IRF GLOBAL

Design & Construction of Road Tunnels

Expert training by professionals, for professionals

Brussels, Belgium
May 4-10, 2024

SCAN FOR INTERACTIVE AGENDA

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Background

This comprehensive course on the Design and Construction of Road Tunnels offers an in-depth exploration into the world of underground road infrastructure. Designed for engineers, architects, and construction professionals, this program delves into the fundamental concepts, innovative techniques, and best practices essential for the successful design and construction of road tunnels. Participants will learn about the unique challenges presented by underground construction, including geological considerations, environmental impacts, and the latest technological advancements in tunneling. The course also covers critical aspects of safety, ventilation, lighting, and emergency response systems specific to road tunnels. Through a combination of expert lectures, case studies, and hands-on exercises, attendees will gain the knowledge and skills needed to effectively contribute to all phases of road tunnel projects.

Learning Objectives

- ✓ Understanding of Geotechnical and Environmental Considerations: Participants will learn to assess and address the geotechnical challenges and environmental implications inherent in tunnel design and construction, ensuring sustainable and safe underground structures.
- ✓ Proficiency in Road Tunnel Design Principles: Gain expertise in the key principles of road tunnel design, including structural analysis, load considerations, and the integration of effective ventilation, lighting, and drainage systems.
- ✓ Knowledge of Advanced Construction Techniques: Develop an understanding of the latest technologies and methods in tunnel construction, such as Tunnel Boring Machines (TBMs), New Austrian Tunnelling Method (NATM), and other cutting-edge techniques.
- ✓ Skills in Safety and Risk Management: Acquire critical skills in identifying and managing risks associated with tunnel construction, including the implementation of robust safety protocols and emergency response systems.
- ✓ Insight into Project Management and Regulatory Compliance: Learn to effectively manage tunnel construction projects, focusing on budgeting, scheduling, and compliance with regulatory standards and environmental laws.

Target Audience

- **Civil Engineers**: Professionals specializing in tunnel design, structural engineering, and construction management who are looking to deepen their expertise in road tunnel projects.
- **Geotechnical Engineers**: Experts in soil and rock mechanics who play a critical role in assessing tunneling environments and ensuring the structural integrity of tunnels.
- **Project Managers**: Individuals responsible for overseeing road tunnel projects, ensuring they are completed on time, within budget, and according to specifications.
- **Transportation Planners**: Professionals involved in the strategic planning of transportation infrastructure, focusing on integrating road tunnels into broader transportation networks.
- **Construction Contractors:** Firms and individuals directly involved in the construction of road tunnels, looking to update their practices and understand the latest technologies and methodologies.

Lead Instructor

Dr. Amin K. Akhnoukh

Dr. Amin K. Akhnoukh is an Associate Professor in the Construction Management Department at East Carolina University (ECU). Prior to joining ECU in August 2017, Dr. Akhnoukh worked as an Assistant and Associate Professor at the Construction Management & Civil and Construction Engineering at the University of Arkansas at Little Rock, a Senior Design Engineer at Dar El-Handasa, and an Engineer at Orascom Engineering, Cairo, Egypt. Dr. Akhnoukh's main research interests are in the fields of construction materials, with an emphasis on concrete and asphalt. Dr. Akhnoukh has an extensive teaching portfolio with more than 14 undergraduate and graduate level courses, including Structure Analysis, Mechanics of Materials, Soil Mechanics and Foundations, Reinforced and Prestressed Concrete, Flexible and Rigid Pavement Design, Sustainability in Construction, and Construction Quality. Dr. Akhnoukh is a registered Professional Engineer in the States of Arkansas and North Carolina and a registered Associate Constructor by the American Institute of Constructors, Virginia, USA. Dr. Akhnoukh has more than 75 refereed publications in prestigious journals and local and international conferences. Dr. Akhnoukh received research funding in excess of $3.0 million as PI and Co. PI. His research is funded by the Arkansas Department of Transportation, the Arkansas Science and Technology Association, the Arkansas Space Grant Consortium, the North Carolina Department of Transportation, the National Science Foundation, and NASA. Dr. Akhnoukh supervised and graduated more than 20 Doctorate and Master students. Dr. Akhnoukh is a member of the American Society of Civil Engineers, American Concrete Institute, and Precast/Prestressed Concrete Institute. Dr. Akhnoukh is a Fellow of the International Road Federation (IRF) and the National Aeronautics and Space Administration (NASA).

Registration

- **2,500 USD IRF Members / Groups of 3 or more**
- **3,000 USD Non-IRF Members**

Registration: https://www.irf.global/event/tunnels24-ws-brussels/
For any support, please contact melabyad@irf.global

Agenda

Saturday - Friday (9:00 AM – 4:00 PM)

Day 1: Introduction to Road Tunnel Design and Construction

- Morning Session:
  - Overview of road tunnel engineering principles
  - Introduction to different types of tunnels
  - Safety considerations in tunnel design and construction
- Afternoon Session:
  - Tunnel ventilation systems
  - Geotechnical considerations

Day 2: Structural Design of Road Tunnels

- Morning Session:
  - Structural analysis and design principles
  - Materials selection for tunnel construction
- Afternoon Session:
  - Waterproofing and drainage systems
  - Fire protection measures in tunnels

Day 3: Construction Methods and Techniques

- Morning Session:
  - Tunnel excavation methods (e.g., cut-and-cover, drill and blast, TBM)
  - Construction sequencing and scheduling
- Afternoon Session:
  - Ground support systems
  - Quality control and assurance during tunnel construction

Day 4: Tunnel Operation and Management

- Morning Session:
  - Routine maintenance activities
  - Monitoring and inspection techniques
- Afternoon Session:
  - Case Studies

Day 5: Environmental and Social Impact of Road Tunnels

- Morning Session:
  - Environmental assessment and mitigation measures
  - Noise and air pollution control
- Afternoon Session:
  - Dealing with water table
  - Case studies

Day 6: Innovative Technologies in Tunnel Engineering

- Morning Session:
  - Advances in tunneling equipment and machinery
  - Use of advanced technology/ground penetrating radars
- Afternoon Session:
  - Future trends and challenges in road tunnel design and construction
  - Group discussion and course wrap-up

Day 7: Field Trip - Visit to a Road Tunnel Construction Site

- Guided tour of an ongoing road tunnel construction project
- Q&A session with project engineers and contractors

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IRF GLOBAL

International Road Federation

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