Introduction To Tunnel Construction Applied Geotechnics

Over the past decades, geological survey organizations have digitized their data handling and holdings, unlocking vast amounts of data and information for computer processing. They have undertaken 3-D modeling alongside, and in some cases instead of, conventional geological mapping and begun delivering both data and interpretations to increasingly diverse stakeholder communities. Applied Multidimensional Geological Modeling provides a citable central source that documents the current capabilities and contributions of leading geological

survey organization and other practitioners in industry and academia that are producing multidimensional geological models. This book focuses on applications related to human interactions with conditions in the shallow subsurface, within 100-200 m of the surface. The 26 chapters, developed by 100 contributors associated with 37 organizations, discuss topics relevant to any geologist, scientist, engineer, urban planner, or decision maker whose practice includes assessment or planning of underground space. Advances in Applied Mechanics, Volume 54 in this ongoing series, highlights new advances in the field, with this new volume presenting interesting chapters on Advanced geometry representations and tools for microstructural and multiscale

modelling, Material Point Method: overview and challenges ahead, From Experimental Modeling of Shotcrete to Numerical Simulations of Tunneling, Mechanics of Hydrogel-Based Bioprinting: From 3D to 4D, and more.
Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Advances in Applied Mechanics series
Since the 1990s five books onApplications of Computational Mechanics in Geotechnical Engineering have been published. Innovative Numerical Modelling in Geomechanics is the 6th and final book in this series, and contains papers written by leading experts on computational mechanics. The book treats highly relevant topics in the field of geotechnic

Introduction to Tunnel Construction, Second EditionCRC Press
Advances in Applied Mechanics
Underground Engineering for Sustainable Urban Development
Managing the Final Stages of Boston's Central Artery/Tunnel Project
Carbon Emission Calculation Methods for Highway Tunnel Construction
Practical Tunnel Construction
Soft Ground Tunnel Design
Shield Construction Techniques in Tunnelling presents the latest on this fast, environmentally-friendly and relatively safe construction technique, reflecting on its technical risks and challenges as seen in China. Sections introduce the type of shields, the history of the technique, shielding principles, selection, management, the latest techniques in operation, consider engineering

cases, discuss construction in gravel, soft-soil, composite, and rock strata, and present video clips of construction that are accessible through QR codes embedded in the text. The book combines theory and practical experience, giving the reader unique insights into shield equipment and construction techniques. The shield tunneling technique is being used very widely, particularly in China, which is building urban-rail transit systems at an unparalleled scale and speed. The use of tunneling-shields provides a fast, relatively-safe, and ecologically-friendly method for the construction of tunnels. However, a number of incidents have shown the risks involved in tunnelling through geologically complex areas. Gives the principles and practice of shield

construction techniques, including shield selection and operation Demonstrates the latest technologies in shield construction that can be applied in practice Reflects on the technical risks and challenges of shield construction, based on extensive use of the technique for tunnel construction in China Discusses challenges in construction in gravel, soft-soil, composite and rock strata Provides engineers with applicable insights into shield equipment and construction techniques

This book highlights the latest technologies and applications of Artificial Intelligence (AI) in the domain of construction engineering and management. The construction industry worldwide has been a late bloomer to adopting digital

technology, where construction projects are predominantly managed with a heavy reliance on the knowledge and experience of construction professionals. AI works by combining large amounts of data with fast, iterative processing, and intelligent algorithms (e.g., neural networks, process mining, and deep learning), allowing the computer to learn automatically from patterns or features in the data. It provides a wide range of solutions to address many challenging construction problems, such as knowledge discovery, risk estimates, root cause analysis, damage assessment and prediction, and defect detection. A tremendous transformation has taken place in the past years with the emerging applications of AI. This enables industrial participants to

operate projects more efficiently and safely, not only increasing the automation and productivity in construction but also enhancing the competitiveness globally.
This work illustrates how the Analysis of Controlled Deformation in Rocks and Soils (ADECO-RS) is used in the design and the construction of tunnels. This is a very new and effective way of tunnel construction. The ADECO-RS approach makes a clear distinction between the design and the construction stages and allows reliable forecasts of construction times and costs to be made. It uses the advance core (the core of ground ahead of the face) as a structural tool for the long and short term stabilisation of tunnels, after its rigidity has first been regulated using conservation

techniques.
The Tunnel Engineering Handbook, Second Edition provides, in a single convenient volume, comprehensive coverage of the state of the art in the design, construction, and rehabilitation of tunnels. It brings together essential information on all the principal classifications of tunnels, including soft ground, hard rock, immersed tube and cut-and-cover, with comparisons of their relative advantages and suitability. The broad coverage found in the Tunnel Engineering Handbook enables engineers to address such critical questions as how tunnels are planned and laid out, how the design of tunnels depends on site and ground conditions, and which types of tunnels and construction methods are best suited to different conditions.

*Written by the leading engineers in the fields, this second edition features major revisions from the first, including: * Complete updating of all chapters from the first edition * Seven completely new chapters covering tunnel stabilization and lining, difficult ground, deep shafts, water conveyance tunnels, small diameter tunnels, fire life safety, tunnel rehabilitation and tunnel construction contracting *New coverage of the modern philosophy and techniques of tunnel design and tunnel construction contracting The comprehensive coverage of the Tunnel Engineering Handbook makes it an essential resource for all practicing engineers engaged in the design of tunnels and underground construction. In addition, the book contains a wealth of information that*

government administrators and planners and transportation officials will use in the planning and management of tunnels.
Underground Infrastructures
Volume 1
Applied Multidimensional Geological Modeling

Tunnel Engineering Handbook
An Introduction to Construction of Tunnels and Shafts
The North American Tunneling Conference is the premier forum to discuss new trends and developments in underground construction in North America. With every conference, the

number of attendees and breadth of topics grows. North American Tunneling: 2014 Proceedings reflects the theme for the 2014 conference, "Mission Possible." The authors share new theories, novel innovations, and the latest tools that make what once may have been perceived as impossible, now possible. The authors of 128 papers share the latest case histories, expertise, lessons learned, and real-world

applications from around the globe on a wide range of topics. They cover the successes and failures of challenging construction projects. Read about challenging design issues, fresh approaches on performance, future projects, and industry trends as well as ground movement and support, structure analysis, risk and cost management, rock tunnels, caverns and shafts, TBM technology and selection, and water and

wastewater conveyance. Tunnelling provides a robust solution to a variety of engineering challenges. It is a complex process, which requires a firm understanding of the ground conditions as well as the importance of ground-structure interaction. This book covers the full range of areas related to tunnel construction required to embark upon a career in tunnelling. It also includes a number of case studies related to

real tunnel projects, to demonstrate how the theory applies in practice. New features of this second edition include: the introduction of a case study related to Crossrail's project in London, focussing on the Whitechapel and Liverpool Street station tunnels and including considerations of building tunnels in a congested urban area; and further information on recent developments in tunnel boring

machines, including further examples of all the different types of machine as well as multi-mode machines. The coverage includes: Both hard-rock and soft-ground conditions Site investigation, parameter selection, and design considerations Methods of improving the stability of the ground and lining techniques Descriptions of the various main tunnelling techniques Health and safety considerations Monitoring of tunnels

during construction Description of the latest tunnel boring machines Case studies with real examples, including Crossrail's project in London Clear, concise, and heavily illustrated, this is a vital text for final-year undergraduate and MSc students and an invaluable starting point for young professionals and novices in tunnelling. 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 106 papers presented at the 2021

conference. Though the tunneling industry continues to develop both technically and contractually, one notable adaptation of the last two years has been the onset and management of COVID-19. The hallmarks of tunneling professionals include adaptability, resiliency, optimism, and management of change. These are traits that have been recently put to an entirely new challenge over the last year or so. We have

truly witnessed why what we do is deemed "essential" infrastructure. The COVID-19 pandemic has impacted each of us, personally and professionally, and while times have been hard, we are fortunate to work in a field that is able to meet the challenge and thrive thereafter. Congratulations are in order to everyone in our industry for keeping the planning and development of projects moving

forward and for maintaining safe and productive worksites in these challenging times. This book introduces the research background and significance of carbon emissions in the tunnel industry and systematically reviewed the research progresses of carbon emission researches for tunnels, LCA (life cycle assessment) research framework, and uncertainty research progress. The authors propose a novel modular

carbon emission calculation method for highway tunnel construction and expounds on the modular LCA system boundary theory of tunnel construction. This method does not require abundant knowledge of LCA modeling, which is convenient for general engineering and technical personnel to calculate the carbon emission level of tunnel construction. The calculation formulas for input and carbon

emissions of each module are provided. It also analyzes the parameter uncertainty, model uncertainty, and scenario uncertainty of the carbon emissions from tunnel construction by the Monte Carlo method. Further, this book proposes the fitting model of carbon emissions of unit engineering quantity in tunnel construction, which benefits to simplify the calculation of carbon emissions.This book is mainly aimed at

engineering and technical personnel in the construction industry, especially tunnel and underground engineering, including tunnel design engineers; tunnel construction engineers, experts, and scholars; tunnel owners; management departments.

Shield Tunnel Cutter Replacement Technology

Construction Technology of Large Diameter Underwater Shield Tunnel

Design and Construction of Tunnels

Information Technology

in Geo-Engineering

Sprayed Concrete Lined Tunnels

XAFS for Everyone

One thing that mature, developing, or undeveloped nations have incommon in today's global economy is the necessity to construct,repair, refurbish, and modernize their infrastructure. More andmore governments are turning to the Build-Operate-Transfer (BOT)process to accomplish this expensive and enormously challengingtask--allowing private developers to design, finance, construct,and operate

revenue-producing public projects, and then turn themover to the community at the end of an agreed payback period. The first book to explore this innovative approach toprivatization, Build, Operate, Transfer covers the creation of BOTprojects from the ground up. Using a real-world, case-orientedapproach, it provides a comprehensive examination of theengineering, construction, and financial skills required to bringBOT ventures from the planning stage to design, construction, andoperation. From the

Channel Tunnel to the Dulles Greenway, the bookexamines both successful projects and troubled ones, extracting keyinformation on what sets them apart--including such crucial factorsas the importance of public support and government control inensuring a positive outcome. You will also find specific coverageof construction techniques and procedures, plus financialcomparisons, demographics, and other statistical data. Whether you are a student or a professional working in engineering,construction,

finance, or government, BOT cannot be ignored as aneffective way to build infrastructure projects quickly,efficiently, and at minimal cost. This book equips you with boththe comprehensive information and the practical guidance you needto put this dynamic practice into action. The only book available on the BOT approach to private constructionand maintenance of public projects--complete coverage from theground up Contractors the world over are discovering how to useprivate-public partnerships to build

much-needed infrastructureprojects quickly, efficiently, and at minimal cost. This bookthoroughly explores the combination of engineering, construction,and financial skills required to bring these Build-Operate-Transfer(BOT) ventures from the planning stage to design, construction, andoperation. Based on a real-world, case-driven approach, Build,Operate, Transfer examines specific BOT projects, identifying keyfactors necessary to their successful implementation, and offeringimportant

guidance on avoiding common pitfalls. This practical bookfeatures: A full introduction to BOT systems, with diagrams ofconstruction techniques and procedures, complete sample contract,and more * Charts and graphs with financial analyses, demographicinformation, and important statistical data * BOT examples from many different countries, including the UnitedStates, Britain, Japan, the Philippines, Thailand, Indonesia, andMexico * A broad spectrum of project types--from tunnel construction tohighways and

more * Important guidance on keeping projects on time and on budget

Tunnelling provides a robust solution to a variety of engineering challenges. It is a complex process, which requires a firm understanding of the ground conditions as well as the importance of ground-structure interaction. This book covers the full range of areas related to tunnel construction required to embark upon a career in tunnelling. It also includes a number of case studies related to real tunnel projects, to demonstrate how the theory

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investigation, parameter selection, and design considerations Methods of improving the stability of the ground and lining techniques Descriptions of the various main tunnelling techniques Health and safety considerations Monitoring of tunnels during construction Description of the latest tunnel boring machines Case studies with real examples, including Crossrail's project in London Clear, concise, and heavily illustrated, this is a vital text for final-year undergraduate and MSc students and an invaluable starting point for

young professionals and novices in tunnelling.
Shield Tunnel Engineering: From Theory to Practice is a key technique that offers one of the most important ways to build tunnels in fast, relatively safe, and ecologically friendly ways. The book presents state-of-the-art solutions for engineers working within the field of shield tunnelling technology for railways. It includes expertise from major projects in shield tunnel construction for high-speed rail, subways and other major projects. In particular, it presents a series of advances

in shield muck conditioning technology, slurry treatment, backfill grouting, and environmental impact and control. In this volume, foundational knowledge is combined with the latest advances in shield tunnel engineering. Twelve chapters cover key areas including geological investigation, the types, structures and workings of shield machines, selecting a machine, shield segment design, shield tunnelling parameter control, soil conditioning for earth pressure balance (EPB) shield tunnelling, shield slurry

treatment, backfill grouting, environmental impact, and problems in shield tunnel structures and their amelioration. This book presents the essential knowledge needed for shield tunnel engineering, the latest advances in the field, and practical guidance for engineers. Presents the foundational concepts of shield tunnel engineering Gives the latest advances in shield tunnel engineering techniques Considers common problems in shield tunnel structures and their solutions Lays out step-by-

step guidance for engineers working with shield tunnelling Assesses environmental impacts and their control in shield tunnel engineering Introductory technical guidance for civil engineers, geotechnical engineers and construction managers interested in construction of tunnels and shafts. Here is what is discussed: 1. GENERAL, 2. TUNNEL EXCAVATION BY DRILLING AND BLASTING, 3. TUNNEL EXCAVATION BY MECHANICAL MEANS, 4. INITIAL GROUND SUPPORT, 5. SEQUENTIAL EXCAVATION

AND SUPPORT, 6. PORTAL CONSTRUCTION, 7. SHAFT CONSTRUCTION, 8. OPTIONS FOR GROUND IMPROVEMENT, 9. DRAINAGE AND CONTROL OF GROUNDWATER, 10. CONSTRUCTION OF FINAL, PERMANENT TUNNEL LININGS, 11. VENTILATION OF TUNNELS AND SHAFTS, 12. SURVEYING FOR TUNNELS AND SHAFTS, 13. CONSTRUCTION HAZARDS AND SAFETY REQUIREMENTS, 14. ENVIRONMENTAL CONSIDERATIONS AND EFFECTS, 15. CONTRACTING

PRACTICES, 16. PRACTICAL CONSIDERATIONS FOR THE PLANNING OF TUNNEL PROJECTS.

Paving the Way for Tomorrow's Infrastructure

Volume 11: Urban Tunnels - Part 1

Tunnels and Underground Cities: Engineering and Innovation Meet Archaeology, Architecture and Art

Selected Topics

Tunnel Construction

Design of Underground Structures

For thousands of years, the underground has provided humans refuge, useful

resources, physical support for surface structures, and a place for spiritual or artistic expression. More recently, many urban services have been placed underground. Over this time, humans have rarely considered how underground space can contribute to or be engineered to maximize its contribution to the sustainability of society. As human activities begin to change the planet and population struggle to maintain satisfactory standards of living, placing new infrastructure and related facilities underground may be the most successful way to encourage or support the redirection of urban development

into sustainable patterns. Well maintained, resilient, and adequately performing underground infrastructure, therefore, becomes an essential part of sustainability, but much remains to be learned about improving the sustainability of underground infrastructure itself. At the request of the National Science Foundation (NSF), the National Research Council (NRC) conducted a study to consider sustainable underground development in the urban environment, to identify research needed to maximize opportunities for using underground space, and to enhance understanding among

the public and technical communities of the role of underground engineering in urban sustainability. Underground Engineering for Sustainable Urban Development explains the findings of researchers and practitioners with expertise in geotechnical engineering, underground design and construction, trenchless technologies, risk assessment, visualization techniques for geotechnical applications, sustainable infrastructure development, life cycle assessment, infrastructure policy and planning, and fire prevention, safety and ventilation in the underground. This report

is intended to inform a future research track and will be of interest to a broad audience including those in the private and public sectors engaged in urban and facility planning and design, underground construction, and safety and security.

The only modern guide to all aspects of practical tunnel construction Practical Tunnel Construction fills a void in the literature for a practical guide to tunnel construction. By taking the reader through a brief introduction and history to a comprehensive discussion of how the geological factors affect tunneling, the author covers the

stages and technology that are common today without using complex equations. Written for the individual who does not have an extensive background in tunneling but who has to make tunneling decisions, the various tunneling methods are discussed to help in the determination of the appropriate method. The methods discussed are: hand mining, drill/blast, Tunnel Boring Machine (TBM), New Austrian Tunnelling Method (NATM), Norwegian Method of Tunnelling (NMT), Roadheader, Earth Pressure Balance Machine (EPBM), and Slurry Pressure Balance Machine (SPBM). This book focuses on driven tunnels.

This versatile handbook: Offers clear and accessible coverage of the state of the art in tunnel construction Introduces the essentials of design and construction of many types of tunnels, including TBM, EPB, Roadheader, NATM, drill and blast, and soft ground tunneling Provides nontechnical guidance on selecting the most appropriate tunneling methods for various situations Includes a brief history of tunneling and an introduction to geotechnical considerations Discusses tunnel access shaft construction, mucking methods, tunnel haulage, grout, water handling, and much more Practical Tunnel

Construction is an important resource for students, construction managers, tunnel designers, municipal engineers, or engineers who are employed by government agencies or corporations that are exploring the feasibility of planning and designing or building a tunnel. Introductory technical guidance for civil and geotechnical engineers and construction managers interested in construction of tunnels and shafts. Here is what is discussed: 1. GENERAL 2. TUNNEL EXCAVATION BY DRILLING AND BLASTING 3. TUNNEL EXCAVATION BY MECHANICAL MEANS 4. INITIAL

GROUND SUPPORT 5. SEQUENTIAL EXCAVATION AND SUPPORT 6. PORTAL CONSTRUCTION 7. SHAFT CONSTRUCTION 8. OPTIONS FOR GROUND IMPROVEMENT 9. DRAINAGE AND CONTROL OF GROUNDWATER 10. CONSTRUCTION OF FINAL, PERMANENT TUNNEL LININGS 11. VENTILATION OF TUNNELS AND SHAFTS 12. SURVEYING FOR TUNNELS AND SHAFTS 13. CONSTRUCTION HAZARDS AND SAFETY REQUIREMENTS 14. ENVIRONMENTAL CONSIDERATIONS AND EFFECTS 15. CONTRACTING PRACTICES 16. PRACTICAL CONSIDERATIONS FOR THE

PLANNING OF TUNNEL PROJECTS.

Practising engineers on site, in the design office or in client organizations will find this book an excellent introduction to the design and construction of sprayed concrete lined (SCL) tunnels. The complex behaviour of the early age behaviour of the sprayed concrete requires careful management. This book covers all aspects of SCL tunnelling – from the constituents of sprayed concrete to detailed design and management during construction. Although there is a close interdependence between all the facets of sprayed

concrete, few engineers have the right breadth of experience and expertise, and this urgently needs to be transferred to the wider engineering community. Disseminating essential information for tunnelling engineers, Sprayed Concrete Lined Tunnels is key reading for all involved in or studying the process.

Introduction to Tunnel Construction, Second Edition

North American Tunneling: 2014 Proceedings

Completing the "Big Dig"

Proceedings of the 5th International Symposium TC28. Amsterdam, the Netherlands, 15-17 June 2005

Construction Project Management
Introduction to Tunnel Construction

First Published in 2017. Routledge is an imprint of Taylor & Francis, an Informa company.

This book proposes the tool change methods for the excessive tool wear in the construction rules of shield tunnel construction in China. From the perspective of shield tunneling, atmospheric pressure tool change, pressure opening and tool change, and other special techniques, the tool change technologies are proposed. It highlights a number of tool-changing techniques and research and development work, including pressure-changing tools, tool-changing tools in the tool-cylinder

arm, and cutter-tooth cutter interchange since the beginning of the construction of the Nanjing Yangtze River Tunnel.

A valuable source of reference on the current practices of analysis, design and construction of tunnels and underground structures in soft ground. This collection of reviewed papers covers a wide range of tunnelling practice, from deep excavations in Singapore to the construction of a new metro line in Barcelona. The international scope of the contributors makes this a truly comprehensive collection of work on the geotechnical aspects of soft ground excavation.

Tunnelling has become a fragmented process, excessively influenced by lawyers'notions of confrontational contractual bases. This prevents the

pooling of skills, essential to the achievement of the promoters' objectives. Tunnelling: Management by Design seeks the reversal of this trend. After a brief historical treatment of selected developments, th

Tunnel Engineering

Concept - Basic Principles of Design

Numerical Models in Geomechanics

Informing Sustainable Human Interactions with the Shallow Subsurface

A Practical Approach Demystified

Shield Tunnel Engineering

"This book set provides a global, up-to-date, thorough, clear and practical new risk-based approach to tunnelling design and construction

methods and discusses detailed examples of solutions applied to relevant case histories. It is organised in three sequential and integrated volumes: VOLUME 1 "Concept - Basic Principles of Design" VOLUME 2 "Construction - Methods, Equipment, Tools and Materials" VOLUME 3 "Case Histories and Best Practices" The set covers all aspects of tunnelling, giving useful and practical information about design

(Vol. 1), construction (Vol. 2) and best practices (Vol. 3). It provides the following features and benefits: 1) updated vision on tunnelling design, tools, materials and construction 2) balanced mix of theory, technology and applied experience 3) different and harmonized points of view from academics, professionals and contractors 4) easy consultation in form of handbook and 5) risk-oriented approach to

tunnelling problems. The tunnelling industry is amazingly widespread and increasingly important all over the world, particularly in developing countries. The audience for these books consists of engineers, geologists, designers, constructors, providers, contractors, public and private customers, and in general technicians involved in tunnelling and underground works industry. They are also a suitable source of

information for industry professionals, senior undergraduate and graduate students, researchers and academics"--

This volume presents a selection of chapters covering a wide range of tunneling engineering topics. The scope was to present reviews of established methods and new approaches in construction practice and in digital technology tools like building information modeling. The book is

divided in four sections dealing with geological aspects of tunneling, analysis and design, new challenges in tunnel construction, and tunneling in the digital era. Topics from site investigation and rock mass failure mechanisms, analysis and design approaches, and innovations in tunnel construction through digital tools are covered in 10 chapters. The references provided will be useful for further reading.

In this special collection of over 304 peer-reviewed papers, are to be found some original ideas and angles on every aspect of Automation, Communication, Architectonics and Materials. Researchers here exchange their innovative ideas and new perspectives. The book will provide invaluable guidance to scientists, physicists, chemists and teachers concerning the topics covered. Volume is indexed by Thomson

Reuters CPCI-S (WoS). These proceedings address the latest developments in information communication and technologies for geo-engineering. The 3rd International Conference on Information Technology in Geo-Engineering (ICITG 2019), held in Guimarães, Portugal, follows the previous successful installments of this conference series in Durham (2014) and Shanghai (2010). The

respective chapters cover the following: Use of information and communications technologies Big data and databases Data mining and data science Imaging technologies Building information modelling applied to geo-structures Artificial intelligence Smart geomaterials and intelligent construction Sensors and monitoring Asset management Case studies on design, construction and maintenance Given its

broad range of coverage, the book will benefit students, educators, researchers and professional practitioners alike, encouraging these readers to help take the geo-engineering community into the digital age
Shield Construction Techniques in Tunneling
Innovative Numerical Modelling in Geomechanics
Modern Tunneling Science And Technology
Principles and Practice

of Ground Improvement
Tunnelling
Intelligent Robotics and Applications

This book provides a general review of the literature on underground structures, combined with new specifications, engineering case studies, and numerical simulations based on the authors' research. It focuses on the basic concepts, theories, and methods of the design of underground structures. After an introduction, it covers various topics, such as elastic foundation beam theory and numerical analysis methods for

underground structures, as well as the design of shallow underground structures, diaphragm wall structures, shield tunnel structures, caisson structures, immersed tube structures, and integral tunnel structures. It also includes tables for calculating elastic foundation beam. This book is intended for senior undergraduate and graduate students majoring in urban underground space engineering, building engineering, highway engineering, railway engineering, bridge and tunnel engineering, water conservancy and hydropower engineering.

Boston's Central Artery/Tunnel Project, a 7.8 mile system of bridges and underground highways and ramps, is the most expensive public works project ever undertaken in the United States. The original cost estimate of $2.6 billion has already been exceeded by $12 billion, and the project will not be completed until 2005, seven years late. The Massachusetts Turnpike Authority (MTA), the public steward of the project, requested that the National Research Council carry out an independent assessment of the project's management and contract administration practices,

with a focus on the present situation and measures that should be taken to bring the project to a successful conclusion. This report presents the committee's findings and recommendations pertaining to cost, scheduling, and transitioning from the current organization dominated by consultants to an operations organization composed largely of full-time MTA staff. The report recommends that MTA establish an external, independent, peer-review program to address technical and management issues until the transition to operations and maintenance is

complete; begin a media campaign now to teach drivers how to use the new system safely; and develop, immediately implement, and maintain a comprehensive security program.

This book systematically introduces the new technology used in the construction of underwater large slurry shields under complex conditions. The basic principles, scope of application, construction technology and technical points of the key technologies such as the origin and arrival of the shield, crossing the shallow soil in the middle of the river,

crossing the guard, and changing the knife and opening the knife are clarified.

The market demands for skills, knowledge and personalities have positioned robotics as an important field in both engineering and science. To meet these challenging - mands, robotics has already seen its success in automating many industrial tasks in factories. And, a new era will come for us to see a greater success of robotics in n- industrial environments. In anticipating a wider deployment of intelligent and auto- mous robots for tasks such as manufacturing, eldercare,

homecare, edutainment, search and rescue, de-mining, surveillance, exploration, and security missions, it is necessary for us to push the frontier of robotics into a new dimension, in which motion and intelligence play equally important roles. After the success of the inaugural conference, the purpose of the Second International Conference on Intelligent Robotics and Applications was to provide a venue where researchers, scientists, engineers and practitioners throughout the world could come together to present and discuss the latest achievement, future

challenges and exciting applications of intelligent and autonomous robots. In particular, the emphasis of this year's conference was on "robot intelligence for achieving digital manufact- ing and intelligent automations. " This volume of Springer's Lecture Notes in Artificial Intelligence and Lecture Notes in Computer Science contains accepted papers presented at ICIRA 2009, held in Singapore, December 16–18, 2009. On the basis of the reviews and recommendations by the international Program Committee members, we decided to accept 128 papers

having technical novelty, out of 173 submissions received from different parts of the world.
From Theory to Practice
Build, Operate, Transfer
Artificial Intelligence in Construction Engineering and Management
Geotechnical Aspects of Underground Construction in Soft Ground
Second International Conference, ICIRA 2009, Singapore, December 16-18, 2009, Proceedings
Handbook on Tunnels and Underground Works
Tunnels and Underground Cities: Engineering and Innovation meet

Archaeology, Architecture and Art. Volume 11: Urban Tunnels - Part 1 contains the contributions presented in the eponymous Technical Session during the World Tunnel Congress 2019 (Naples, Italy, 3-9 May 2019). The use of underground space is continuing to grow, due to global urbanization, public demand for efficient transportation, and energy saving, production and distribution. The growing need for space at ground level, along with its continuous value increase and the challenges of energy saving and achieving sustainable development objectives, demand greater and better use of the underground space to ensure that it supports sustainable, resilient and more liveable cities. The contributions cover a wide range of topics, from

geomechanical behavior evaluation, evaluation of long-term tunnel behaviour, via monitoring excavation-related ground deformation to risk management for tunneling-induced deformations. The book is a valuable reference text for tunnelling specialists, owners, engineers, archaeologists, architects, artists and others involved in underground planning, design and building around the world, and for academics who are interested in underground constructions and geotechnics.

".. integrates business knowledge, principles and practices of project managment and construction management... will help you achieve a strategic vision, continuously improve construction operations and manage industrial, commercial and institutional projects from conception

to occupancy." -- Publisher's description.

Soft Ground Tunnel Design is a textbook that teaches the principles of tunnel and underground space design in soft ground. 'Soft ground' refers to soil, in contrast to rock. The book focuses on stability, prediction of ground movements and structural design of the lining. It shows that the choice of excavation and support methods depends on ground stability; limitation of damage to the existing built environment; and health, safety and environmental considerations. Author Benoît Jones builds on the basic principles of soil-structure interaction, the three-dimensional effects of construction sequence and the effects of construction on other surface or subsurface structures in steps of

gradually increasing complexity. The use of worked examples throughout, and example problems at the end of each chapter, gives the reader confidence to apply their knowledge. Engineers and graduate students will be able to: • Understand the complex soil-structure interaction around an advancing tunnel. • Calculate heading stability. • Understand the basis for choosing an underground construction method and/or ground improvement method. • Design tunnel linings in soft ground using a variety of methods. • Predict ground movements. • Predict the effects of construction on the built environment and assess potential damage. Benoît Jones has worked in tunnelling as a designer, contractor and academic for more than 20 years. He set up and ran the MSc

*Tunnelling and Underground Space course at the University of Warwick. He is now managing director of his own company, Inbye Engineering. Reflecting the current research and advances made in the application of numerical methods in geotechnical engineering, this volume details proceedings of the Ninth International Symposium on 'Numerical Models in Geomechanics - NUMOG IX' held in Ottawa, Canada, 25-27 August 2004. Highlighting a number of new developments in the area, papers concentrate upon the following four main areas: * constitutive relations for geomaterials * numerical algorithms: formulation and performance * modelling of transient, coupled and dynamic problems * application of numerical*

techniques to practical problems. Representing the most advanced, modern findings in the field, Numerical Models in Geomechanics is a comprehensive and impeccably-researched text, ideal for students and researchers as well as practising engineers.

Advanced Research on Automation, Communication, Architectonics and Materials

Management by Design

Planning, Design, and Construction

An Introduction to Construction of Tunnels and Shafts for Professional Engineers

A Managerial Approach

Proceedings of the Ninth International Symposium on 'Numerical Models in Geomechanics - NUMOG IX', Ottawa, Canada, 25-27 August 2004

The book describes the details about the tunnel construction, that includes, history, shape and sizes, various conventional methods, techniques, planning, designing and methodology of construction in Indian context. The geological investigation for the selection of most economical, and technically viable, alignment for transportation. Further book highlights the necessity of safety for men, material and machinery, during construction. The Geo technical investigation

reports are prepared, Rock is classified in five classes like good rock, poor, fair, poor and very poor, according to the strength and characteristics of the rock the conclusion and recommendation are followed while designing the tunnel with adequately safe and sound tunnel support system. 'The book emphasises on engaging skilled, experienced and trained workmen, plant and equipment in good service condition, which is very important for the completion within stipulated time and cost.

The principle of reduce, reuse and recycle is applied in all possible construction activities to minimise the risk to the environment. For ensuring this, the temporary and permanent support system are designed to provide adequate support for the excavated tunnel profile. The Geo technical instrumentation is also provided to continuously monitoring the profile, foresee the behaviour of Rock mass, so that preventive steps are taken in time to mitigate the threats posed by fractured

rock mass or poor rock. Finally, it illustrates the various detailed activities and sequences involved at macro level and micro level, for the construction of a tunnel.

"The proposed book focuses on the principles and design of ground improvement technologies"--

Offers exposition of the classification of underground space, important considerations such as geological and engineering and underground planning. This title includes chapters

concerning applications for underground water storage, underground car parks, underground metros and road tunnels and underground storage of crude oil, lpg and natural gas.

XAFS for Everyone provides a practical, thorough guide to x-ray absorption fine-structure (XAFS) spectroscopy for both novices and seasoned practitioners from a range of disciplines. The text is enhanced with more than 200 figures as well as cartoon characters who offer informative

commentary on the different approaches used in XAFS spectroscopy. The book covers sample preparation, data reduction, tips and tricks for data collection, fingerprinting, linear combination analysis, principal component analysis, and modeling using theoretical standards. It describes both near-edge (XANES) and extended (EXAFS) applications in detail. Examples throughout the text are drawn from diverse areas, including materials science, environmental science, structural biology,

catalysis, nanoscience, chemistry, art, and archaeology. In addition, five case studies from the literature demonstrate the use of XAFS principles and analysis in practice. The text includes derivations and sample calculations to foster a deeper comprehension of the results. Whether you are encountering this technique for the first time or looking to hone your craft, this innovative and engaging book gives you insight on implementing XAFS spectroscopy and interpreting XAFS

experiments and results. It helps you understand real-world trade-offs and the reasons behind common rules of thumb.

Analysis of Controlled Deformations in Rock and Soils (ADECO-RS)

Rapid Excavation and Tunneling Conference 2021 Proceedings

Proceedings of the 3rd International Conference (ICITG), Guimarães, Portugal