



ASSOCIATED RESEARCH CENTERS
FOR URBAN UNDERGROUND SPACE
ASSOCIATION DES CENTERS DE RECHERCHE
SUR L'UTILIZATION URBAINE DU SOUS-SOL

NATIONAL TECHNICAL UNIVERSITY OF ATHENS
LAB. OF MINING & ENVIRONMENTAL TECHNOLOGY



11th ACUUS International Conference

Underground Space: Expanding the Frontiers

10-13 September 2007, Athens, GREECE

Conference Program

Welcome letter from the executive chairman of the organising committee

Dear colleagues,

On behalf of the Organizing Committee, I would like to extend a warm welcome to all of you that participate in the 11th ACUUS Conference "Underground Space: Expanding the Frontiers". I would also like to express our gratitude for the variety and quality of the scientific contributions that were submitted. Your support is gratefully appreciated and we are pleased to host scientists from 18 countries that will present 90 papers. This Conference brings together international information, experience and research in order to provide a greater knowledge and ability to deal with various issues regarding underground development.

Today, underground development encompasses the relocation of several surface land uses or activities, which are difficult, impractical, or environmentally hostile, into subsurface built environments.

Nevertheless, the course towards an intensive utilization of the underground space still encounters several obstacles. The incorporation of the utilization of the underground space into urban planning, the appraisal of the environmental benefits of underground structures and the estimation of the value of underground space are just a few of the critical issues that need to be addressed. Underground development holds a considerable potential that can serve the needs of the public and contribute to the sustainable development of urban areas by enhancing the environmental conditions and the quality of life.

We sincerely hope that the 11th ACUUS Conference will carry on and extend the successful legacy of its predecessors. We truly wish that the product of our Conference will take underground development several steps forward and pave the way for a wider and more systematic utilization of the underground space.

Dimitris Kaliampakos
Executive Conference Chairman

Main Conference Topics

- A strategic view of going underground
- Underground projects: Experience from the field
- Underground space utilization in the world
- Future challenges in underground development
- Underground solutions towards sustainability
- Aesthetics and architecture of the underground environment
- Innovative tools in underground development
- Feasibility studies of underground projects
- Public and the underground space
- Safety and the underground space
- Improving the underground habitat



General Information

Conference Venue

The conference will take place in the facilities of the Lavrion Technological Cultural Park (LTCP). The venue is located by the sea, in the wider area of Athens, in close proximity to the Athens international airport. This site bears a strong underground mining tradition that goes back almost 2000 BC. The LTCP site includes a number of impressive restored historical buildings, and it is characterized as a landmark of industrial architecture. A restored mining gallery-museum is also found there, whereas, the first underground hazardous waste storage facility in Greece is currently under way within the LTCP premises.

The Conference & Exhibition Centre - Lavrion Technological Cultural Park is ideal for housing conferences, exhibitions, cultural events and seminars. The rich history of the area, the wealth of its monuments and its great industrial tradition are key attractions for visitors. The facilities include a restaurant and a cafeteria and offer state-of-the art technological infrastructure which can fully support high-quality events.

More info is available at the web site of the LTCP Conference & Exhibition Centre:

<http://www.lavriconference.gr>

The area of Lavrion

A rich history, unique monuments, superb natural beauty, easy access from the city of Athens and the Athens International Airport, as well as an array of quality hotels make the area of Lavrion an ideal tourism destination, for brief or longer visits. Only 45 minutes away from Athens and 20 minutes away from the Athens International Airport, stretching over 15 kilometers by the seashore, Lavrion offers a wide range of activities to those who wish to combine a conference, a cultural - or an educational event with a pleasant tour of Eastern Attica.

A walk through the town of Lavrion is the best way to get to know its rich history. Neoclassical buildings, picturesque alleys and monuments of the industrial era make Lavrion attractive year round. The Old Agora (Marketplace), built in 1885-1887, and the French Skala (1888) at the harbor - a unique monument of industrial archaeology - form an indispensable part of every tour in the town.

The surroundings of Lavrion, with the Sounion National Nature Reserve and important archaeological sites, constitute a significant center for cultural tourism and entertainment. Visitors should also visit the ancient mines and washing installations (plynteria), the ancient theatre at Thorikos, as well as the Temple of Poseidon and the remains of the Temple of Athena at Sounion.

Registration info

All pre-registered participants should contact the Zita Congress & Travel secretariat in order to pick up their registration pack. On site registration will also be carried out from the same registration desk.

On site Registration fee	
Full participant	Euro 400
Accompanying person	Euro 100

The conference secretariat will operate the following hours	
Monday , September 10 th 2007	14:00-17:30
Tuesday , September 11 th 2007	08:30-18:30
Wednesday , September 12 th 2007	09:00-18:30

Registration fee for full participant includes: Participation in the scientific program, welcome reception, opening ceremony, gala dinner, buffet lunches, technical visit, congress kit and shuttle transportation.

Registration fee for accompanying person includes: participation in welcome reception, opening ceremony, gala dinner and shuttle transportation.

Welcome Reception

The welcome reception will take place at the garden of Villa Serpieri in the Lavrion Technological Cultural Park on the 10th of September at 17:30-20:30. Round trip transfers will be provided for all participants staying at Aegeon and Cape Sounion Hotels.

Gala Dinner

The Gala Dinner will take place at the Cape Sounion Hotel on the 11th of September 2007 at 21:00. Round trip transfers will be provided for all participants who reside at the Aegeon Hotel.



ACUUS 2007 Conference Program

Monday, September 10th 2007	14:00 – 17:30	Registration		
	17:30 – 20:30	Welcome Banquet (Serpieri villa)		
Tuesday, September 11th 2007	09:00	Registration		
	09:00 – 09:30	Coffee Break		
	09:30 – 12:00	Opening session		
	12:00 – 13:00	Lunch Break		
	13:00 – 15:00	Michanourgio Hall	Farmakio Hall	
		Session 1: A strategic view of going underground	Session 2: Underground projects: Experience from the field (I)	
	15:00 – 15:30	Coffee Break		
	15:30 – 16:15	Session 3A: Underground space utilization in the world	Session 4: Underground projects: Experience from the field (II)	
	16:15 – 17:30	Session 3B: Future challenges in underground development		
	21:00	Gala Dinner		
Wednesday, September 12th 2007	09:00 – 11:00	Session 5: Underground solutions towards sustainability (I)	Session 6: Aesthetics and architecture of the underground environment	
	11:00 – 11:30	Coffee Break		
	11:30 – 13:00	Session 7: Underground solutions towards sustainability (II)	Session 8: Innovative tools in underground development (I)	
	13:00 – 14:00	Lunch Break		
	14:00 – 15:00	Session 9A: Feasibility studies of underground projects	Session 10: Innovative tools in underground development (II)	
	15:00 – 16:00	Session 9B: Public and the underground space		
	16:00 – 16:30	Coffee Break		
	16:30 – 17:30	Session 11: Safety and the underground space	Session 12: Improving the underground habitat	
18:00	General Assembly			
Thursday, September 13th 2007	09:30 – 13:30	Technical Visit to Attiko Metro Construction sites (Elliniko station, Argyroupoli station)		



Tuesday, September 11th 2007

Michanourgio Hall

Farmakio Hall

Session 1: A strategic view of going underground

1. Develop the Underground Space With a Master Plan or Incentives
Jacques Besner
2. Energy Rational Use and Underground Space: Opportunities for Sustainability
Evasio Lavagno, Laura Schranz
3. Evaluation of the Status Quo and Outlook of the Urban Underground Space Development and Utilization in China
Qian Qihu, Chen Xiaoqiang
4. Sustainable Use and Management of the Subsurface
Eduardo F.J. de Mulder, Robert Hack, Derk van Ree
5. The Urban Problems and the Underground Solutions
Junji Nishi, Takahumi Seiki, Yukio Nishida
6. Planning Underground Urban Space ? Where, When and How?
John Zacharias
7. Systemic Approach of Urban Underground Resources Exploitation
Pascal Blunier, Laurent Tacher, Aurèle Parriaux

Session 3A: Underground space utilization in the world

1. Recent Development and Utilisation of Underground Space in Italy
Evasio Lavagno, Laura Schranz
2. The Underground Images in Japan, Korea and Indonesia
Yukio Nishida, Harris Fabillah, Shigeru Ichihara, Junji Nishi, Kyung Duk Cho
3. Use of the Underground in the City of Trondheim, Norway
Einar Broch
4. The Current Status of Underground Space Utilization in Korea
Hee-Soon Shin, Eui-Seob Park
5. The Current Actuality and Developing Trend of Chinese Urban Underground Space Utility
Shu Yu, Wang Xuan, Peng Fangle, He Lei

Session 3B: Future challenges in underground development

1. New High-Speed Railway Lines Stuttgart 21 and Wendlingen-Ulm -Approximately 100 Km of Tunnels
Walter Wittke
2. A New Choice for Shanghai Container Distribution ? Underground Container Transportation System (UCTS)
Guo Dongjun, Yu Mingjian, Chen Zhilong
3. Safe Nuclear Power Plants Shall Be Built Underground
Pierre Duffaut
4. A Proposal of Metropolitan Area Deep Underground Distribution Tunnel
Masami Yokotsuka, Taro Kasuya, Tadahiko Okumura
5. Underground Space Development in Attica County in Relation with Its Geological Structure
Ioannis Koumantakis, Dimitrios Rozos, Paraskevas Tsagaratos

Session 2: Underground projects: Experience from the field (I)

1. The Underground Option for the New Railway Line between Turin and Caselle Airport in the Turin Urban Area
Biagio Burdizzo, Luciano Filicetti, Sebastiano Pelizza, Lorenzo Peretti
2. Assessment of Ground Conditions with Respect to Mechanised Tunnelling for the Construction of the Extension of the Athens Metro to the City of Piraeus
P.G. Marinos, M. Novack, M Benissi, G. Stoumpos, D. Papouli, M. Panteliadou, V. Marinos, K. Boronkay, K. Korkaris
3. L-Surf - Large Scale Underground Research Facility for Safety and Security
Volker Wetzig
4. LPG Underground Storage Project (Y-2 Project) Underneath an Artificial Island in Incheon, Korea
Seokwon Jeon, Sang-Pil Lee, Sang-Min Ra, Chung-In Lee, Jae-Joon Song
5. Effective Underground Use Enabled By Subway Construction in Narrow Area Where Many Other Lifelines Lie
Hiroyuki Nabeshima, Tomohiro Shiotani, Akira Matsushita
6. An Outstanding Project of Underground Space Utilization in Urban Redevelopment of Beijing
Tong Linxu
7. Urban Underground Road and Urban CBD Traffic - Underground #-shaped Corridor in CBD Core Area of Shanghai
Yu Mingjian, Luo Jianhui, Liu Yi, Guo Dongjun
8. Construction of Rail Tunnels Using Slurry Machines on Circle Line Stage 3, Singapore
Seah Tiong Peng, Kulaindran Ariaratnam, Ow Chun Nam

Session 4: Underground projects: Experience from the field (II)

1. Construction of City Gas-Trunk Line by Shield Tunnelling Method in the Deep Underground of Metropolitan Tokyo
Tsutomu Ikeda, Takashi Akiyama, Takehiko Yaguchi, Shiro Saito
2. Athens Underground Parking Facilities
D.V. Batsos, I. Tzouvadakis
3. Underground Space Utilization for Developing Sustainable Water Supply for Southern Nevada in a Sensitive Environment
Michael Feroz, Erika Moonin
4. The Turin Railway Link.
F. Bocchimuzzo, A. Perazzone, G.M. Cavallero, E. Piovano
5. Innovative Underground Works at Madeira Island, Portugal
Paulo Cafofo, Luis Ribeiro e Sousa, Francisco Moura
6. The Utilization of Underground Spaces in Osaka City's Sewage Projects
Akitaka Oosugi, Toshiyuki Nagasawa, Kazuo Yamane, Satoshi Fukui, Toshinori Fujisawa
7. Bifurcating and Widening Tunnels in Urban Environments.
P. Youta-Mitra, K. Kaliakakis, P.P. Nomikos, A.I. Sofianos
8. Experience of operating an underground LNG storage pilot cavern
Eui-Seob Park, So-Keul Chung, Dae-Hyuk Lee, Ho-Yeong Kim
9. Renovation Challenge of Underground Quarries for Oya Tuff
Takafumi Seiki, Junji Nishi, Yukio Nishida

Wednesday, September 12th 2007

Michanourgio Hall

Farmakio Hall

Session 5: *Underground solutions towards sustainability (I)*

1. The Environmental Benefit Analysis of Urban Underground Expressway
Jianqiang Cui, Dong Lin, Zhilong Chen
2. Basic Research into Ideal Way of Underground Space of District around Osaka Station
Masaaki Sakamoto, Masatoshi Kawachi
3. Thermal Loads Analysis of an Underground Cold Storage Facility
Grigorios Brachos, Andreas Benardos
4. Integrating Existing Tunnels into Modern Facility Management Systems: A New Approach for Operating Tunnel Facilities
Markus Thewes, Goetz Vollmann
5. The DEEP CITY Project: A Global Concept for a Sustainable Urban Underground Management
Aurele Parriaux, Pascal Blunier, Pierrick Maire, Laurent Tacher
6. Appraising the Environmental Advantages of Underground Storage Facilities in Athens
Athanassios Mavrikos, Dimitris Kaliampakos
7. The Development of the Underground Infrastructure of the System of Mobility in Torino
Biagio Burdizzo, Bruna Cavaglia, Lorenzo Peretti
8. Environmental Performance of Underground Railway Stations in Athens
E.S. Triantis, I. Tzouvadakis, A. Sotiropoulou
9. Shenzhen : Exploration of the Utilization of Underground Space Resource in the Period of Transition to Market Economy
Wang Fuhai, Gu Xin, Tang Yuanzhou

Session 7: *Underground solutions towards sustainability (II)*

1. Ecological Impact of Underground Construction Methods: A Methodology for Evaluating and Decision Making
Markus Thewes, Rolf Bielecki
2. Deep Underground Usage for Effective Executing of City Facility Construction
Seiji Nishioka, Yasuo Tannaka, Tomoya Minemura
3. A Probe into the Development and Utilization of Underground Space of New Towns in Beijing
Jun Chen, Shi Xiaodong
4. Case Studies of Master Planning for Sustainable Urban Underground Space Utilization
Zhu Wenjun, Wang Hui, Li Chuanbin, Wei Lijun
5. The Effect of Underground Subway Development on the Rehabilitation of Historical Urban Places: Case Study Tehran- Iran
Mohammad - Mehdi Safaee, Nahid Mohajeri, Anita Aghili
6. Incorporating Underground Space in Urban Planning
Eleni Drakouli, Athanassios Mavrikos
7. Creation of New Multi-Level Urban Space for the Northern Osaka Station Area Development
Masato Tanaka

Session 9A: *Feasibility studies of underground projects*

1. Comparative Evaluation of Alternative Methods for the Construction of Underground Car Parks
Meliti Papa, Andreas Benardos

Session 6: *Aesthetics and architecture of the underground environment*

1. Underground Landscape: The Urbanism & Infrastructure of Toronto's Downtown Pedestrian Network
Pierre Belanger
2. The Aesthetics of the Athens Metro Stations
I. Tzouvadakis, D.V. Batsos
3. A Study for the Construction Method, Site Environment and it's Usage of Newly Built Underground Architecture in Japan
Kenji Okuyama
4. Consideration on the Key Elements of Exterior Environment of Underground Public Architectures and Their Integrations
Tao Wu, Zhengru Ruan
5. Understanding Underground Spaces: Archaeological Layering of Building and Excavating Inverted Architectural Spaces
Wendy W. Fok
6. The Urban Road Tunnels and Some Cultural Aspects of the Contemporary City Development
Jacques Sillos
7. Utilization Model of Underground Space to Protect Historical Relics
Zhang Ping, Chen Zhilong, Xu Wei

Session 8: *Innovative tools in underground development (I)*

1. Engineering Characteristics of Rock-Soil Masses and Engineering Suitability Evaluation for Underground Projects
Cao Jiyong, Yuan Zhengru, Wang Hong
2. Optimization of Sunken Road Planning With Environmental Impact Analysis by CFD Simulation
Kong Lingjuan, Chen Zhilong, Cai Hao, Wu Tao
3. Elastoplastic Modeling of the Chimney Failure Potential at the Face of Underground Openings
Z. Agioutantis, P. Viopoulos, S. Maurigiannakis
4. 3D GIS Supporting Underground Urbanisation in the City of Turin (Italy)
Francesca de Rienzo, Pierpaolo Oreste, Sebastiano Pelizza
5. 3D Laser Scanning for the Documentation of Cave Environments
Maria Tsakiri, Kostas Sigizis, Harilaos Billiris, Stefanos Dogouris
6. The Study on Fuzzy Comprehensive Evaluation Method Using in Underground Space Resources Quality Evaluation
Chen Zhilong, Gong Huadong, Wang Yubei, Yuan Zhenru, Yang Hongyu
7. Design and Visualisation of Underground Workings Using Information from Multiple Sources
Grigorios Pasiakos, Diamantenia Moutsika, Aggeliki Chalari, Ioannis Kapageridis

Session 10: *Innovative tools in underground development (II)*

1. Problems of Calculation of Underground Construction on Limiting States of Service Ability
Levan Japaridze
2. Use of Artificial Neural Networks for the Prediction of Tunneling-Induced Ground Movements in Urban Areas
A.S. Kapsampeli, M.G. Sakellariou

2. Research on the Feasibility of Chao Tianmen Cross-River Tunnel Project in Chongqing
Liu Xinrong, Zhong Zuliang, Qian Qihu, Zhang Yongxin
3. Feasibility Study of Underground LNG Storage System in Rock Cavern
So-Keul Chung, Eui-Seob Park, Kong-Chang Han
4. Probe into Control and Guidance System of Underground Space Planning for New Urban Center - An example of Underground Space Planning for the New District Airport in TangShan
Cai Xiani, Chen Zhilong

Session 9B: **Public and the underground space**

1. Public Acceptance of the Athens Urban Underground Metropolitan Railway (Metro)
I. Tzouvadakis, D.V. Batsos
2. Extensions of Indoor Walkways into the Public Domain, a Partnership Experiment
Michel Boisvert
3. Modelling Pedestrian Route Choice Behaviour and Its Application to the Planning of Underground Shopping Streets
Hiroshi Tsukaguchi, Yuki Ohashi
4. Sapporo's Urban Management and Roles of the Underground Path
Yoshihumi Sakakura, Hideyuki Shimizu, Hideyuki Itabashi

Session 11: **Safety and the underground space**

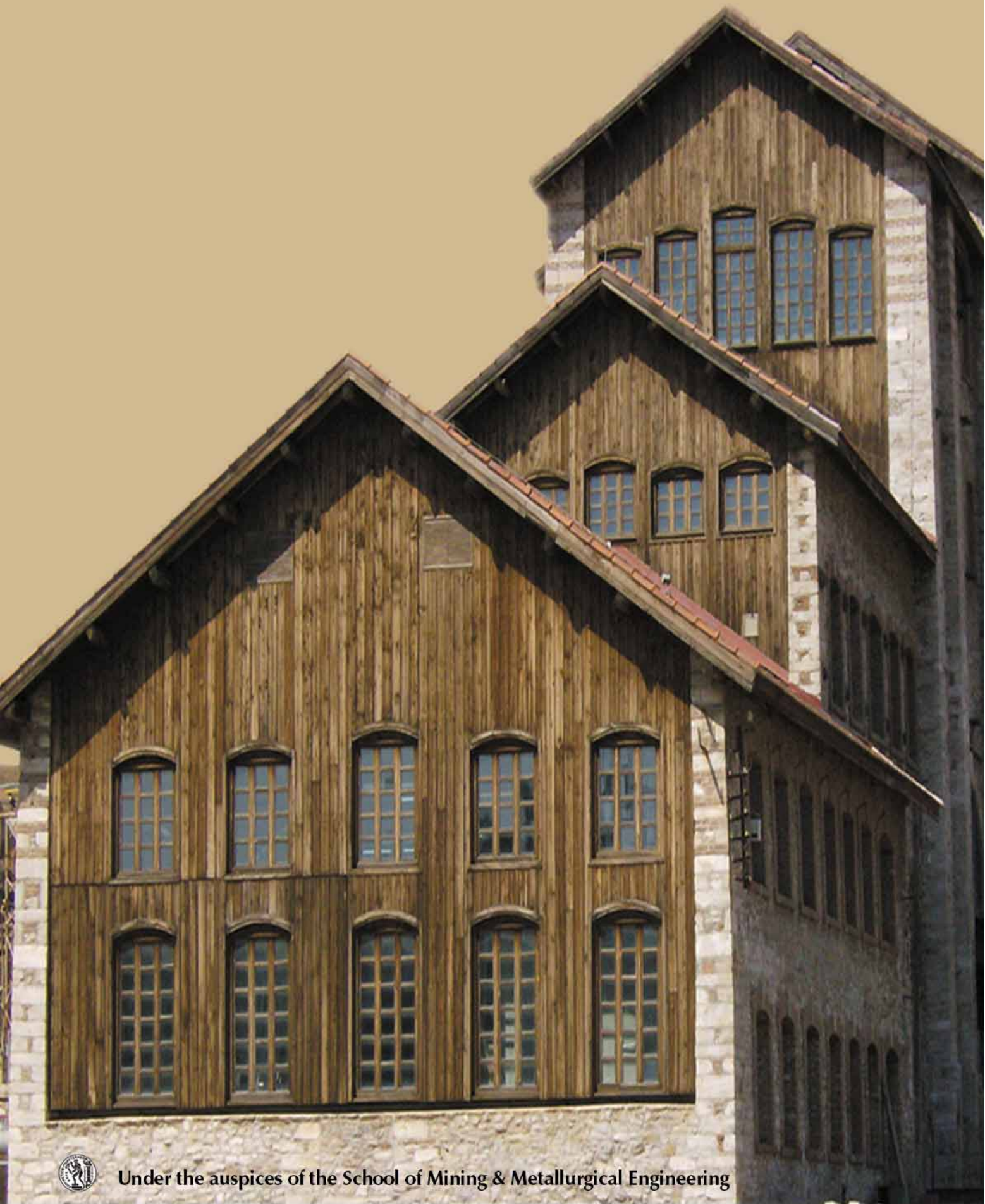
1. Planning of Disaster Prevention Measures in Long Urban Tunnel - Metropolitan Expressway Central Circular Shinjuku Route
Hisamitsu Hanno, Naruhiko Kawada, Tomoaki Okada, Takashi Okano, Tsutomu Hasegawa
2. Re-Designing the Ventilation System to Control Unexpected Strata Gases during Tunnel Construction
Dimitris Damigos, Dimitris Solomos
3. Upgrading The Tokyo Marunouchi District's Disaster-Response Capabilities through Public-Private Cooperation as Deregulation Proceeds
Masaharu Mizuguchi
4. Safety of Employees Engaged in Underground Projects - The Case of the Athens Metro
D.V. Batsos, I. Tzouvadakis

3. Numerical Analysis of the Change in Groundwater System with Tunnel Excavation in Discontinuous Rock Mass
Jung-Wook Park, Bong-Ki Son, Chung-In Lee, Jae-Joon Song
4. The Study of the Pavement Settlement Standard Induced by Shallow Buried Tunnel
Zhang Peng, Tan Zhong-Sheng
5. Permanent Control of Displacements in Tunnels
Carlos Dinis da Gama
6. Numerical Modelling of the Effect of Loading and Timing in Wall Control Applications
P. D. Katsabanis, A.S. Tawadrous
7. Stability of Multi-Jointed Roof Rock Beams in Large Underground Opening
Pavlos P. Nomikos, Paraskevi Youta-Mitra, Alexandros I. Sofianos
8. Effect of Anisotropy on Rock Mass Deformation Modulus in Javeh Dam Site
Habib Aliasghari, Bahman Ahadi
9. The Effect of Ground Water and Its Prediction Methods and Techniques during Tunnel Construction
Jian Yang, Xin Qiang Li, Wei Ping Yu, Yu Jie Wang

Session 12: **Improving the underground habitat**

1. Subjective Evaluation of Noise in Underground Train Stations in Athens; Multi-dimensional Description of Evaluations
A.G. Sotiropoulou, G. Poulakos, I. Tzouvadakis
2. Minimization Solutions for Vibrations Induced by Underground Train Circulation
Carlos Dinis da Gama, Gustavo Paneiro
3. A Study on Space Reorganization / Use Strategy for Municipal Renovation - An Example of Yaesu Area at Eastern Side of Tokyo Station
Satoshi Ohmura, Masatoshi Kawachi
4. Design of Ventilation for a Highway Tunnel in a Very Crowded Urban Area
Morteza Gharouni-Nik





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