent traffic systems are the new traffic management paradigm, and an overview of new solutions is addressed here. Finally, in the third part of the book, trends in the field and laboratory measurements and corresponding data analysis are presented according to the different hydraulic domains addressed in this publication, namely maritime hydraulics, surface water and river hydraulics and urban water. The rail network plays an essential role in transport infrastructure worldwide. A ballasted track is commonly used for several reasons, including economic considerations, load bearing capacity, rapid drainage and ease of maintenance. Given the ever-increasing demand for trains to carry heavier axle loads at greater speeds, traditional design and construction must undergo inevitable changes for sustainable performance. Ballast is an unbounded granular assembly that displaces when subjected to repeated train loading affecting track stability. During heavy haul operations, ballast progressively deteriorates and the infiltration of fluidized fines (mud pumping) from the underlying substructure and subgrade decreases its shear strength and also impedes drainage, while increasing track deformation and associated maintenance. Features: serves as a useful guide to assist the practitioner in new track design as well as remediating existing tracks. research discussed in this book has made considerable impact on the railway industry. resulting from collaborative research between academia and industry, incorporating sophisticated laboratory tests, computational modelling and field studies. This book presents a comprehensive procedure for the design of ballasted tracks based on a rational approach that combines extensive laboratory testing, computational modelling and field measurements conducted over the past two decades. Ballast Railroad Design: SMART-UOW Approach will not only become an imperative design aid for rail practitioners, but will also be a valuable resource for postgraduate students and researchers alike in railway engineering. Construction materials are the most widely used materials for civil infrastructure in our daily lives. However, from an environmental point of view, they consume a huge amount of natural resources and generate the majority of greenhouse gasses. Therefore, many new and novel technologies for designing environmentally friendly construction materials have been developed recently. This Special Issue, “Environment-Friendly Construction Materials”, has been proposed and organized as a means to present recent developments in the field of construction materials. It covers a wide range of selected topics on construction materials. This proceedings contains 89 papers from 25 countries and regions, including 14 keynote lectures and 17 invited lectures, presented at the Third International Conference on Geotechnical Engineering for Disaster Mitigation and Rehabilitation (3ICGEDMAR 2011) together with the Fifth International Conference on Geotechnical & Highway Engineering (5ICGHE), which was held in Semarang, Indonesia, from 18 to 20 May 2011. This is the third conference in the GEDMAR conference series. The first was held in Singapore from 12 to 13 December 2005 and the second in Nanjing, China, from 30 May to 2 June 2008. The proceedings is divided into three sections: keynote papers, invited papers and conference papers under which there are six sub-sections: Case Studies on Recent Disasters; Soil Behaviours and Mechanisms for Hazard Analysis; Disaster Mitigation and Rehabilitation Techniques; Risk Analysis and Geohazard Assessment; Innovation Foundations for Rail, Highway, and

Embankments; and Slope Failures and Remedial Measures. The conference is held under the auspices of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) Technical Committee TC-303: Coastal and River Disaster Mitigation and Rehabilitation, TC-203: Earthquake Geotechnical Engineering and Associated Problems, TC-302: Forensic Geotechnical Engineering, TC-304: Engineering Practice of Risk Assessment and Management, TC-213: Geotechnics of Soil Erosion, TC-202: Transportation Geotechnics, TC-211: Ground Improvement, Southeast Asian Geotechnical Society (SEAGS), Association of Geotechnical Societies in Southeast Asia (AGSSEA), and Road Engineering Association of Asia & Australasia (REAAA). Ballast plays a vital role in transmitting and distributing train wheel loads to the underlying sub-ballast and subgrade. Bearing capacity of track, train speed, riding quality and passenger comfort all depend on the stability of ballast through mechanical interlocking of particles. Ballast attrition and breakage occur progressively under heavy cyclic loading, causing track deterioration and rail misalignment—affecting safety and demanding frequent and costly track maintenance. In the absence of realistic constitutive models, the track substructure is traditionally designed using empirical approaches. In Advanced Rail Geotechnology: Ballasted Track, the authors present detailed information on the strength, deformation and degradation, and aspects of fresh and recycled ballast under monotonic, cyclic, and impact loading using innovative geotechnical testing devices. The book presents a new stress-strain constitutive model for ballast incorporating particle breakage and validates mathematical formulations and numerical models using experimental evidence and field trials. The text also elucidates the effectiveness of various commercially available geosynthetics for enhancing track drainage and stability. It presents revised ballast gradations for modern high-speed trains capturing particle breakage and describes the use of geosynthetics in track design. It also provides insight into track design, capturing particle degradation, fouling, and drainage. This book is ideal for final year civil engineering students and postgraduates and is a solid reference for practicing railway engineers and researchers with the task of modernizing existing track designs for heavier and faster trains. This volume comprises select papers presented during TRANSOILCOLD 2019. It covers the challenges and problems faced by engineers, designers, contractors, and infrastructure owners during planning and building of transport infrastructure in Arctic and cold regions. The contents of this book will be of use to researchers and professional engineers alike. This book comprises select proceedings of the annual conference of the Indian Geotechnical Society. The conference brings together research and case histories on various aspects of geotechnical and geoenvironmental engineering. The book presents papers on geotechnical applications and case histories, covering topics such as (i) Characterization of Geomaterials and Physical Modelling; (ii) Foundations and Deep Excavations; (iii) Soil Stabilization and Ground Improvement; (iv) Geoenvironmental Engineering and Waste Material Utilization; (v) Soil Dynamics and Earthquake Geotechnical Engineering; (vi) Earth Retaining Structures, Dams and Embankments; (vii) Slope Stability and Landslides; (viii) Transportation Geotechnics; (ix) Geosynthetics Applications; (x) Computational, Analytical and Numerical Modelling; (xi) Rock Engineering, Tunnelling and Underground Constructions; (xii) Forensic Geotechnical Engineering and Case Studies; and (xiii) Others Topics: Behaviour of Unsaturated Soils, Offshore and Marine Geotechnics, Remote Sensing and GIS, Field Investigations, Instrumentation and Monitoring, Retrofitting of Geotechnical Structures, Reliability in Geotechnical Engineering, Geotechnical Education, Codes and Standards, and other relevant topics. The contents of this book are of interest to researchers and practicing engineers alike. Links Geotechnics with Railway Track Engineering and Railway Operation Good railway track and railway operations depend on good geotechnics, in several different ways and at varying levels. Railway Geotechnics covers track, track substructure, load environment, materials, mechanics, design, construction, measurements, and management. Illustrated by This volume presents selected papers presented during the 4th International Conference on Transportation Geotechnics. The papers address the geotechnical challenges in design, construction, maintenance, monitoring, and upgrading of roads, railways, airfields, and harbor facilities and other ground transportation infrastructure with the goal of providing safe, economic, environmental, reliable and sustainable

infrastructures. This volume will be of interest to postgraduate students, academics, researchers, and consultants working in the field of civil and transport infrastructure. This book highlights advances in the fields of civil engineering and construction industry with a particular focus on Structural Engineering and Construction Management. This book consists of top quality and innovative research papers selected from the proceedings of the 12th ICSECM 2021 under the themes of Innovations in Building Materials, Construction Management, Tall buildings, Concrete Technology and High Performance concrete, Geotechnical Engineering, Water and Waste Water Treatment, CKDu problem in Sri Lanka, Structural Health Monitoring & Design of Resistive Structures, Disaster Risk Reduction and Resilience in the Built Environment, Fibre Reinforced Polymer, Life Cycle Assessment of Buildings and Fire Safety Engineering. 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. This volume comprises select papers presented during the Indian Geotechnical Conference 2018. This volume discusses construction challenges and issues in geotechnical engineering. The contents cover foundation design and analysis, issues related to geotechnical structures, including dams, retaining walls, embankments and pavements, and rock mechanics and construction in rocks and rocky environments. Many of the papers discuss live case studies related to important geotechnical engineering projects worldwide, providing useful insights into the realistic designs and constructions. This volume will be of interest to students, researchers and practitioners alike.