

Tunnel Engineering

"The increased use of underground space for transportation systems and the increasing complexity and constraints of constructing and maintaining above ground transportation infrastructure have prompted the need to develop this technical manual. This FHWA manual is intended to be a single-source technical manual providing guidelines for planning, design, construction and rehabilitation of road tunnels, and encompasses various types of road tunnels"--P. ix.

Tunnel engineering is one of the oldest, most interesting but also challenging engineering disciplines and demands not only theoretical knowledge but also practical experience in geology, geomechanics, structural design, concrete construction, machine technology, construction process technology and construction management. The two-volume "Handbuch des Tunnel- und Stollenbaus" has been the standard reference for German-speaking tunnellers in theory and practice for 30 years. The new English edition is based on a revised and adapted version of the third German edition and reflects the latest state of knowledge. The book is published in two volumes, with the first being devoted to more practical themes of construction and construction process in drill and blast and mechanised tunnelling. Microtunnelling and ventilation are also dealt with. All chapters include practical examples.

Cities are the next frontier for artificial intelligence to permeate. As smart urban environments become possible, probable, and even preferred, artificial intelligence offers the chance for even further advancement through infrastructure and industry boosting. Opportunity overflows, but without thorough research to guide a complicated development and implementation process, urban environments can become disorganized and outright dangerous for citizens. AI-Based Services for Smart Cities and Urban Infrastructure is a collection of innovative research that explores artificial intelligence (AI) applications in urban planning. In addition, the book looks at how the internet of things and AI can work together to enable a real smart city and discusses state-of-the-art techniques in urban infrastructure design, construction, operation, maintenance, and management. While highlighting a broad range of topics including construction management, public transportation, and smart agriculture, this book is ideally designed for engineers, entrepreneurs, urban planners, architects, policymakers, researchers, academicians, and students.

Tunnels

Three-Dimensional Exploration Technology of Tunnel Geology

Investigate Feats of Engineering with 25 Projects

Grand Central's Engineer

Applications to Tunnel Engineering

One of the world's currently largests tunnel projects is under construction at the Yangtze River estuary: the Shanghai Yangtze River Tunnel project, with its length of 8950 m and a diameter of 15.43 m. The Shanghai Yangtze River Tunnel. Theory, Design and Construction, which was presented as a special issue at the occasion of the 6th International

"—Journal of the Society of Architectural Historians"Ably tells the story of the New York rail system's most active and visible symbol: the architectural and engineering masterpiece, with its grand public concourse, in the heart of Midtown.—"New Scientist

This book gives a comprehensive introduction to the new geophysical detection theories, methods and technologies of tunnel engineering under complex geological conditions and environments. It mainly focuses on the application of 3D seismic technique, 3D high-power resistivity sounding, and 3D GPR, etc. There are 7 chapters in the book. Chapter 1 introduces the state of the art and developing trends of geophysical detection technologies for tunnel engineering. Chapter 2 analyzes the complex geological conditions and environments for tunnel construction and the latest geophysical detection technologies. Chapter 3 to Chapter 7 systematically elaborate on the 3D seismic techniques, 3D detection technologies for water content in tunnel surrounding rocks, 3D detection technologies for side/back slope, 3D detection technologies for shield tunneling, and 3D detection technologies for collapse treatment of tunnel construction. The book presents numerous case studies to illustrate the applications of these technologies.

Introduction to Tunnel Construction

Engineering Mechanics

Introduction to Tunnel Engineering

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

Tunnel Engineering Handbook

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

Concept, reality and expectations - Management of the project - Tunnel design and construction - Geology, alignment and survey - Machine-driven tunnels - Major Underground structures - Construction planning and logisitics - Tunnel lining design and procurement

This book set provides a new, global, updated, thorough, clear, and practical risk-based approach to tunnelling design and construction methods, and discusses detailed examples of solutions applied to relevant case histories. It is organized 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 book 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: updated vision on tunnelling design, tools, materials, and construction balanced mix of theory, technology, and applied experience different and harmonized points of view from academics, professionals, and contractors easy consultation in the form of a handbook risk-oriented approach to tunnelling problems. The tunnelling industry is amazingly widespread and increasingly important all over the world, particularly in developing countries. The possible audience of the book are engineers, geologists, designers, constructors, providers, contractors, public and private customers, and, in general, technicians involved in the tunnelling and underground works industry. It is also a suitable source of information for industry professionals, senior undergraduate and graduate students, researchers, and academics.

Electrical, Civil, Mechanical, and Mining Engineering

Theory and Practice of Tunnel Engineering

ICivilEngineer: Web Directory: Tunnel Engineering

Shield Tunnel Engineering

Basics and Additional Services for Design and Construction

Tunnel engineering is one of the oldest, most interesting but also challenging engineering disciplines and demands not only theoretical knowledge but also practical experience in geology, geomechanics, structural design, concrete construction, machine technology, construction process technology and construction management. The two-volume "Handbuch des Tunnel- und Stollenbaus" has been the standard reference work for German-speaking tunnellers in theory and practice for 30 years. The new English edition is based on a revised and adapted version of the third German edition and reflects the latest state of knowledge. The book is published in two volumes, with the second volume covering both theoretical themes like design basics, geological engineering, structural design of tunnels and monitoring instrumentation, and also the practical side of work on the construction site such as dewatering, waterproofing and scheduling as well as questions of tendering, award and contracts, data management and process controlling. As with volume I, all chapters include practical examples.

Tunnels and Underground Cities: Engineering and Innovation meet Archaeology, Architecture and Art contains the contributions presented at 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. This vision was the source of inspiration for the design of the logos of both the International (ITA) and Italian (SIG) Tunnelling Association. By placing key infrastructures underground – the black circle in the logos – it will be possible to preserve and enhance the quality of the space at ground level – the green line. In order to consider and value underground space usage together with human and social needs, engineers, architects, and artists will have to learn to collaborate and develop an interdisciplinary design approach that addresses functionality, safety, aesthetics and quality of life, and adaptability to future and varied functions. The 700 contributions cover a wide range of topics, from more traditional subjects connected to technical challenges of design and construction of underground works, with emphasis on innovation in tunneling engineering, to less conventional and archetypically Italian themes such as archaeology, architecture, and art. The book has the following main themes: Archaeology, Architecture and Art in underground construction; Environment sustainability in underground construction; Geological and geotechnical knowledge and requirements for project implementation; Ground improvement in underground constructions; Innovation in underground engineering, materials and equipment; Long and deep tunnels; Public communication and awareness; Risk management, contracts and financial aspects; Safety in underground construction; Strategic use of underground space for resilient cities; Urban tunnels. *Tunnels and Underground Cities: Engineering and Innovation meet Archaeology, Architecture and Art* is a valuable reference text for tunneling specialists, owners, engineers, architects and others involved in underground planning, design and building around the world, and for academics who are interested in underground constructions and geotechnics.

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

Engineering News-record

Handbook of Tunnel Engineering

Handbook of Tunnel Engineering II

The Channel Tunnel

Modern Tunneling Science And Technology

Like New, No Highlights,No Markup,all pages are intact.

Project planning is generally accepted as an important contributor to project success. However, is there research that affirms the positive impact of project planning and gives guidance on how much effort should be spent on planning? To answer these questions, this book looks at current literature and new research of this under-studied area of project management. The author presents his findings from an extensive review of project planning literature that covers more than 270 sources. He also discusses new research that analyzes data from more than 1,300 global projects. The book confirms that the time spent on planning activities reduces risk and significantly increases the chances of project success. It also concludes that there can be too much planning and shows that the optimum ratio of planning to effort is 25%. The book examines the impact of project planning on different industries. It discusses research in the construction and information technology (IT) industries, and presents a case study of how to plan and track a software development project. The book also looks at the impact of geography on project planning and success. Intended as a basic tool in the library of any project manager or general manager, this book brings to light project planning techniques and information that have never been published previously. It is an important resource on how to plan projects properly and propel your career forward.

Winner of the 2004 Claire P. Holdredge Award of the Association of Engineering Geologists (USA). The only book to concentrate on the relationship between geology and its implications for construction, this book covers the full scope of the subject from site investigation through to the complexities of reservoirs and dam sites. Features include international case studies throughout, and summaries of accepted practice, plus sections on waste disposal, and contaminated land.

Bridges and Tunnels

Volume 1

Tunnel Engineering

The Blue Ridge Tunnel

AI-Based Services for Smart Cities and Urban Infrastructure

Tunnel construction is expensive when compared to the construction of other engineering structures. As such, there is always the need to develop more sophisticated and effective methods of construction. There are many long and large tunnels with various purposes in the world, especially for highways, railways, water conveyance, and energy production. Tunnels can be designed effectively by means of two and three-dimensional numerical models. Ground–structure interaction is one of the significant factors acting on economic and safe design. This book presents recent data on tunnel engineering to improve the theory and practice of the construction of underground structures. It provides an overview of tunneling technology and includes chapters that address analytical and numerical methods for rock load estimation and design support systems and advances in measurement systems for underground structures. The book discusses the empirical, analytical, and numerical methods of tunneling practice worldwide.

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.

ICivilEngineer.com offers a collection of Web sites on tunnel engineering. The sites cover tunnels, tunnel construction, research on fire in transportation tunnels, tunnel construction and safety, and related articles.

Engineering-contracting

Engineering the Channel Tunnel

A Remarkable Engineering Feat in Antebellum Virginia

Selected Topics

Project Planning and Project Success

The true story of the construction of the historic Crozet railroad tunnel—as seen through the eyes of three Irish immigrant families who helped build it. In one of the greatest engineering feats of the time, Claudius Crozet led the completion of Virginia’s Blue Ridge Tunnel in 1858. More than a century and a half later, the tunnel stands as a National Historic Civil Engineering Landmark, but the stories and lives of those who built it are the true lasting triumph. Irish immigrants fleeing the Great Hunger poured into America resolved to find something to call their own. They would persevere through life in overcrowded shanties and years of blasting through rock to see the tunnel to completion. In this intriguing history, Mary E. Lyons follows three Irish families in their struggle to build Crozet’s famed tunnel—and their American dream. Includes photos and illustrations

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. Tunnel engineering is one of the oldest, most interesting but also challenging engineering disciplines and demands not only theoretical knowledge but also practical experience in geology, geomechanics, structural design, concrete construction, machine technology,

construction process technology and construction management. The two-volume " Handbuch des Tunnel- und Stollenbaus " has been the standard reference for German-speaking tunnellers in theory and practice for 30 years. The new English edition is based on a revised and adapted version of the third German edition and reflects the latest state of knowledge. The book is published in two volumes, with the first being devoted to more practical themes of construction and construction process in drill and blast and mechanised tunnelling. Microtunnelling and ventilation are also dealt with. The second volume covers both theoretical themes like design basics, geological engineering, structural design of tunnels and monitoring instrumentation, and also the practical side of work on the construction site such as dewatering, waterproofing and scheduling as well as questions of tendering, award and contracts, data management and process controlling. All chapters of both volumes include practical examples.

Hazardous Gases Underground

Structures and Methods

Shield Construction Techniques in Tunneling

Soft Ground Tunnel Design

The Shanghai Yangtze River Tunnel. Theory, Design and Construction

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

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 Benoit 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.**

Benoit 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.

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.

The 25% Solution

Technical Manual for Design and Construction of Road Tunnels--civil Elements

From Theory to Practice

Handbook of Tunnel Engineering I

Tunnel Engineering HandbookSpringer Science & Business Media

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.

Bridges and tunnels are lifelines. People have tackled seemingly insurmountable obstacles, including vast canyons and mountain ranges, to design and construct these amazing passageways. Bridges and Tunnels: Investigate Feats of Engineering invites children ages 9 and up to explore the innovation and physical science behind structures our world depends on. Trivia and fun facts illustrate engineering ingenuity and achievements. Activities and projects encourage children to learn about the engineering process and to embrace trial and error.

Proceedings of the WTC 2019 ITA-AITES World Tunnel Congress (WTC 2019), May 3-9, 2019, Naples, Italy

Report of the Joint Tunnel Engineering Commission to the City Council of Oakland, Board of Supervisors of Alameda County, Board of Supervisors of Contra Costa County, State of California

The Handbook of Tunnel Fire Safety

Handbook on Tunnels and Underground Works

Volume 2: Construction – Methods, Equipment, Tools and Materials

The Channel Tunnel may be the greatest engineering project in Europe this century. This book describes the tremendous engineering achievement of the construction of the tunnel. Written by twenty of the key engineers involved, it provides a fascinating, informative and inspiring account of the project for both engineering professionals and general readers.

Applies detailed knowledge toward the design and construction of underground civil works projects. Develops critical skills for managing risk and designing reliable gas control measures within project time and cost constraints.

Engineering Geology and Construction

Engineering and Contracting

Practical Tunnel Construction

William J. Wilgus and the Planning of Modern Manhattan