

Session ID: GEO-1

Title

RECENT ADVANCES IN THE SEISMIC DESIGN, RISK ASSESSMENT AND MANAGEMENT OF TUNNELS AND UNDERGROUND INFRASTRUCTURES

Convenors

K. Pitilakis ¹, H.-T. Yu ², R. Wang ³

Description

Urban development in densely populated areas and the construction of new high speed transportation infrastructures strongly motivated the expand of tunneling construction and the rapid exploitation of metropolitan systems and underground spaces. Tunnels within mega transportation projects are often exposed to strong earthquakes associated to very high ground motions and permanent ground displacements when crossing seismic faults or other unstable and precarious geological conditions. On the other hand, the typology of underground structures at urban environment is continuously evolving, complex mega structures like complex metro stations, parking stations often combined with huge market places, are conceived, new structural components are developed, like joints capable to accommodate large differential strains and distortions, structure types such as fully precast structures, and many more, are being conceived, designed, sometimes tested and finally used. All these challenging constructions should be designed and constructed with the highest safety standards for long operational periods.

The proposed technical session aims to present and discuss recent advances in the seismic design and risk assessment of tunnels and underground structures under these new and challenging conditions. The main topics of the TC may include, but not exclusively:

- Novel methods and technologies on seismic design and construction aspects of tunnels and underground infrastructures
- Development on seismic performance and evaluation criteria for tunnels and underground structures in the context of urban metropolitan systems
- Advanced methodologies for seismic analysis of tunnels and underground structures in adverse geological conditions and high seismic risk areas
- Monitoring aspects and large-scale experimental tests
- Recent progress on the seismic design of tunnels crossing active seismic faults, liquefaction prone areas, etc.
- Seismic risk assessment of tunnels, metropolitan infrastructures and large underground large spaces
- Resilience-based seismic design and evaluation methods
- Seismic interaction of tunnels and aboveground structures at city scale
- Seismic codes and construction guidelines
- Presentation of best examples and construction practices

Invited Speakers

E. Billota ⁴, A. Bobet ⁵, X. Bao, X. Du ⁶, H. Zhuang ⁷, D. Zhang, E. Taciroglu ⁸, G. Tsinidis ¹, I. Anastasopoulos ⁹, R. Fuentes ¹⁰, S. Argyroudis, M.R. Filomena ¹¹, S. Dashti ¹², D. Park ¹³

Affiliations

¹ Aristotle University, Thessaloniki, Greece, ² Tongji University, Shanghai, China, ³ Tsinghua University, Beijing, China, ⁴ University of Naples Federico II, Napoli, Italy, ⁵ Purdue University, Purdue, USA, ⁶ Beijing University of Technology, Beijing, China, ⁷ East China Jiaotong University, Nanchang, China, ⁸ University of California, Los Angeles, USA, ⁹ ETH Zurich, Zurich, Switzerland, ¹⁰ University of Aachen, Aachen, Germany, ¹¹ University of Catania, Catania, Italy, ¹² University of Colorado Boulder, Boulder, USA, ¹³ University of Hanyang, Seoul, South Korea