

VIRTUAL TALK VIA 'ZOOM PLATFORM' ON

“TUNNELING IN JAPAN UNDER CHALLENGING GEOLOGICAL CONDITIONS”

Saturday | 31 July 2021 | 09.00 a.m. – 11.00 a.m.

SYNOPSIS 1

“Watertight Tunnel Construction with Peripheral Grouting”

The Kitanomine Tunnel is a 2928 m long tunnel in Furano City, as part of the Asahikawa-Tokachi Road running N-S in central Hokkaido, Japan. The geology of the Kitanomine Tunnel mainly comprised of mudstone, welded tuff and alluvial fan deposits, causing additional challenges for tunnel excavation. The area was also rich in water resources and thus a part of the tunnel was designed as watertight structure to mitigate the environmental impact.

The presentation will address the following:

- Pre grouting design before tunnel excavation and complex grouting implementation
- Tunnel excavation procedure at watertight section with full circle cross section
- Water ingress during construction and groundwater recovery after completion

SPEAKER 1

Mr. Kensuke Date has 25+ years of experience in tunnelling and geotechnical engineering. He graduated from the University of Tokyo and then has worked for Kajima Corporation, one of the largest construction companies in Japan.

He has published a lot of peer-reviewed papers on tunnelling in journals and international conferences. He has served as a tunnelling specialist and design manager in challenging projects, including the Kitanomine tunnel passing through an artesian aquifer with watertight tunnel support.



SYNOPSIS 2

“Deformation Controlled Tunnel Support for High Overburden Tunnels”

To prevent large tunnel deformations caused by the rock bursts or the squeezing ground conditions, the rock bolts should satisfy both strength capacity and the required deformability. Energy-absorbing rock bolts, such as the cone bolt and D bolt, have been successfully utilised in deep mining to avoid sudden tunnel collapses. However, a rigid type rock bolt (e.g. a fully grouted rock bolt) is still commonly used in civil engineering tunnels even when they are excavated under a high overburden pressure with poor geological conditions. In such cases, the rock bolt might fail in tension due to the large deformation. Therefore, we proposed a new energy-absorbing rock bolt, which is referred to as a deformation-controlled rock bolt (DC-bolt). The performance of the proposed DC-bolt was verified by the numerical simulations using the discontinuous deformation analysis (DDA) and by the prototype laboratory tests. We concluded that the DC-bolt possesses both the high loading capacity and the deformable capacity. Additionally, the DC-bolt can limit the rock surface movement when it reaches a certain displacement; thus, it can be a useful tunnel support for civil engineering tunnels excavated under the squeezing ground condition.

SPEAKER 2



Dr Yasuhiro Yokota is currently a senior research engineer of Kajima Technical Research Institute Singapore (KaTRIS). He has pursued his undergraduate and master program in the Department of Civil Engineering at Kobe University, Japan. After graduating in 2006, he started to work at Kajima Technical Research Institute, Kajima Corporation in Japan.

He has mainly worked in the field of tunnel engineering and rock mechanics related projects primarily working on new tunnelling supports and Geological surveying technologies. Also, he experienced a large tunnel project in Japan as a technical manager for two years. After returning from the construction site in 2015, he moved to Singapore, for his PhD program at Nanyang Technological University (NTU). After being involved in the collaborative research between NTU and Kajima, he came back and started to work at KaTRIS from 2019. He received many awards and is being awarded the Rocha Medal 2021 by International Society for Rock Mechanics and Rock Engineering.

Registration Fees (effective 1st August 2020)

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