

SEMINAR:

# Graduate Student Research Talks

## EXPERIMENTAL STUDY ON THE BEHAVIOR OF FOAM AND FOAM-CONDITIONED SOIL UNDER PRESSURE



Proper soil conditioning is critical for effective EPB TBM tunneling. The formation soil at the cutterhead must be transformed into a highly compressible, low shear strength and low permeability paste within the excavation chamber to allow optimal EPB performance. This presentation will introduce the experimental research on soil conditioning, which mainly focuses on the properties of foam and foam-conditioned soil under pressure.

**Yuanli Wu** is a Ph.D. candidate in Civil and Environmental Engineering at Colorado School of Mines. She is working with Mike Mooney and her research area is soil conditioning in EPB TBM tunneling.

## EFFICIENT HYDRO-MECHANICAL SIMULATION OF EMBANKMENT LOADING ON FOUNDATION AND TUNNELS IN SATURATED GROUND



Embankment loading on foundation or tunnel in saturated ground induces hydraulic and mechanical responses through pore pressure and stress and displacement changes. Explicit numerical techniques to simulate this hydro-mechanical (H-M) interaction can be time-consuming for long-term analysis because small time steps must be used. This talk will present a novel finite difference (FD) scheme that can remove the time step restriction on the flow calculation of a H-M problem to improve the efficiency of the simulation. The scheme is based on the newly-derived high-order alternating direction explicit technique for non-uniform grids. The new scheme is implemented in the commercial FD program FLAC to simulate the effect of embankment loading on foundation and tunnel in saturated ground. Results show that the new scheme can reduce computer runtime to 40-66% that of FLAC's explicit fluid flow scheme, yet still maintain the maximum absolute errors below 5% for the pore pressure and displacement solutions.

**Simon Prassetyo** is a Ph.D. candidate in Civil and Environmental Engineering, supervised by Marte Gutierrez. His research focuses on developing an efficient numerical solution to hydro-mechanical response of tunneling in saturated ground. Simon received his MS degree in Mining Engineering from West Virginia University and BS degree in Mining Engineering from Bandung Institute of Technology, Indonesia.

**Wednesday, September 28**

**12:00 p.m.\***

**BE 108**

\*LUNCH WILL BE PROVIDED



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