
Contribution ID: **420** Type: **Oral Presentation**

# Microbial Induced Desaturation and Precipitation (MIDP) in Stratified Granular Soil

*Monday, 31 May 2021 15:55 (15 minutes)*

A meter-scale tank test simulating two-dimensional plane strain conditions was performed to evaluate the effectiveness of microbially induced desaturation & precipitation (MIDP) through denitrification for ground improvement applications in stratified soils. The process stimulates indigenous nitrate-reducing bacteria through the injection of a solution containing nitrate, calcium and a dissolved organic carbon source and results in the production of biogenic gas, biominerals and biomass. Entrapped gas bubbles can dampen pore pressures under cyclic loading, while biominerals form cementing bridges between existing grains, making MIDP a viable ground improvement technique for liquefaction hazards in granular soils. Desaturation of the soil requires a much lower amount of treatment than precipitation, however, precipitation may provide a more durable stabilizing effect as the entrapped gas may migrate and vent to the atmosphere. Previous studies have demonstrated the mechanical response for treated granular soils at bench scale, however limited knowledge is available on the impact of partial desaturation on the hydraulic properties of the soil, particularly in stratified formations. Further investigation into this area is important for the up-scaling and future commercialization of the process as it may affect injection strategies, and the distribution of substrates and metabolic products. The process was monitored in terms of changes in electrical conductivity, moisture content, pore pressure and flow velocity. The results demonstrate how stratification affects the process performance and identify the challenges associated with treatment of layered soil systems.

## Time Block Preference

Time Block C (18:00-21:00 CET)

## References

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