Contribution ID: **589** Type: **Poster + 3 Minute Pitch**

Use of Biogenic Gas Production as a Pre-Treatment to improve the Efficiency of Dynamic Compaction

Monday, 14 May 2018 15:40 (2 minutes)

One of the most economical and viable methods of soil improvement is dynamic compaction. However, dynamic compaction can only be applied on deposits where the degree of saturation is low and the permeability of the soil mass is high to allow for good drainage. The technique does not work very well on soils having a large content of fines. Also dynamic compaction produces lateral ground vibrations which can travel far from the construction site, which can discomfort the people living close to these areas. The current research aims to develop a new technology to desaturate saturated soils using the process of MIDP –Microbially Induced Desaturation and Precipitation through nitrate reduction, which extend the use of dynamic compaction as a ground improvement technique to saturated soil conditions and soils with higher fines content. To evaluate the feasibility of this technology an experimental program has been performed, in which soil columns have been treated with MIDP. In this process, indigenous micro-organisms are stimulated to convert nitrate into nitrogen gas, which desaturates the soil. After the process has finished, dynamic loading is applied to the soil columns. During the MIDP process and during the dynamic loading, the deformation and pore pressures area measured for various amounts of compactive effort and compared with the non-treated soil. Based on the experimental results the feasibility of the proposed technology is discussed.

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Session Classification: Parallel 2-B

Track Classification: MS 4.03: Applications of biochemical modification of porous media